



2009-2011  
Graduate Course Catalog

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# Academic Calendar

<b>Fall Semester</b>	<b>2009</b>	<b>2010</b>
Classes begin	Aug 24	
Labor Day holiday	Sept 7	
Veterans' Day holiday	Nov 11	
Thanksgiving Vacation	Nov 23-27	
Final Examinations, Monday through Friday	Dec 14-18	
Final grades due, 5:00 p.m.	Dec 22	
<b>Spring Semester</b>	<b>2010</b>	
Classes begin	Jan 11	
Martin Luther King Jr. Day holiday	Jan 18	
Presidents' Day holiday	Feb 15	
Spring Vacation	Mar 15-19	
Final Examinations, Monday through Friday	May 3-7	
Commencement	May 8	
Final grades due, 5:00 p.m.	May 11	
<b>Summer Semester</b>	<b>2010</b>	
Early Session begins	May 10	
Memorial Day holiday	May 24	
Eight-Week Session begins	June 7	
Late Six-Week Session	June 21	
Independence Day	July 5	
Summer Session ends	July 30	
Final grades due, 5:00 p.m.	Aug 3	

# Administration of Washington State University

## Executive Officers

Elson S. Floyd President

Warwick Bayly, Interim Provost and Executive Vice President

## Board of Regents

[www.regents.wsu.edu](http://www.regents.wsu.edu)

## WSU Administration

[publishing.wsu.edu/mailingservices/admin.html](http://publishing.wsu.edu/mailingservices/admin.html)

## Academic Deans

Warwick M. Bayly	College of Veterinary Medicine
Daniel J. Bernardo	College of Agricultural, Human, and Natural Resource Sciences
Candis Claiborn	College of Engineering and Architecture
Harold A. Dengerink	Chancellor, WSU Vancouver
Howard D. Grimes	Graduate School
Michael Griswold	College of Sciences
Patricia Butterfield	College of Nursing
James P. Kehrer	College of Pharmacy
Paul Whitney, Interim	College of Liberal Arts
Vicky Carwein	Chancellor, WSU Tri-Cities
Judy N. Mitchell	College of Education
Brian Pitcher	Chancellor, WSU Spokane
Eric Spangenberg	College of Business
Libby Walker, Interim	University Honors College

# Graduate Education at Washington State University

Washington State University, the land-grant institution of the State of Washington, was founded in 1890. The first class of twenty-one students enrolled on January 13, 1892. Since that time, the University has grown steadily in size and diversity into an institution of nine colleges and a Graduate School, with a total enrollment for all campus locations of over 20,000. The main campus of nearly 600 acres, located at Pullman in the Palouse country of southeastern Washington, encompasses one of the largest residential universities west of the Mississippi, with more than 80 per cent of all students living on or near campus. In addition to the main campus, Washington State University offers courses of study at three regional campuses located in Spokane, Tri-Cities (Richland), and Vancouver. Further, the University maintains over 5,000 acres of farmlands and eight agricultural research centers located at various points in the state.

Washington State University offers more than 70 degree programs. Permanent tenure track faculty numbers over 1,000 and is drawn from the faculties of the nine academic colleges. Approximately 70 percent of all full-time graduate students hold positions as teaching, research, and/or staff assistants.

The University granted its first graduate degree, a Master of Science in Botany, to William Hurford Lawrence in 1902. Graduate degrees were granted occasionally in history, economics, English, and the sciences through the first thirty years of the century, but not until the 1930s did the Graduate Division begin to emphasize the importance of graduate education and to coordinate graduate programs.

The Dean of the Graduate School administers the diverse graduate programs throughout the University. The faculty is primarily responsible for directing graduate education. The Graduate Studies Committee of the Faculty Senate, composed of faculty members and graduate students, assists the Graduate School in the establishment of the policies and procedures of the Graduate School.

The Graduate School is committed to helping graduate students become learned scholars, effective researchers, and masters of disciplinary and interdisciplinary knowledge. To these ends, the faculty emphasizes both independent scholarship and research, and classroom learning. State-of-the-art equipment for the conduct of research is present in the research centers and academic departments. Student enrollments in graduate classes and seminars are limited, ensuring an active exchange between student and professor. The close relationships between students and faculty members and common aims of all involved in graduate education create an atmosphere that stimulates intellectual curiosity. The individualized nature of graduate education at Washington State University also provides students with considerable flexibility in designing programs of study, and broadens the possibilities for unique creative endeavors.

The Graduate School may be contacted at  
PO Box 641030  
Pullman, WA 99164-1030  
509-335-6424  
E-mail: [gradsch@wsu.edu](mailto:gradsch@wsu.edu)  
[www.gradschool.wsu.edu](http://www.gradschool.wsu.edu)

# Graduate Degrees

Degree Programs -- Programs of study leading to graduate degrees are offered in the following fields of study: [S=Spokane, T=Tri Cities, V=Vancouver; all degrees are offered on Pullman campus unless \*]

Accounting, MAcct  
Agriculture, MS  
Agricultural Economics, PhD  
American Studies, MA, PhD  
Animal Sciences, MS, PhD  
Anthropology, MA, PhD  
Apparel, Merchandising, Design and Textiles, MA  
Applied Economics, MA  
Architecture, MS, MArch (S)  
Biological and Agricultural Engineering, MS, PhD  
Biology, MS (T)  
Botany, MS, PhD  
Business Administration, MBA (T, V); PhD  
Chemical Engineering, MS, PhD  
Chemistry, MS, (T); PhD  
Civil Engineering, MS, PhD  
Communication, MA, PhD  
Computer Engineering, MS  
Computer Science, MS (T,V); PhD  
Criminal Justice, MA (S); PhD  
Crop Science, MS, PhD  
Design, DDes (S\*)  
Economics, PhD  
Education  
EdM, MIT (S, T, V)  
MA (T)  
EdD (S, T, V); PhD  
Electrical and Computer Engineering, PhD  
Electrical Engineering, MS (S, T)  
Engineering, MS  
Engineering and Technology Management, MEngMgt (S, T, V)\*  
Engineering Science, PhD  
English, MA, PhD  
Entomology, MS, PhD  
Environmental and Natural Resource Sciences, PhD  
Environmental Engineering, MS (V)  
Environmental Science, MS (T, V)  
Exercise Science, MS (S\*)  
Fine Arts, MFA  
Food Science, MS, PhD  
Foreign Languages and Cultures, MA  
Genetics and Cell Biology, MS, PhD [should this be under molecular biosciences]  
Geology, MS, PhD



Health Policy and Administration, MHPA (S\*)  
History, MA (V); PhD  
Horticulture, MS, PhD  
Human Development, MA  
Human Nutrition, MS  
Individual Interdisciplinary, PhD  
Interior Design, MA (S\*)  
Landscape Architecture, MS (S)  
Materials Science, PhD  
Materials Science and Engineering, MS  
Mathematics, MS, PhD  
Mechanical Engineering, MS (T, V); PhD  
Molecular Biosciences, MS, PhD  
Molecular Plant Sciences, MS, PhD  
Music, MA  
Natural Resource Sciences, MS  
Neuroscience, MS, PhD  
Nursing, MNurs (T, V); PhD  
Pharmacology and Toxicology, MS, PhD  
Philosophy, MA  
Physics, MS, PhD  
Plant Pathology, MS, PhD  
Political Science, MA, PhD  
Psychology, MS, PhD  
Public Affairs, MPA (V\*)  
Sociology, MA, PhD  
Soil Science, MS, PhD  
Speech and Hearing Sciences, MA (S\*)  
Statistics, MS  
Veterinary Science, MS, PhD  
Zoology, MS, PhD

The above fields of study are offered through the Colleges as indicated below:

### **College of Agricultural, Human, and Natural Resource Sciences**

Agriculture, MS  
Agricultural Economics, PhD  
Animal Sciences, MS, PhD  
Apparel, Merchandising, Design, and Textiles, MA  
Applied Economics, MA  
Crop Science, MS, PhD  
Economics, PhD  
Entomology, MS, PhD  
Environmental and Natural Resource Sciences, PhD  
Food Science, MS, PhD  
Horticulture, MS, PhD  
Human Development, MA  
Interior Design, MA (S\*)

Landscape Architecture, MS (S)  
Molecular Plant Sciences, MS, PhD  
Natural Resource Sciences, MS  
Natural Resources, MS  
Plant Pathology, MS, PhD  
Soil Science, MS, PhD  
Statistics, MS

### **College of Business**

Accounting, MAcct  
Business Administration, MBA (T,V); PhD  
Executive MBA

### **College of Education**

Education  
EdM, MIT (S,T,V)  
MA (T)  
EdD (S,T,V); PhD

### **College of Engineering and Architecture**

Architecture, MS, MArch (S)  
Biological and Agricultural Engineering, MS, PhD  
Chemical Engineering, MS, PhD  
Civil Engineering, MS, PhD  
Computer Engineering, MS  
Computer Science, MS (T, V\*); PhD  
Electrical and Computer Engineering, PhD  
Electrical Engineering, MS (S,T)  
Engineering, MS  
Engineering and Technology Management, MEngMgt (S,T,V)\*  
Engineering Science, PhD  
Environmental Engineering, MS (T)  
Materials Science, PhD  
Materials Science and Engineering, MS  
Mechanical Engineering, MS (T, V\*); PhD

### **Intercollegiate College of Nursing**

Nursing, MNurs (T, V); PhD

### **College of Liberal Arts**

American Studies, MA, PhD  
Anthropology, MA, PhD  
Communication, MA, PhD  
Criminal Justice, MA (S); PhD  
English, MA, PhD  
Fine Arts, MFA  
Foreign Languages and Cultures, MA

History, MA (V), PhD  
Music, MA  
Philosophy, MA  
Political Science, MA, PhD  
Public Affairs, MPA (V\*)  
Psychology, MS, PhD  
Sociology, MA, PhD  
Speech and Hearing Sciences, MA (S\*)

### **College of Pharmacy**

Health Policy and Administration, MHPA (S\*)  
Neuroscience, MS, PhD  
Pharmacology and Toxicology, MS, PhD

### **College of Sciences**

Biology, MS (T)  
Botany, MS, PhD  
Chemistry, MS (T); PhD  
Environmental Science, MS (T, V)  
Genetics and Cell Biology, MS, PhD  
Geology, MS, PhD  
Materials Science, PhD  
Mathematics, MS, PhD  
Microbiology, MS, PhD  
Pharmacology and Toxicology, MS, PhD  
Physics, MS, PhD  
Statistics, MS  
Zoology, MS, PhD

### **College of Veterinary Medicine**

Neuroscience, MS, PhD  
Veterinary Science, MS, PhD

The following fields of study are interdisciplinary in nature and are offered through two or more colleges, thus providing a broad base for graduate training:

Design, DDes (S\*)  
Engineering and Technology Management, M EngMgt (S,T,V)\*  
Environmental and Natural Resource Sciences, PhD  
Exercise Science, MS (S\*)  
Individual Interdisciplinary, PhD  
Materials Science, PhD  
Molecular Plant Sciences, MS, PhD  
Neuroscience, MS, PhD  
Pharmacology and Toxicology, MS, PhD  
Public Affairs, MPA (V\*)  
Statistics, MS

## **Certificates**

Agribusiness  
Biotechnology Management  
Constraints Management  
Construction Project Management  
Engineering Nanotechnology  
Exercise Science  
General Engineering and Technology Management  
Global Justice and Security Studies  
Interdisciplinary Environmental Biogeochemistry  
Manufacturing Leadership  
Optoelectronics  
Project Management  
Protein Biotechnology  
Reproductive Biology  
Six Sigma Quality Management  
Supply Chain Management  
Sustainable Agriculture  
Systems Engineering Management

## **Doctor of Design**

The Doctor of Design is offered through the Interdisciplinary Program at the Interdisciplinary Design Institute at WSU Spokane. The program is a collaborative effort among the School of Architecture, the Department of Interior Design and the Department of Horticulture and Landscape Architecture. The DDes program is intended to advance both the “art” and “science” of design within the philosophical and pedagogical framework of interdisciplinary inquiry, critical synthesis, and problem solving. At the same level of academic standards as the PhD program, the DDes focuses on applied research and emphasizes the advancement of knowledge in the design disciplines. It is intended for persons who are well versed and professionally advanced in the design profession and who seek to make original contributions to their fields.

## **Doctor of Philosophy**

The degree of Doctor of Philosophy (PhD), the highest earned academic degree offered by American universities, is awarded in recognition of distinctive scholarship and original contributions to knowledge. Thus, although formal courses are required in programs leading to the PhD, the award is made primarily for creative scholarship rather than for the accumulation of credits in courses. The Board of Regents of Washington State University has authorized the granting of the degree Doctor of Philosophy in 42 academic fields.

Study for the degree of PhD falls into two rather clearly defined periods, the pre-candidate period and the candidate period.

During the pre-candidate period the student acquires most of the preparation necessary for research, completes most of the formal courses, acquires the necessary background expected in the chosen field, and satisfies departmental requirements. In some departments, the student may be required to pass a qualifying examination; in some, research may be begun during this period. The pre-candidate period terminates when the student passes the preliminary examination, thereby becoming a candidate for the PhD.

The candidate period is devoted largely to research and the preparation of the dissertation. During

this period, the student demonstrates the qualities of a creative scholar. It is at this time that the relationship between the advisor and the candidate reaches its maximum development. This period terminates when the candidate passes the final examination, including defense of the dissertation, and has the dissertation accepted by the Graduate School.

### **Doctor of Education**

The Doctor of Education (EdD) degree—different from the PhD in Education—is designed to provide training for students interested in the practice of education. Demonstrated ability in some service phase of education is a prerequisite to candidacy for this degree. There is no foreign language reading requirement for this degree, but the course requirements and procedures are similar to those for the PhD in education.

### **Master of Arts and Master of Science**

The MA and MS degrees are awarded to graduate students who demonstrate substantial scholarly achievement beyond the baccalaureate level. This achievement represents more than the mere accumulation of additional credit, for the student is expected to demonstrate an integrated knowledge of the chosen discipline. In most departments the student is expected to demonstrate research competence in the form of a thesis. In some departments, a non-thesis option is available by which it may be replaced with additional course work and a special project.

### **Additional Master's Degrees**

Master in Teaching  
Master of Accounting  
Master of Architecture  
Master of Business Administration  
Master of Education  
Master of Engineering and Technology Management  
Master of Fine Arts  
Master of Health Policy and Administration (S\*)  
Master of Nursing (T, V)  
Master of Public Affairs (V\*)

# Facilities

## The Libraries

[www.wsulibs.wsu.edu](http://www.wsulibs.wsu.edu)

The Libraries system is an integral part of WSU's educational resources. The Libraries' collection contains in excess of 7 million items including over 2 million volumes and more than 28,000 serials publications (scientific, scholarly, and specialized journals and periodicals); regional and national newspapers; foreign, federal, state, and municipal documents; United Nations publications; and other materials in a variety of print, electronic, multimedia, and micro formats.

The Libraries' online catalog, *Griffin*, provides access to information on books, journals, documents, media materials and select electronic resources available through the Libraries. *Summit*, a joint catalog that WSU shares with 33 academic libraries in Washington and Oregon, provides an online requesting service for book delivery at participating campuses.

The Libraries provide Web access to a wide variety of electronic indexes and abstracts, as well as thousands of full-text electronic journals and books. Librarians provide personal assistance and online and email reference to users of these traditional and electronic collections, offer instruction on use of library resources, work with teaching faculty to develop the collections, and provide access to materials from other libraries.

**The Holland/Terrell Library**, the largest of six Pullman-campus libraries, provides extensive collections in the social sciences, business, fine arts, and the humanities, as well as sophisticated service components designed to assist students, faculty, and researchers. **Manuscripts, Archives, and Special Collections** contain rich collections of primary resource materials including books, manuscripts, maps, photographs, and digital collections to support study and research in a number of fields, including Pacific Northwest history, modern British literature, regional publishing, veterinary history, agricultural history, wildlife and outdoor recreation, WSU history, and other subjects. **Media Materials & Reserves** houses equipment and provides CDs, DVDs, videotapes, films, slides, audio tapes and other media for classroom instruction and for personal checkout, as well as housing course Reserves. Special media collections include the WSU-UI Regional Media Collection, the McCaw Classic Feature Films, Gnaedinger Historical Films, Pitzer Classic Radio Tapes, and others.

The **Owen Science and Engineering Library** supports study and research in the pure and applied sciences with substantial traditional and electronic collections in these disciplines. The Owen Library's wireless Commons has Microsoft Office workstations, fast Internet connections, hotwired carrels, a reference/info center, and collaborative learning areas.

The collections of the **George W. Fischer Agricultural Sciences Library** in Johnson Hall Annex emphasize support for plant and entomological sciences.

The biomedical collections and services offered by the **Health Sciences Library**, located in Wegner Hall, primarily support the instructional and research needs of the College of Veterinary Medicine and the College of Pharmacy.

The **George B. Brain Education Library** in Cleveland Hall offers a wide range of materials and services to meet research and instructional needs from preschool through higher education and adult education.

The **Architecture Library**, which supports programs in the School of Architecture, is located in Carpenter Hall. In addition, library facilities and services are available at the Spokane, Tri-Cities, and Vancouver regional campuses, and at the Intercollegiate College of Nursing (Spokane) and the WSU Energy Library (Olympia). Library services for students enrolled in the Distance Degree Program or other distance learning programs are available via toll-free telephone, email, and/or web-based services.

The WSU Libraries are open throughout the year, although hours vary during intersessions and holidays. Visit [www.wsulibs.wsu.edu](http://www.wsulibs.wsu.edu) for detailed information on library resources, services and hours.

### **Computing Services/ Information Technology** **[infotech.wsu.edu](http://infotech.wsu.edu)**

**Academic Computing Services** For information about these services please contact Phil Scuderi, Academic Services Manager at 335-0408.

**Academic Computing Facility (ACF)** For additional information, contact the Computing Information Center (335-0411). Various handouts are available free of charge; certain other manuals and publications are sold at the Personal Computing Center. Training courses, both free and fee-based, are available.

### **Museums and Collections**

#### *College of Agricultural, Human, and Natural Resource Sciences*

The **Minnie Barstow Drucker Memorial Collection** of Oriental art is maintained by the Department of Apparel, Merchandising, Design, and Textiles. The Drucker Collection consists of Oriental furniture, accessories, art, textiles, and costumes. The collection was given to the University in 1944 by the late Arthur Eilert Drucker in memory of his wife. The Chinese, Korean, and Japanese artifacts were collected during the years the Druckers made the Orient their home. The collection is in storage in the Holland Library and managed by the Apparel, Merchandising, and Textiles Program. Contact the Department of Apparel, Merchandising, Design, and Textiles, 335-3823.

The **Historic Textiles and Costume Collection** contains approximately 4,000 items of women's, children's, and men's clothing and costume accessories from 1935 to the present, and quilts and woven coverlets. It also contains a limited number of ethnic textiles and costumes from around the world. The collection is housed in Kruegel Hall. Contact the Department of Apparel, Merchandising, Design, and Textiles, 335-3823.

One of the largest insect collections in the Pacific Northwest, the **Maurice T. James Entomological Collection** houses over one and a half million insect specimens and an extensive working library. Adults and immature stages of all insect groups and many related arthropods are represented with particular strengths in the flies, beetles, and butterflies. Primarily of regional significance, the collection also includes considerable material from the New World tropics, eastern North America, and Europe. The collection functions essentially as a research facility by providing specimens on loan to recognized scientists worldwide, by offering identification services to University extension entomologists, and by serving as a repository of type specimens and other materials. The collection room is located in the Food Science and Human Nutrition building, Room 157. Contact Dr. Richard Zack at 335-3394 to arrange a tour and presentation.

The **Mycological Herbarium** was founded by Frederick D. Heald, the first chair of the Department of Plant Pathology, in 1915. It now contains more than 70,000 specimens of fungi, including representative materials of all the major groups from the slime molds and true molds to the larger, fleshy mushrooms. The parasitic fungi of northwestern North America have been emphasized; however, through exchange and purchase, representative materials of all groups from all over the world have been incorporated. Loans are freely available to individuals associated with recognized botanical institutions anywhere in the world. The Herbarium is maintained by the Department of Plant Pathology and is located on the third floor of Johnson Hall. Specialists wishing to utilize the facilities are welcome and are asked only to inform the Department of Plant Pathology, 335-9541, in advance.

The **Henry W. Smith Soil Monolith Collection** contains more than 150 preserved soil profiles, some as much as eight feet in length, representing soils from all of the geographic regions in the State of Washington and nine of the eleven soil Orders in Soil Taxonomy. Soils that are particularly well represented in the collection are those of the Palouse region and those from eastern and central Washington that contain layers of volcanic ash from the many prehistoric and historic eruptions of volcanoes in the Cascade Region. The collection is the work of Dr. Henry W. Smith, Emeritus Professor of Soils at Washington State University. The soil monoliths constitute a very valuable resource for both teaching and research within the Department of Crop and Soil Sciences. The collection is located in Johnson Hall 114, and may be viewed from an observation window any time the building is open. Persons interested in touring the collection should contact Dr. Alan Busacca at 335-1859.

#### *College of Liberal Arts*

Permanent exhibits at the **Museum of Anthropology** illustrate topics in human biological and cultural evolution and the culture of the native people of the Columbian Plateau. The museum houses archaeological collections from the interior Northwest that represent a record of the last 11,000 years of human occupation. This is the most extensive collection of archaeological materials from the Columbian Plateau, and it forms an important research resource for those interested in this region's archaeological history. Research collections representing faculty archaeological research in the Southwestern U.S. are also maintained. In addition, there are important collections of historic period Native American basketry from several parts of western North America.

The museum located in 110 College Hall is open Monday through Friday during the academic year, plus selected Saturdays. About 4,500 people visit the museum each year. The museum staff includes Dr. William Andrefsky Jr., Director, and Dr. Mary Collins, Associate Director.

#### *College of Sciences*

The **Charles R. Conner Museum**, located in Abelson Hall, exhibits fish, amphibians, reptiles, and several hundred mounted birds and mammals, including deer, antelope, mountain sheep, mountain goat, cougar, and small species. The display collection is open to the public from 8:00 am-5:00 pm weekdays.

The **Culver Display**, located in Webster, houses the **Jacklin Petrified Wood Collection**. This spectacular collection contains more than 2,000 cut and polished specimens of petrified wood from all major localities in the western United States. It is the largest display of its kind in the western United States. Also included in the Collection is a large selection of cut and polished agate, geodes, and dinosaur bone. The Culver Collection includes over 100 classic rock and mineral specimens from localities throughout the world. Both the Jacklin and Culver Collections may be viewed weekdays, 8:00 am-5:00 pm. Tours may be arranged by calling the Department of Geology, 335-3009.

The **Marion Ownbey Herbarium** is an internationally recognized resource for research, teaching, and service. The Herbarium houses 300,000 plant specimens, primarily from the Pacific Northwest, but including worldwide collections. In addition to native vascular plants and weeds, the Herbarium contains mosses, liverworts, lichens, and special collections of seeds and cultivated plants. The Herbarium is located in Heald G-9 and is open weekdays from 8:00 am-5:00 pm and by appointment, 335-3250.

#### *College of Veterinary Medicine*

The **Worthman Veterinary Anatomy Teaching Museum** features several hundred specimens of mammals and several exhibits of fowl. The collection consists primarily of domesticated animals, since they represent the species most important to veterinary medical education and research, yet a few wild species are included also. The only one of its kind in the nation, the Museum offers a unique learning environment. It is used extensively for teaching purposes in classes of anatomy, radiology,



and surgery, and it serves as a reference tool for current research by veterinary medicine faculty members. The Museum is located on the second floor of Wegner Hall. For information, call 335-6621.

### *Museum of Art*

The **Museum of Art** was established in 1974 around a core collection of American paintings assembled by former President E. O. Holland and former WSU Regent Charles Orton. Dedicated to serving the educational purposes of WSU and the people of the State of Washington, the Museum operates a program which embraces a wide variety of changing exhibitions ranging from antiquity to the contemporary, from design and photography to sculpture and painting, by internationally, nationally and regionally known artists. Many of the exhibits originated by the Museum staff have toured the nation. The Museum offers a wide variety of speakers, films, and special programs throughout the year.

The Museum's collection of American 19th and 20th century paintings, drawings, and prints has grown in the past years through financial donations and important gifts from collectors and alumni in the Northwest. In 1975, the Museum of Art was a founding member of the Washington Art Consortium, a cooperative venture by four small museums to build a major national collection of works on paper by American artists. The Museum's consortium activities have provided an added focus to its own collecting of works on paper.

The Museum's programs are free and open to the public. For information, call 335-1910.

## **Research**

### **Research Support Units**

The **Office of the Campus Veterinarian (Laboratory Animal Resources Center)** is the central coordinating facility for the care, production, procurement, and use of laboratory animals at WSU. It provides assurance to governmental agencies, granting authorities, accrediting bodies, and the public that all animals utilized by WSU in teaching, research, and testing are cared for in a humane manner consistent with established federal and state guidelines. The Office also provides formal presentations, informal assistance, and educational services to assist instructors and investigators in their use of animals.

The **Center for Integrated Biotechnology (CIB)** is an organized research unit that operates as an inter-departmental, inter-college and multi-disciplinary program across campus. The Center has broadly defined biotechnology as the use of living organisms or their products to modify human health and the human environment. The applications of biotechnology are extensive and have already had critical impacts in agriculture, human health, and environmental protection. The Center for Integrated Biotechnology promotes multi-investigator research programs and the development of new and innovative advanced technologies. The CIB is designed to enhance and increase the level of basic and applied research being done in the area of biotechnology at WSU. In addition, the CIB promotes interactions with the biotechnology industry through spin-out companies and technology transfer. University research plays a critical role in the biotechnology industry and the Center's role is to facilitate this process. Additionally the Center operates Core Laboratories that provide high-tech centralized services to members in areas such as bioinformatics, genomics and proteomics. These cores enhance faculty research capabilities and improve opportunities to compete for federal and industry research grants and contracts. The Center has integrated activities that include seminars, workshops, and retreats to promote interactions with members across campus. The Center facilitates the development of campus-wide undergraduate and graduate education programs involving the biotechnology area. The Center currently has approximately 161 research faculty and is expanding rapidly. <http://sciences.wsu.edu/biotech/home.html>

WSU's **Office of Grant and Research Development (OGRD)** was established with the mission of assisting the university's faculty and graduate students in securing extramural support for their scholarly, research, teaching, and community service activities. OGRD promotes and facilitates the procurement of grant and contract funding through information dissemination and outreach, proposal and award processing. OGRD offers education and training for proposal development and writing classes throughout the year. For more information please visit OGRD's web site at [www.ogrd.wsu.edu](http://www.ogrd.wsu.edu).

Washington State University's **Office of Intellectual Property Administration** is the campus resource for patents and technology transfer. In this office, faculty inventions are managed and transferred into the public domain. At the same time, applying for patent protection protects the rights of WSU and the inventors.

The **Nuclear Radiation Center** serves as an all-University resource unit, supporting research and graduate education related to nuclear engineering and physics, radiochemistry, elemental analysis, and neutron activation analysis.

The **Radiation Safety Office** administers a program providing for the safe use of radiation machines and radioactive materials in research, service, and instruction at the main campus, regional campuses, and at the extension centers. The activities of this program are conducted in accordance with the statutes and rules of radiation protection specified in WAC-246, and with the conditions enumerated in Radioactive Materials License WN-C003-1 issued by the State of Washington.

The **Office of Research Assurances** provides oversight and coordinates compliance efforts (as required by federal and state laws and University policies) primarily through close cooperation and coordination with the following faculty/Presidential Committees:

1. Institutional Animal Care and Use Committee (IACUC)
2. Institutional Biosafety Committee (IBC)
3. Institutional Review Board (IRB)
4. Radiation Safety Committee (RSC)

The **Research Compliance Office** offers support and help to researchers to identify, understand, and comply with all pertinent regulations, rules, and policies. The Office is a resource for facilitating the conduct of research at WSU.

The mission of the **Social and Economic Sciences Research Center** is to strengthen research in the social, economic, and behavioral sciences at Washington State University. This mission is pursued through a variety of activities including a computer-assisted telephone interview facility, mail survey capabilities, personal interviewing capabilities, assistance to faculty in the preparation and submission of research proposals for extramural funding, and efforts to stimulate and organize interdisciplinary research. Consultation is also provided to faculty, staff, students, and others on the development and implementation of research projects.

Although located at Washington State University, the **Water Research Center** is a cooperative venture by WSU and the University of Washington with input from other state research universities. The mission of the Center is to plan, promote, conduct, and administer research in water resources; to educate and train scientists and engineers through participation in research projects; and to disseminate the results of completed research to users through publications, conferences, seminars, short courses, and symposia. The Center operates in consultation with state, federal, and private water-interested organizations.

**Statistical Services** is a statistical consulting service provided by the Department of Statistics for WSU faculty, staff, and student researchers. Assistance is provided in the design of experiments and sample surveys, analysis of data including use of statistical packages, and interpretation of results of statistical analyses.

## Research Facilities

### *College of Agricultural, Human, and Natural Resource Sciences*

The College of Agricultural, Human and Natural Resource Sciences (CAHNRS) houses many departments, units and centers whose missions involve research. The **Agricultural Research Center (ARC)** is the administrative unit within CAHNRS overseeing research performed within the College. Research is conducted within the following departments: Agricultural and Natural Resource Sciences; Animal Sciences; Apparel Merchandising, Design and Textiles; Biological Systems Engineering; Crop and Soil Sciences; Entomology; Food Science and Human Nutrition; Horticulture and Landscape Architecture; Human Development; Interior Design, Plant Pathology; Natural Resource Sciences; Rural Sociology and Statistics. The Institute of Biological Chemistry performs fundamental research in the biochemistry and molecular biology of plants. CAHNRS houses several centers, which are collaborative programs for conducting unique interdisciplinary types of research which include: the **Center for Precision Agriculture Systems**, the **Center for Nonthermal Processing of Food**, the **IMPACT Center (International Marketing Program for Agricultural Commodities and Trade)**, and the **Center for Sustaining Agriculture and Natural Resources**. There are collaborative projects and interdisciplinary research projects involving other colleges and regional campuses within the University including: the College of Engineering and Architecture (Wood Materials and Engineering Laboratory); the College of Sciences (School of Molecular Biosciences and the Center for Reproductive Biology; The Program in Environmental Science and Regional Planning), the College of Veterinary Medicine (Field Disease Investigative Unit), the Interdisciplinary Design Institute (WSU Spokane) and the State of Washington Water Research Center.

The research programs in CAHNRS are diverse and require many sites that carry out the work, especially plant-related sciences. Regional locations having extensive laboratory and field-research equipment include the **WSU Prosser Irrigated Agriculture Research and Extension Center** (also the location for the Center for Precision Agriculture Systems); the WSU-Tri Cities campus **Food and Environmental Quality Laboratory**; the **WSU Wenatchee Tree Fruit Research and Extension Center**; and the **WSU Puyallup Research and Extension Center**. Other research and extension units include the **Lind Dryland Research Unit**, the **WSU Vancouver Research and Extension Unit**, the **Long Beach Research and Extension Unit** and the **Mount Vernon Research and Extension Unit**. The **Food and Environmental Quality Laboratory** has state of the art equipment to detect environmental contaminants. FEQL laboratory faculty ensure the quality and safety of food, the long-term sustainability of our food-producing lands and surrounding environment, and economic viability of the agricultural and food industries of the region. Many WSU scientists are located throughout the state to solve problems associated with production and marketing of Washington's agricultural and forestry products and to provide basic knowledge for improving the efficiency, quality, and quantity of production needed to supply an ever-increasing demand for food, fiber, and improvement in the quality of life.

The **International Marketing Program for Agricultural Commodities and Trade (IMPACT) Center** funds interdisciplinary research, extension, and teaching to assist the state in exporting its agricultural products. Its major thrusts are in uncovering marketing opportunities, developing strategies to exploit those opportunities, solving economic and technical impediments to current agricultural exports, and finding alternative products or processes with export market potential.

The **Center for Nonthermal Processing of Food** includes faculty members from Biological Systems Engineering, Food Science and Human Nutrition, Electrical Engineering, Biochemistry/Biophysics, and Microbiology. Research at the Center is focused on pulsed electric fields, oscillating magnetic fields, and high hydrostatic pressure as alternatives to more widely used methods of food processing that

involve application of heat. These new technologies produce minimally processed, fresh-like, safe food products to meet consumer demand for high quality processed foods without degradation, which often accompanies thermal processing methods.

The **Center for Precision Agricultural Systems** fosters collaborative research, education, and outreach programs that produce practical technologies and management systems for Precision Agriculture. The Center brings university expertise from agriculture, engineering, computer science, and other units across the state and external collaborators to address critical issues preventing economic implementation of information-based agriculture. Technologies include sensors for monitoring plant and environment status, software for data analysis and modeling, decision models for system optimization, and equipment to implement precision management decisions. These technologies and related educational offerings support competitive production of agricultural commodities, while stimulating economic development and protecting the environment and natural resources.

The **Center for Sustaining Agriculture and Natural Resources** (CSANR) works to create sustainable agriculture and natural resource systems providing a high quality of life for the people of Washington. The CSANR leads in developing and implementing interdisciplinary systems-oriented research and education programs at WSU. CSANR facilitates work towards sustainable agricultural systems, provides information through educational activities and publications encourages the use of sustainable agriculture practices including improving air, water and soil quality, and attempts to strengthen rural communities by providing farming opportunities for future generations. It sponsors capacity building programs in the areas of consensus building and conflict.

The majority of the coursework undertaken by graduate students in CAHNRS is centralized on the Pullman campus. On the Pullman campus most CAHNRS faculty hold joint appointments in teaching and research. In addition, many of the research scientists at the other research centers around the state serve in varying degrees in the academic guidance of graduate students in CAHNRS and in the direction of thesis work. The association of graduate students with the Agricultural Research Center research programs, scientists, equipment and facilities offers a depth of experience and training beyond that ordinarily encountered.

### *College of Business*

The statewide office of the **Small Business Development Center**, located at WSU Spokane, provides training programs, research services, and management counseling to business firms and communities throughout Washington. To this end, the Center draws on its own professional staff as well as on the resources of the University and other cooperating Washington institutions of higher education. The Center's Business Development Specialists provide no-fee, confidential, one-on-one counseling on all management topics. The counselors have certified broad-based skills and significant experience as business owners or managers. They help improve profitability and growth with assistance in buying, selling or starting a business, preparing a business plan, choosing and incorporating new technology, analyzing financials, and improving marketing.

Business counseling is also available through NetCounseling. This innovative program permits live, face-to-face business counseling and technical assistance over the Internet from a designated NetCounseling site or a business owner's office or home PC.

In addition to business counseling, the SBDC evaluates new products through its Innovation Assessment Center on a fee basis.

The SBDC provides business training through many Washington community colleges. They offer seminars, workshops and conferences to assist small business owners and operators with specific skills and methods to maintain or expand their business.

## *College of Engineering and Architecture*

The **Center for Materials Research** is an interdisciplinary effort involving faculty from physics, chemistry, mechanical and materials engineering. It involves more than 20 researchers and attracts significant funding for equipment and research in such projects as deformation and fracture, diamond and thin films, soft lithography, semiconductors, electron tunneling microscopy, and nondestructive probes (e.g., positron beams) of defects in solids at the atomic and nuclear levels ([www.cmr.wsu.edu](http://www.cmr.wsu.edu)).

The **Center for Multiphase Environmental Research** The center unites doctoral students from a variety of departments to address threats to the water, air, and earth. As part of this program, you will work in teams to transfer your own innovations to industry for application and commercialization.

By tackling regional, national, and even international problems in a cooperative framework, you will emerge with the deep knowledge and real-world experience required to remedy environmental ills.

The **Wood Materials and Engineering Laboratory (WMEL)** is an interdisciplinary research facility involving faculty and students from engineering and materials science. It attracts significant funding for research on natural fiber composites development, materials engineering, adhesion, polymer processing, structural engineering, and nondestructive evaluation of materials. Faculty and students at the WMEL pioneered the development of natural fiber composites (e.g. wood-plastics and I-joists), nondestructive evaluation techniques, and novel building design and construction techniques, [www.wmel.wsu.edu](http://www.wmel.wsu.edu).

The **Center for the Design of Analog-Digital Integrated Circuits** is an NSF-sponsored industry-university research consortium in integrated circuitry that addresses electronics industry problems in the fast growing field of mixed signal design. Emphasis is on research in low-voltage circuits, wireless communication, and design for high-performance data converters and associated simulation, modeling, and layout tools. It has garnered more than 24 industrial and four university partners and has involved more than 210 students since it began in 1990. [www.cdadic.com](http://www.cdadic.com)

The **Power Systems Engineering Research Center (PSerc)** is a multi-university collaborative research center supported by the National Science Foundation and the Electrical Power Research Institute. PSerc supports research on the practical problems and those particularly associated with a restructured deregulated power industry. WSU was invited to join PSerc because of its strong power engineering program.

The **Center for Nonthermal Processing of Food** investigates preservation of food by high-voltage pulsed electric field, microwaves, ultra-high pressure, oscillating magnetic fields, and combines methods. It draws both extramural corporate and government support. Novel food preservation and packaging techniques are developed for the U.S. military.

The **Albrook Hydraulic Laboratory** provides engineering services to government and industry in hydraulics and water resources. For more than four decades, it has helped solve hydroelectric power problems, salmon fish recovery efforts, facilities construction, flood mitigation, land-based hazardous waste management, hydrology, and engineered wetlands, [www.ce.wsu.edu/Hydraulics/hwOverview.htm](http://www.ce.wsu.edu/Hydraulics/hwOverview.htm)

The **Imaging Research Laboratory** uses the resources of signal processing, computer graphics and computational geometry in support of image, video and geometry compression, shape representation and description, graphics hardware design and animation production. [www.eecs.wsu.edu/~irl](http://www.eecs.wsu.edu/~irl).

The **Laboratory for Atmospheric Research** is recognized worldwide for its pioneering role in development of regional and national emission inventories, tracer methods to measure air and ground gas pollution of all kinds, worldwide methane emissions surveys, windblown dust, and photochemical air contamination in the Northwest. Recent investigations include Spokane and Puget Sound health hazard research on small air particulates, ozone concentration in the Puget Sound region, and improved understanding of global warming by measuring biogenic hydrocarbons released from

vegetation. See [lar.wsu.edu](http://lar.wsu.edu).

The centers for **Virtual Reality In Design and Manufacturing**, and **Advanced Multiphase Materials Processing** work with industry on practical problems in superplastic forming, rapid prototyping, mass transfer, geometric modeling and other related areas.

### *College of Liberal Arts*

Under the direction of Professor Susan Dente Ross, **AccessNorthwest** strives to increase access to and use of government information, particularly by disenfranchised populations. Her group hopes to enhance civic engagement and to build a more informed electorate for a stronger democracy.

The **Consortium for Communication and Decision Making**, led by Professor Erica Weintraub Austin and Bruce E. Pinkleton, studies scientific-based development and scientific evaluation of media literacy interventions, especially as they apply to health campaigns. Professor Moon Lee also evaluates technology such as hypertext and the choices it provides, and she analyzes how people use that technology.

The **Digital Recording Studio** was established in 2003 to serve the programmatic needs of the Music Program within the School of Music & Theatre Arts. Located in Kimbrough Music Building, the studio provides an ideal acoustic setting for limited scope recordings in the studio, and processing of on-location recordings from other venues. The recording studio is equipped with a Fazioli Concert Grand Piano and the most current versions of the requisite digital recording, editing, and processing equipment.

The **Hearing and Speech Clinic**, located in the Health Sciences Building on the WSU Spokane campus, is operated jointly by the WSU Department of Speech and Hearing Sciences and the Eastern Washington University Communication Disorders Department. The Hearing and Speech Clinic is a state-of-the-art facility that serves the Department of Speech and Hearing Sciences' tripartite missions in teaching, research and service. The Clinic provides a full range of assessment and rehabilitation services to the community in the areas of speech, voice, language, and hearing. Graduate students gain valuable clinical experiences with patients across the lifespan under supervision of nationally certified and state licensed faculty. Clinic clientele are invited to participate in master's thesis research approved by the WSU and EWU Institutional Research Boards (IRB).

The **Humanities Research Center** was established in 1980 by the Dean of the Humanities and Social Sciences Division (now College of Liberal Arts) to provide shared facilities, equipment, and consulting services in support of humanistic research by the faculty of the College. The facilities and services of the Center are available to all faculty in the College subject to a schedule of project priorities, and since 1984 computing support has been provided to all graduate students in the College. This support is predominantly in the area of text processing (production of books, articles, and dissertations) and photocomposition of scholarly journals, as well as new visual media communications.

The **Laboratory for the Study of Communication Emotion and Cognition** investigates how media message characteristics affect cognitive and emotional responses to messages. The lab's interim director is Professor Mija Shin.

The **Language Learning Resource Center (LLRC)** was established in 1912 by the Department of Foreign Languages and Literatures as a teaching resource center. Since its inception the Center has been a focal point within the Department for exploring the use of technology in the teaching of languages. Continuing in this tradition the LLRC is today engaged in managing and maintaining two computer-based language learning labs offering undergraduate and graduate students access to course specific on-line language learning tools and resources. Additionally, the Center manages and maintains a Departmental web server and a streaming audio/video server that together provide students with 24-hour access to a wealth of language related educational and informational resources. Of course the LLRC also maintains equipment (such as audio and video tape players) for accessing its extensive

collection of traditional audio and video resources. Overall the LLRC is both an established language learning service center for the Department and at the same time a research tool for faculty interested in exploring new teaching techniques and technologies and building new language learning tools and resources.

The Department of **Psychology** has recently developed an **Undergraduate Human Psychophysiology Laboratory**. This laboratory combines the standard E-prime computer software for testing of cognition and behavior along with equipment for the examination of central nervous system activity responsible for cognition and behavior. The laboratory provides state of the art technology for measurement of brain activity by means of electroencephalograph (EEG). Also included are devices for peripheral physiological measurement of skin conductance response (SCR ) and cardiovascular activity. The laboratory is designed to be used by Undergraduates with minimal technical training, but is also available for use by graduate students.

The **Sociological Data Processing Center** and the **Social Science Computing Laboratory** are important resources for graduate students in the sociology program. Supported by the College of Liberal Arts, they are located adjacently in 231 and 233, Wilson Hall. They serve many functions, including provision of the following: Internet access and email, access to the campus UNIX system, data manipulation and analysis programs, graphics and image processing software and consultation services for statistical techniques and procedures.

While the Sociological Data Processing Center is reserved exclusively for graduate students and faculty, the Social Science Computing Laboratory is used primarily for graduate students and faculty course instruction in the College of Liberal Arts. In all, there are 28 Gateway 2000 Pentium computers with large 17-inch displays for student use. High-speed laser printers, scanners, and mass storage devices ensure that graduate students have access to quality computing resources. In recent years, new computer labs for graduate students have been installed in Anthropology, including one devoted to Physical Anthropology, and in Political Science. Another computer lab in Fine Arts is presently being expanded.

**The Writing Laboratory**, established in 1983 by the Department of English, is an instructional resource center serving students and faculty who want assistance with writing. The Laboratory offers several courses, an on-line writing component, and is a consulting resource for instructors who want assistance in incorporating writing into their courses.

The **Thomas S. Foley Institute for Public Policy and Public Service**, established in 1995 by the College of Liberal Arts, supports congressional and legislative studies, public policy research voter education, and community outreach. The Institute will also provide opportunities for public service internships in congress, state legislatures and other governmental and non-profit organization.

**The Division of Governmental Studies and Services** employs graduate students on research projects relating to government and public affairs, administers an internship program to provide practical experience in government, and maintains a collection of specialized government publications.

#### *College of Sciences*

**The Franceschi Microscopy and Imaging Center**, located in Science Hall, is available for training and research in science and technology. Washington State University students, staff, and faculty members have access to the facilities for training consultation, and service work under flexible conditions designed to provide maximal use of the EMC. Formal courses in electron microscopy are offered by the Center. The EMC maintains three transmission electron microscopes (including an analytical TEM equipped with STEM and EDX), a scanning electron microscope, also with EDX, a new confocal microscope, and a full complement of ancillary equipment and facilities. The Center has a skilled staff experienced in handling a wide range of research problems in electron microscopy.

**The Environmental Research Center** is closely integrated with the academic Program in

Environmental Science and Regional Planning and is the focal point for university development of interdisciplinary research on problems related to the environment.

The **James Richard Jewett Observatory** is the gift of Mr. and Mrs. George F. Jewett of Spokane and is named in honor of Mr. Jewett's father, a former professor of ancient languages at Harvard University. The Observatory houses a twelve-inch refractor with a visual lens and a twenty-five foot revolving dome. The University Planetarium is located in Sloan Hall 231. Information about open house and group tours of either the Observatory or Planetarium can be obtained by contacting the Program in Astronomy.

A **Center for Nuclear Magnetic Resonance (NMR)** is in the new Chemistry Synthesis Building. The Center houses three high-field superconducting NMR instruments. Additional instruments will be added within five years. The prime purpose of the instruments is to characterize structures of biological samples as solids or in solution for faculty and students in the sciences, agriculture, veterinary medicine, and pharmacy.

The **Institute for Shock Physics** was created in 1997 from the Shock Dynamics Center and given a broader mission. The Institute is involved in shock wave research that promotes the understanding of physical and chemical changes in solids and liquids under very rapid and large compressions, and applying this knowledge to fundamental and applied problems of strategic national interest. Scientific activities at the Institute examine physical and chemical changes at extreme conditions through: time-resolved, optical spectroscopy and x-ray diffraction to probe atomic/molecular processes in shock wave experiments; time-resolved, continuum measurements in shock wave experiments; static high pressure measurements using diamond-anvil-cell experiments; and theoretical developments and computational modeling to stimulate dynamic compression phenomena at different length scales. The Institute's Applied Sciences Laboratory, a multidisciplinary contract research organization, undertakes a broad range of applied research activities of interest to industry and government agencies; it is located at WSU Spokane.

The **Laboratory for Bioanalysis and Biotechnology (LBB)** has three units with closely related but distinct functions. LBB I provides protein and DNA sequencing as well as peptide and oligonucleotide synthesis. It also has gene chip analyzers for genomics research. LBB II houses four mass spectrometers to do proteomics and high resolution analyses of biological macromolecules. LBB III provides amino acid analysis of peptides and other biological materials.

To assist the University in attracting and conducting research in materials-related areas and to strengthen the educational capabilities of the University, the **Center for Materials Research** was established as an interdisciplinary unit to serve the scientific community. The Center promotes interaction between researchers, provides mechanisms to improve educational programs in materials science, and provides a focal point for the purchase and construction of shared equipment and the development of other resources. It is shared between the Colleges of Science and Engineering and Architecture.

The **Center for Reproductive Biology** was formed in 1996 and is now comprised of 77 faculty investigators at WSU, the University of Idaho and National Marine Fisheries. The broadest definition possible is used for reproductive biology and research associated with the Center. In mammals any process involved or related to reproduction including neuroendocrine control, gonadal function, gamete biology, fertilization, implantation, pregnancy, reproductive tract biology, reproductive disease, (e.g. breast cancer) and fertility. In addition, reproduction in non-mammalian species and plants is considered. The current faculty has areas of interest from domestic animal and human reproduction to fish and plant reproduction. This diversity in research areas is a major strength of the Center and fosters collaborations not previously considered. The objectives of the Center are to foster research of the highest quality and promote collaborative interactions among Center members; enhance opportunities for extramural funding with an emphasis on multi-investigator grants; and to



enhance the training and education programs of advanced undergraduate, graduate and postdoctoral fellows with an interest in the biology of reproduction. Additionally, the Center operates 11 Core Laboratories that provide high-tech centralized services to members. These cores enhance faculty research capabilities and improve opportunities to compete for federal and industry research grants and contracts. For more information on the Center please visit our web site at [www.reproduction.wsu.edu](http://www.reproduction.wsu.edu).

#### *College of Veterinary Medicine*

Since its creation in 1974, The **Washington Animal Disease Diagnostic Laboratory (WADDL)** has provided essential laboratory services in bacteriology, parasitology, pathology, serology, toxicology, and virology. The Laboratory is an integral part of a network of tax-supported state diagnostic reference facilities throughout the United States dedicated to the betterment of animal and human health. WADDL has a responsibility to provide appropriate, timely results to safeguard the health of livestock, pets, poultry, and fish in the Pacific Northwest and to protect the public from zoonotic diseases. Advice and consultation is provided to practicing veterinarians, animal industry groups, state and federal regulatory officials, and physicians. WADDL also provides centralized service for the College by providing electron microscopy and histology support.

The **Animal Health Research Center (AHRC)** provides oversight of research programs within the College of Veterinary Medicine, with an emphasis on diseases of agricultural animals and public health. Center research is divided into core programs that include transmissible spongiform encephalopathies, food borne diseases and antimicrobial resistance, immunology and vaccine development, microbial and host genomics, vector-borne diseases, and lentiviral diseases. In conjunction with the College departmental graduate programs, AHRC research programs provide undergraduate research and graduate education opportunities.

#### *Institute of Biological Chemistry*

The **Institute of Biological Chemistry** is dedicated to research on fundamental aspects of biological chemistry relevant to agriculture and forestry. Although not offering a formal course of study leading to a degree, the Institute provides research opportunities to fulfill the requirements for the Master of Science and Doctor of Philosophy in the graduate programs in the School of Molecular Biosciences (biochemistry/biophysics, chemistry, genetics and cell biology), and the Graduate Program in Molecular Plant Sciences.

Research fellowships and assistantships are available in the Institute for incoming students on a competitive basis. Teaching assistantships are available from cooperating instructional departments and programs through which entry to the Graduate School is obtained.

The most important component of any doctorate program involves independent study and original research in the area of the student's interest. The internationally recognized research programs of the Institute cover a broad spectrum of areas from plant biochemistry, molecular biology, and genetic engineering to plant pathology and pest resistance, as well as the traditional areas of biochemistry. These programs receive support from federal, state and private sources. The Institute thus offers a unique opportunity for graduate training in an intensive research environment which complements formal study leading to the chosen degree. All recent graduates are in positions appropriate to their training in academic, industrial and governmental institutions.

The Institute is housed in modern, well-equipped laboratories, and enjoys the support of centralized campus research facilities. Broad-based support of the Institute through the cooperative efforts of several colleges within the University assures a solid foundation for a wide scope of research activities, and provides for strong interaction of the Institute faculty with other scientists. The Institute also cooperates with agricultural, academic and industrial organizations at the regional, national, and

international levels. An active seminar and visiting scientists program further contributes to the focused research environment.

#### *Cancer Prevention and Research Center*

The interdisciplinary **Cancer Prevention and Research Center** functions as the focal point of cancer prevention research at Washington State University. While serving to catalyze and coordinate collaborative efforts around the University, the Center also provides central support services and shared facilities for on-going research.

#### *Center for the Study of Animal Wellbeing*

The **Center for the Study of Animal Wellbeing** is a joint development between the College of Veterinary Medicine and the Department of Animal Sciences in the College of Agricultural, Human and Natural Resource Sciences. The primary mission of the Center is to generate and disseminate new knowledge to make animal well-being and human-animal interactions better understood. Research areas include indicators of animal well-being, objective assessment of stress and pain, animal behavior and preferences, and the interrelationship of animal health and well-being to production and performance.

#### *Center for Teaching, Learning, and Technology*

The **Center for Teaching, Learning, and Technology** is a central resource for all WSU instructors, including graduate teaching assistants. The CTLT works with faculty to identify and implement strategic methods of incorporating successful teaching approaches into their courses and programs. In addition, the CTLT applies current scholarship on effective teaching and learning to develop a variety of resources to help instructors in their efforts. The CTLT's resources include consultations about course and learning activity design, assessment techniques, and integrating instructional technologies; frequent discussions and workshops; and on-line technologies for learning and assessment. CTLT is located in ITB 2001B and can be reached at 509/335-1355 or [ctlit@wsu.edu](mailto:ctlit@wsu.edu).

### **Center for Distance and Professional Education**

The **Center for Distance and Professional Education** (CDPE) is responsible for extending the educational resources of the University to people throughout the State of Washington, and beyond. Distance Degree Programs (DDP), a unit of CDPE, collaborates with University departments and administrative units to provide online distance degree programs at the graduate and undergraduate levels. DDP also provides a mechanism for academic departments to deliver select courses to various sites in the State of Washington and other areas. Professional Education (PE) provides professional training programs and conferencing support services for large and small programs, and DDP and PE cooperate to offer both credit and noncredit on-line certificate programs. CDPE provides services such as marketing and market research, instructional design and development, and student and faculty support for each of the activities it delivers.

### **Graduate Programs at Regional Campuses**

With the creation of WSU's multi-campus system in July 1989, select graduate programs are offered at the University's regional campuses in Spokane, Tri-Cities, and Vancouver. Expansion of offerings will continue as the campuses grow.

Graduate students who plan to use coursework and research undertaken through the regional campuses must be admitted to the Graduate School on the Pullman campus. Requirements are generally identical.

### **WSU Spokane**

WSU Spokane offers master's degrees in architecture, criminal justice, engineering management, exercise science, health policy and administration, interior design, landscape architecture, and speech and hearing sciences. Supporting courses toward the Master in Teaching, Doctor of Education, and administrative credentials (certification for principals and superintendents) also are offered. The Doctor of Design is an interdisciplinary degree for persons who are well versed and professionally skilled in the design profession and who seek to make substantive, innovative, and original scholarly contributions to their fields. Courses taken at WSU Spokane may apply to the PhD in Criminal Justice, the Individual Interdisciplinary PhD, and other doctoral degrees, depending on the program. The Doctor of Pharmacy program established in 1992 begins studies at WSU Pullman and finishes at WSU Spokane.

The campus also offers a Graduate Certificate in Exercise Science and a post-master's School Psychology Certification (one of only 3 in the nation). The campus also houses upper-division baccalaureate studies in a number of disciplines: architecture; construction management; exercise physiology and metabolism; interior design; landscape architecture; and professional development studies with programs in informatics and other areas under development. Students begin undergraduate studies at WSU Pullman, community college, or another accredited higher education institution, and complete at WSU Spokane.

New classrooms, research laboratories, and computer labs are located at the Riverpoint campus, in the heart of a developing university district. Students benefit from the metropolitan context and urban amenities. The full range of academic and student services is available, including the Cooperative Academic Library Service (CALs) shared by students of WSU Spokane and Eastern Washington University.

WSU Spokane also has exclusive research and public service programs in the health sciences, design disciplines, and policy, social, and behavioral sciences that leverage the strength of a top public research university with access to community resources for collaborative research and internship opportunities for students.

For specific information, contact WSU Spokane, Student Services, Health Sciences Building 125E, 310 N. Riverpoint, P.O. Box 1495, Spokane, WA 99202-1495, [enroll@wsu.edu](mailto:enroll@wsu.edu), 509-358-7537 or visit us at [www.spokane.wsu.edu](http://www.spokane.wsu.edu).

### **WSU Tri Cities**

WSU has offered credit courses in the Tri-Cities for almost six decades. Master's degree programs currently are provided in biology, business administration, chemistry, computer science, education, electrical engineering, environmental engineering, environmental science and mechanical engineering. Supporting coursework is available in mathematics and physics.

The present facilities provide classrooms, offices, laboratories, networked computing, and an extensive library. Research is carried on in a wide variety of areas. Of particular interest here are the Food and Environmental Quality Laboratory, and the United States Transuranium and Uranium Registries, all housed at WSU Tri-Cities. Additional opportunities are available to share research laboratories and equipment of nearby US Department of Energy contractors through individual arrangements.

Graduate assistantships are available in certain departments for qualified students who wish to pursue study and research at WSU Tri-Cities. For specific information about courses, programs, facilities or admission, contact WSU Tri-Cities, 2710 University Drive, Richland, WA 99354-1643, 509-372-7250; [www.tricity.wsu.edu](http://www.tricity.wsu.edu)

## **WSU Vancouver**

Washington State University Vancouver has been offering undergraduate and graduate education to residents of southwest Washington and Oregon for more than 12 years. Located on a 351-acre campus in Salmon Creek, students enjoy small classes and schedules designed for place-bound students balancing their education with career and family responsibilities.

Currently eight master's degrees are offered in business administration, education, engineering management, environmental science, history, nursing, public affairs, and technology management. For more information contact the WSU Vancouver Office of Admissions by phone, 360-546-9779, or e-mail, [admissions@vancouver.wsu.edu](mailto:admissions@vancouver.wsu.edu). [www.vancouver.wsu.edu](http://www.vancouver.wsu.edu)

## **Graduate Certificate Programs**

Graduate certificates are designed to provide students with an opportunity for graduate education in a specific area of study. They convey that the student has developed a mastery over course material in a specific area. While the requirements for each graduate certificate vary among departments and programs, the core is typically 9 to 12 credits of graded coursework taken at the graduate level. These core courses are generally selected to provide the student with expertise on a specified topic. In order to determine the applicability of any credits earned while a certificate student, the student must file a Program of Study as part of the admission material. The determination of applicable coursework will be made by the academic department or graduate program at the time of admission. Graduate certificates that are currently offered at Washington State University are the following:

- Graduate Certificate in Agribusiness
- Graduate Certificate in Biotechnology Management
- Graduate Certificate in Constraints Management
- Graduate Certificate in Construction Project Management
- Graduate Certificate in Engineering Nanotechnology
- Graduate Certificate in Exercise Science
- Graduate Certificate in General Engineering and Technology Management
- Graduate Certificate in Global Justice and Security Studies
- Graduate Certificate in Interdisciplinary Environmental Biogeochemistry
- Graduate Certificate in Manufacturing Leadership
- Graduate Certificate in Optoelectronics
- Graduate Certificate in Project Management
- Graduate Certificate in Protein Biotechnology
- Graduate Certificate in Reproductive Biology
- Graduate Certificate in Six Sigma Quality Management
- Graduate Certificate in Supply Chain Management
- Graduate Certificate in Sustainable Agriculture
- Graduate Certificate in Systems Engineering Management Regional Programs

## **Regional Programs**

### **Program for Cooperative Courses for Graduate Students at Washington State University and the University of Idaho**

Washington State University and the University of Idaho have developed a program of cooperative courses in which one institution offers exclusively a particular course for use by graduate students of both. The program provides a wider variety of graduate courses than otherwise would be possible at

either University.

This arrangement permits graduate students at Washington State University to take cooperative courses at the University of Idaho on the same basis that they take resident courses. No special fees are charged for these courses. In each cooperative class, the regulations of the host institution prevail, but only the institution in which the student is seeking an advanced degree records official enrollment and grades.

The cooperative program is limited to specific courses. All other courses taken at the University of Idaho must be presented as transfer courses, with the usual rules and fees applying. For further information, consult the chair of the department or program or the Office of the Dean of the Graduate School.

### **Western Regional Graduate Programs - WICHE**

The Western Interstate Commission for Higher Education (WICHE) coordinates a program involving 17 graduate institutions where students who are residents of Alaska, Arizona, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, and Wyoming may attend Graduate School in Washington. WICHE students pay resident tuition and receive some admission preference. For more information about your program, please visit: [www.wiche.edu/sep/wrgp](http://www.wiche.edu/sep/wrgp)

Washington State University receives students in the following programs:

American Studies (MA and PhD)

Anthropology-Archaeology Option (MA and PhD)

English—Rhetoric and Composition Emphasis (MA and PhD)

Food Science (MS and PhD)

Health Policy and Administration (MHPA)

History—Public History Option (MA and PhD)

Neuroscience (MS and PhD)

Nutrition (PhD)

# Student Services and Facilities

## **Campus Involvement**

335-9667

[www.getinvolved.wsu.edu](http://www.getinvolved.wsu.edu)

## **Career Services**

33-2546

Lighty 180

[www.careers.wsu.edu](http://www.careers.wsu.edu)

## **Campus Information**

335-4636

## **Children's Center**

335-8847

[www.childrenscenter.wsu.edu](http://www.childrenscenter.wsu.edu)

## **Counseling Services**

335-4511

[www.counsel.wsu.edu](http://www.counsel.wsu.edu)

## **Disability Resource Center**

Washington Building 217

335-3417

[www.drc.wsu.edu](http://www.drc.wsu.edu)

## **Employment Office**

335-1969

French Ad 139

[www.hrs.wsu.edu](http://www.hrs.wsu.edu)

## **Equity and Diversity**

335-8888

[ww.diversity.wsu.edu](http://ww.diversity.wsu.edu)

## **Office of Financial Aid and Scholarships**

Lighty Student Services 380

335-9711(Financial Aid)

335-1059 (Scholarships)

[www.finaid.wsu.edu](http://www.finaid.wsu.edu)

## **Graduate School**

French Administration 324

335-6424

[www.gradschool.wsu.edu](http://www.gradschool.wsu.edu)

**Graduate and Professional Student Association**

CUB 308  
335-9545  
[www.gpsa.wsu.edu](http://www.gpsa.wsu.edu)

**Benefits Services**

French Administration 232  
335-4589  
[www.wsu.edu/benefits](http://www.wsu.edu/benefits)

**Bookie (Student Bookstore)**

Located in the CUB  
335-9444  
[www.wsubookie.bncollege.com](http://www.wsubookie.bncollege.com)

**Student Legal Services**

CUB 305  
335-9539

**Housing, Dining, and Residence Life**

Streit-Perham Administration Suite  
335-4577  
[www.livingat.wsu.edu](http://www.livingat.wsu.edu)

**Center for Distance and Professional Education**

Van Doren Hall 104  
335-3557  
[www.online.wsu.edu](http://www.online.wsu.edu)

**Office of Grant and Research Development (OGRD)**

Neill Hall 423  
335-9661  
[www.ogrd.wsu.edu](http://www.ogrd.wsu.edu)

**WSU Office of Veterans Affairs**

French Administration 346  
335-1857, 335-1234  
[www.va.wsu.edu](http://www.va.wsu.edu)

**Alternatives to Violence on the Palouse**

332-4357  
[community.palouse.net/ATVP](http://community.palouse.net/ATVP)  
Crisis Line  
332-1505

**Information Technology**

335-HELP (4357)  
infotech.wsu.edu

**International Programs**

Bryan Hall 108  
335-2541  
www.ip.wsu.edu

**Intensive American Language Center**

McAllister  
335-6675  
www.ialc.wsu.edu

**Legal Assistance**

335-9539  
www.aswsu.org

**Ombudsman's Office**

335-1195 Wilson Hall 2  
www.wsu.edu/~ombuds

**Parking and Transportation**

Corner of Colorado and 'D' Street  
335-PARK (7275)  
www.wsu.edu/parking

**Psychology Clinic**

335-3587 Johnson Tower 362  
www.wsu.edu/psychology/2005/clinic

**Speech and Hearing Clinic**

335-1509 Daggy Hall 133  
libarts.wsu.edu/speechhearing/clinic

**Center for Advising and Career Development**

335-6000 Lighty 260  
www.salc.wsu.edu

**University Recreation**

335-8732 Student Recreation Center  
www.urec.wsu.edu

**Veterans Affairs**

335-1234  
French Ad. 346  
www.va.wsu.edu



**Women's Resource Center**

335-6849

Wilson Hall 8

[www.women.wsu.edu](http://www.women.wsu.edu)

**Women's Transit Program**

335-6830

Wilson Hall 8

**Beasley Performing Arts Coliseum**

Ticket Information

1-800-325-SEAT

[www.beasley.wsu.edu](http://www.beasley.wsu.edu)

**University Theatre Ticket Information**

Daggy Hall Box Office

335-7236

[www.libarts.wsu.edu/theatre/](http://www.libarts.wsu.edu/theatre/)

**Recreation Center**

335-UREC (8732)

[www.urec.wsu.edu](http://www.urec.wsu.edu)

Updated 12/09

# Admission and Registration

## Admission

### General Information

Admission to Washington State University is granted without regard to age, sex, race, religion, color, creed, disability, national or ethnic origin, sexual orientation, or marital status. Graduates of Washington State University and other colleges and universities whose degrees are recognized by this institution and who meet the requirements for admission to the Graduate School may be admitted to the Graduate School.

Inquiries and requests for information may be found at [www.gradschool.wsu.edu](http://www.gradschool.wsu.edu). Or you may write to the Graduate School, Washington State University, Pullman, WA 99164-1030, 509-335-1446.

Applicants for admission must have official transcripts from colleges or universities from which any degrees have been granted or are expected and those transcripts which show the last 60 graded semester or 90 graded quarter hours of undergraduate work taken. In addition, transcripts are required from colleges or universities showing graded graduate level coursework taken after the bachelor's degree. Official transcripts are those mailed directly to the Graduate School from the Registrar of the institution attended. Transcripts mailed by the student are not considered official. Complete credentials should be on file at least one month before registration. Transcripts from other institutions cannot be returned. Records of previous work at Washington State University need not be submitted.

The Dean of the Graduate School may approve admission of a student from a foreign university if the student presents a superior academic record, furnishes satisfactory evidence of adequate ability in English, and has sufficient financial resources. Such applications should be completed at least six months in advance of the proposed date of enrollment in the Graduate School. International students who have undertaken graduate study in other institutions will be accepted only after evaluation of their undergraduate records, as well as their performance in graduate study and the minimum criteria, as described above, will apply.

In a graduate program, a student is required to complete appropriate advanced courses, to participate in seminars, and to make an original contribution to knowledge. At least one academic year of graduate study, or the equivalent, is necessary for the completion of a program leading to a master's degree. The residence requirement for the master's degree is one academic year.

The period of study for the Doctor of Philosophy and Doctor of Education degrees is at least three years (six semesters) beyond the baccalaureate degree. For students without a master's degree, at least two of these three years shall be in residence at Washington State University (enrolled full time and present on a campus where a given program has received approval to grant residency). For students with a master's degree, at least one of these three years shall be in residence at Washington State University (enrolled full time and present on a campus where a given program has received approval to grant residency).

For the Doctor of Education, at least two of the three years beyond the baccalaureate shall be in residence at Washington State University, including a minimum of four semesters, with at least one summer session and one semester being contiguous, when the student is enrolled full time and present on the Pullman campus. Full time enrollment for four summer sessions may be substituted for two academic year semesters. Summer session cannot be substituted for the semester contiguous with a summer session requirement for the doctoral degree.

Most advanced-degree programs emphasize the preparation of students for careers as productive scholars, and accomplishments in research constitute an important part of the training. It is recognized also that those who earn advanced degrees often become teachers in institutions of learning. For this reason, in many departments special attention is given to the preparation of students for careers in the teaching profession.

Departmental approval is required for any admission regardless of grade point average, and departments may require higher levels of performance than those cited. Because of limitations within certain departments, it may be necessary to deny admission to some qualified applicants.

Except as they apply to undergraduate students only, graduate students are subject to the usual procedures and regulations of the institution and to such Graduate School rules and procedures as outlined in the *Graduate School Policies and Procedures Manual*.

### **Enrollment Requirements**

The normal load for a graduate student is 10-18 credit hours per semester (6-8 hours in an eight-week summer session). Graduate students on half-time teaching or research assistantships are expected to carry 10-18 credits per semester with no more than 12 hours of graded credit (3-6 in an eight-week summer session). See the *Graduate School Policies and Procedures Manual* for requirements for graduate students on appointment or taking examinations.

[http://www.gradschool.wsu.edu/current-students/2008\\_updatedpolicies](http://www.gradschool.wsu.edu/current-students/2008_updatedpolicies)

### **Classification of Students**

#### *Regular Student Status*

Applicants with at least a B (3.00 on a 4.00 scale) grade point average, or the equivalent in the last 60 graded semester (90 quarter) hours, from a recognized college or university; or at least a B grade point average in any graduate work from a recognized graduate school are eligible for admission to regular student status. Applicants with at least 12 semester hours of approved in-course work from recognized graduate schools with at least a B grade point average are eligible for admission to regular student status.

#### *Provisional Student Status*

A student not eligible for regular student status may be admitted on provisional student status upon special recommendation of the chair of the major department and with approval of the Associate Dean of the Graduate School.

## **Registration**

### **Full-time Students.**

Graduate students must register for a minimum of 10 credit hours to maintain full-time enrollment status in the fall and spring semesters. All full-time graduate students must register for at least one (1) 700 (masters), 702 (non-thesis masters) or 800 (doctoral) level research credit each semester to track faculty advisor effort. (Students should check with their departments for additional information and/or exceptions to this policy)

### **Part-time Students.**

Graduate students must register for a minimum of 2 credit hours and no more than 9 credit hours to maintain part-time enrollment status in the fall and spring semesters

Instructions for registration and policies and procedures for dropping and adding classes are included in the time schedule of classes available on the Registrar's Office home page at [www.registrar.wsu.edu](http://www.registrar.wsu.edu).

All full- and part-time degree-seeking graduate students at all campus locations must maintain continuous enrollment in the Graduate School, registering for each semester, excluding summer sessions, from the time of first enrollment until all requirements for the degree are completed.

Continuous enrollment is maintained by registering for a minimum of 2 graduate credits per semester (excluding the summer). International students who enroll for fewer than 10 credits must be approved by OISS, in consultation with the Graduate School, prior to part-time enrollment during the academic year. Exceptions to the continuous enrollment policy are noted in Section A.2.b. Continuous doctoral status, explained in Section A.2.a meets the continuous enrollment requirement.

## **Exceptions to Continuous Enrollment**

Typically, degree-seeking graduate students enroll in credits every semester until degree completion; however, sometimes circumstances are such that degree-seeking students are unable to enroll for credits. Such circumstances may include illness, family issues, financial need, work, or other obligations.

The exceptions to continuous enrollment discussed in this section address circumstances in which a degree-seeking student must be away from campus and cannot enroll for credits. These students must complete the appropriate graduate leave or internship leave paperwork, obtain approval from their faculty advisor and program chair, and submit the paperwork to the Graduate School in advance of the semester they will be away. Official leaves of absence, internship leave status, and absences not approved under this policy are included in the time limits to complete a degree.

### **1. Graduate Leave of Absence.**

Students who must be away from campus for reasons such as medical issues, family obligations, job obligations, military service, and Peace Corps service, and who cannot maintain continuous enrollment in any given semester, may apply for an official graduate leave of absence. See Section A.6 for additional information and procedures. Only graduate leave for medical reasons (EFML), military service, and Peace Corps service is available to doctoral students in continuous doctoral status. Students who are approved for graduate leave while in continuous doctoral status will not be charged the \$50 administrative fee.

### **2. Internship Leave.**

Students who wish to go on an internship approved by their program and who do not need to register for credits for the internship may apply for internship leave status. See Section A.7 for information and procedures. Only internship leave required by the student's program is available to doctoral students in continuous doctoral status. Students who are approved for internship leave while in continuous doctoral status will not be charged the \$50 administrative fee.

### **Short-term Parental Leave**

The Short-term Parental Leave plan provides up to four consecutive weeks of leave for the period directly before or after the birth or adoption of a child. During this time, the student continues to be enrolled and, if on an assistantship appointment, the student will continue to receive graduate assistant benefits (i.e., tuition waivers will remain in place), health benefits, and his/her salary.

Special Projects or Independent Study (600), Master's Research, Thesis and/or Examination (700), Master's Special Problems, Directed Study, and/or Examination (702), and Doctoral Research, Dissertation, and/or Examination (800) shall have as prerequisite regular or provisional student status in the Graduate School.

Graduate students must register for the required amount of 700, 702, or 800 credit during the semester or summer session in which they take their final examination. Fall and spring semesters and summer session officially end at the last day of finals week. Examinations normally are not scheduled between regular terms. However, students who have received special permission from the Graduate School to schedule final master's or doctoral oral examinations in the interim nonclass period after the end of a term will be required to register for the following semester or summer session.

# Academic Regulations

## **Scholarship Standards**

A student must earn a 3.00 grade point average for all course work (including all courses listed on the program and other graduate upper- and lower-division courses). No work of C grade or less may be dropped from a program, nor can a course be repeated for a higher grade if the final grade is C or higher. Any course listed on the program in which a grade of C-, D, or F is earned must be repeated.

Any graduate student who fails to maintain a cumulative grade point average of 3.00 or higher for all course work subsequent to admission to the Graduate School will be dropped from the University. A student who is dropped may be permitted to re-enroll if the chair of the major department makes a special recommendation with the concurrence of the Dean of the Graduate School.

## **Requirements for a Graduate Degree**

The graduation requirements of the Graduate School (as published in the *Graduate School Policies and Procedures Manual*) in effect at the time of the student's initial admission as a regular or provisional graduate student must be met for completion of a graduate degree program. Departmental requirements for graduation are those in effect at the time the student files a program.

Subsequent changes in degree requirements of the Graduate School or in departmental requirements may be substituted at the option of the student upon approval by the master's or doctoral committee, by the department chair, and by the Dean of the Graduate School.

If a student is dropped from the University for failure to maintain continuous enrollment, the graduation requirements of the Graduate School are those in effect at the time of readmission to the Graduate School.

The time limit for the use of graduate credits toward a master's degree is six years from the beginning date of the earliest course applied toward the degree.

Each program for a doctoral degree is considered individually. In all cases, work for the degree must be completed within three years of the date of the satisfactory completion of the preliminary examination. At least four months must elapse between preliminary and final examinations for doctoral degrees.

## **Transfer Credit and Credit Restrictions**

Detailed policies and procedures on transfer credit and credit restrictions are outlined in the *Graduate School Policies and Procedures Manual*.

## **Transfer of Graduate Credits**

Appropriate credits (with a grade of B or higher) earned in other accredited graduate schools may be applied to a limited extent toward an advanced degree; however, they may not be substituted for residence requirements.

## **Graduate Work through Continuing Education**

Credit earned in graduate-level courses taken through the Center for Distance and Professional Education will be accepted on graduate student programs without limit subject only to customary program approvals. No extension credits from other institutions, or work done by correspondence with this or any other institution, or credit earned by special examination may be used to meet advanced degree requirements.

### **Graduate Study by Seniors**

Seniors who have at least a 3.00 grade point average in the last half of their undergraduate work at Washington State University may register for up to six semester hours of work in the Graduate School in excess of the number of hours required to complete the bachelor's degree. Graduate School approval is required at the time of registration. Only grades of "B" or higher may be applied toward an advanced degree. Seniors who wish to enroll in 500-level courses for undergraduate credit must obtain approval of the major advisor and the chair of the department or program in which the course is offered.

## **Tuition and Fees**

Tax sources of the state finance the major portion of facilities and operation of the instructional programs, student services, and related activities. Graduate students share in the costs by paying tuition, fees, and other charges as established by the Board of Regents.

Tuition, fees, and other charges are subject to change, and are effective when established by the Legislature of the State of Washington and adopted by the WSU Board of Regents. For the most up-to-date rates, please go to [www.wsu.edu/studacct/tuition.htm](http://www.wsu.edu/studacct/tuition.htm).

Payment of registration fees is due on or before the fifth Friday of class. Receipt of payment after that day will result in a 5% late payment fee. Any tuition balances not paid by the eighth Friday of class will receive another 10% late payment fee.

Resident graduate tuition for the academic year 2008-09 for more than 9 hours of enrollment is \$4034 per semester; nonresident tuition for more than 9 hours is an additional \$9838 per semester. Part-time tuition for 9 hours or less is \$378 credit hour for residents and \$959 per credit hour for nonresidents. Part-time students must pay for a minimum of 2 credit hours per semester. (NOTE: Graduate students appointed to graduate assistantships may receive waivers of tuition. See Assistantships, Fellowships, and Traineeships section.)

On the Pullman Campus, fees for Student Health, Student Recreation Center, and Pullman Transit are charged each semester.

(NOTE: Graduate students appointed to half-time graduate assistantships qualify for medical insurance coverage. See Assistantships, Fellowships, and Traineeships section.) Other fees, including parking permits and health insurance, are options.

A \$50 application fee is required to cover handling and processing costs. This fee is nonrefundable and may not be credited against any other fees charged by WSU.

NOTE: Overdue accounts owed the University will prevent release of transcripts and enrollment. Registration is not complete until all of the student's tuition and fees are paid.

# Student Financial Aid Programs

## Financial Aid

Graduate students wishing to apply for financial aid must complete the Free Application for Federal Student Aid (FAFSA). The FAFSA priority processing date is March 1. Students may apply on-line at [www.fafsa.ed.gov](http://www.fafsa.ed.gov) or pick up a paper version at any local high school, community college, public library, or the Washington State University Office of Student Financial Aid and Scholarship Services (OSFA/OSS), 380 Lighty Student Services Building.

Graduate students are considered for the following programs: Federal Family Educational Loans (Subsidized and Unsubsidized Stafford loans) and Federal or State Work Study Programs. Work Study Program funds may be used toward funding graduate assistantships. The Office of Student Financial Aid determines student eligibility for these programs. Letter of eligibility will notify students. Financial aid counselors are available to assist students and families with their financial aid concerns at 509-335-9711. <http://www.wsu.edu/studacct/finaid.htm>

Each academic year, a number of graduate students at WSU are awarded a graduate assistantship from their departments. The assistantship usually covers the majority of tuition costs. This Operating Fee Waiver is considered a resource when the OSFA determines the student's eligibility for other financial aid programs. In order to ensure your Financial Aid Award Notification is correct, please notify the OSFA if your department has granted you an Operating Fee Waiver. If the OSFA is notified after the first disbursement of your loan, any subsequent disbursement may be reduced accordingly.

**NOTE:** All graduate awards are initially based on resident tuition costs, regardless of resident status. You may request (in writing) an adjustment for non-resident tuition costs. If you have unmet need on your Financial Aid Award Notification and/or the Cost of Attendance has not been met, you may qualify to borrow an Alternative Loan. Contact the OSFA for more information.

Short Term Loans may be available to students who encounter delays in their financial aid delivery through the OSFA.

### Satisfactory Academic Progress (SAP) Policies

To receive and continue to be eligible to receive financial aid, graduate students must be in good standing with their department and the Graduate School. Note: The maximum time frame calculation is based on all semesters of enrollment regardless of whether or not financial aid was received each semester. Semesters in which enrollment is less than 10 hours will be counted as one-half of a full-time semester.

Maximum Time Frame for financial aid (exclusive of graduate assistance):

- Master's degree candidates-three years (6 full-time semesters)
- Doctoral degree candidates who have a previous master's degree - three years (6 full-time semesters)
- Doctoral degree candidates without a master's degree - six years (12 full-time semesters)
- Professional students and veterinary medicine students - five years (10 full-time semesters)

## **Assistantships, Fellowships, and Traineeships**

Teaching and research assistantships are available in most departments offering advanced degrees, and nonservice research fellowships and traineeships are granted in some departments. Ordinarily, graduate appointments are limited to those who pursue programs of study leading to advanced degrees at Washington State University.

The *Graduate School Policies and Procedures Manual* should be consulted concerning qualifications, eligibility, and application procedures.

As most appointments for fall semester are made by April 1, or as soon thereafter as possible, it is desirable to have applications completed by February 1; nonservice appointment applications should be completed by January 1. Spring semester applications should be completed by September 1. Applications received at a later date can be considered only for positions still available.

Assistantship appointments require part-time service. The term of a graduate appointment may be for a nine-month period, a semester, or a summer. Students on appointment must maintain regular enrollment in the Graduate School (10 credit hours or more during the academic year; 3 credit hours during summer session) for the duration of their appointments. Stipends vary according to the amount of required service, the extent of the student's training, and merit factors (e.g., academic record, experience). Contact the Graduate School Office for salary information.

Graduate students, who are not residents of the State of Washington, appointed to assistantships of one-half time service (20 hours per week) or more by the Board of Regents, and who reside in the State of Washington while attending WSU, may receive a waiver of the nonresident portion of the tuition. *(NOTE: Non-resident tuition waivers cannot be assured beyond the first year of graduate students' assistantships. Students who intend to remain in the state are encouraged to review Washington statutes and associated administrative rules governing the establishment of residency for tuition purposes. These may be obtained from the Office of Student Affairs, the Graduate School, or at <http://www.gradsch.wsu.edu/future-students/studentlife/residency.html>*

The resident operating fee may also be waived for resident students who hold half-time (or greater) service appointments (20 hours per week) and who qualify based on merit factors, and for nonresident students who reside in the State of Washington, who hold half-time graduate service appointments and who qualify based on merit factors. Further, graduate students who hold half-time (or greater) service appointments automatically qualify for and receive medical insurance coverage. All students on assistantships pay the general tuition and activities fees. *(Please note: To be eligible for any waiver, a student must be physically living in the State of Washington.)*

Forms for assistantship or fellowship applications are included as part of the general application for admission to Graduate School. For information about special scholarships and fellowships, write to the Dean of the Graduate School or the chair of the department concerned.

Washington State University subscribes to the following resolution of the Council of Graduate Schools in the United States regarding scholars, fellows, trainees, and graduate assistants:

### **Resolution Regarding Scholars, Fellows, Trainees, Assistants**

Acceptance of an offer of financial support (such as a graduate scholarship, fellowship, traineeship, or assistantship) for the next academic year by a prospective or enrolled graduate student completes an agreement that both student and graduate school expect to honor. In that context, the conditions affecting such offers and their acceptance must be defined carefully and understood by all parties. Students are under no obligation to respond to offers of financial support prior to April 15; earlier deadlines for acceptance of such offers violate the intent of this Resolution. In those instances in



which a student accepts an offer before April 15, and subsequently desires to withdraw that acceptance, the student may submit in writing a resignation of the appointment at any time through April 15. However, an acceptance given or left in force after April 15 commits the student not to accept another offer without first obtaining a written release from the institution to which a commitment has been made. Similarly, an offer by an institution after April 15 is conditional on presentation by the student of the written release from any previously accepted offer. It is further agreed by the institutions and organizations subscribing to the above Resolution that a copy of this Resolution should accompany every scholarship, fellowship, traineeship, and assistantship offer.

#### Explanation of SYMBOLS

2        Figure following course title indicates the hours of credit and the number of lectures per week.

( )        hours of lecture and laboratory required each week during the semester, with lecture being the first figure and laboratory the second

(a/y)    Indicates alternate years.

c//       Indicates concurrent enrollment.

*Courses listed in this catalog are subject to change through normal academic channels. New courses and changes are initiated by the corresponding departments or programs, approved through the appropriate academic dean, the Catalog Subcommittee, the Academic Affairs or Graduate Studies Committees, and the University Senate. Additions to the curriculum for the ensuing year are published each fall in the Catalog Supplement within the Fall Time Schedule. It is the obligation of the student to be acquainted with all the pertinent information in this Catalog and the Graduate School Policies and Procedures Manual to see that all departmental requirements are satisfied.*

## **Accounting**

(See Business Administration)

## **Adult and Youth Education**

(See Human Development)

## **Agricultural and Resource Economics**

(See Economic Sciences)

## **Department of American Studies**

**Please note: we are not accepting applications for the 2010-2011 academic year.**

The graduate program in American Studies is currently being restructured. There is a hiatus on accepting applications for the 2010-2011 academic year. Your interest is appreciated. Please revisit our website in the future or [notify us](#) if you wish to be contacted with new information as it is available.

Degrees offered **M.A., Ph.D.**

Faculty working with students **35**

Graduate Students **42**

Students receiving assistantships or scholarships **90%**

Priority deadline **Fall - January 10**

Campuses **Pullman**

Tests required **TOEFL or IELTS**

### **Admission Requirements**

- Send to the Graduate School an official application form and official college transcripts sent directly from each institution attended.
- Send to the American Studies program: A 3 to 5 page statement of purpose describing your areas of interest and why the program at WSU is a good place for you to pursue them and a recent sample of your scholarly or critical writing (15-20 pages)
- Non-native speakers of English who seek teaching assistantships must submit an audiocassette with a two-minute sample of improvised conversation demonstrating their abilities with spoken English.

### **Program Description**

American studies use interdisciplinary approaches to the study of the United States as a multiethnic, multiracial, and multicultural society, embedded in transnational forces. The program has especially strong ties to our comparative ethnic studies and women's studies departments, as well as longstanding ties to the history and English departments. We also work with faculty in anthropology, communication, digital technology and culture, education, fine arts, philosophy, political science, and sociology. In addition to the American studies courses, we coordinate faculty and courses from these departments, and draw them together in rigorous interdisciplinary synthesis. The program offers a broad array of possibilities, with strengths in ethnic studies, feminist studies, multicultural American

West, environmental cultural studies of race, class, gender, sexuality and empire, popular culture, social movements, activist research, labor history, and cyberculture studies.

### **Contact Information**

Rose Smetana  
Washington State University  
PO Box 644010  
Pullman, WA 99164-4010  
Telephone: 509-335-2605  
Fax: 509-335-8338  
E-mail: [rsmetana@wsu.edu](mailto:rsmetana@wsu.edu)

### **Faculty Interests**

This interdisciplinary program draws on some of the finest professors from many disciplines.

**Jose Alamillo**, Comparative Ethnic Studies: Chicano/Latino studies, racial and ethnic studies.  
[alamillo@wsu.edu](mailto:alamillo@wsu.edu)

**Sue Armitage**, History: U.S. women's history and American historiography and social history.  
[armitage@wsu.edu](mailto:armitage@wsu.edu)

**Leroy Ashby**, Claudius and Mary Johnson Distinguished Professor of History: Twentieth century American history and the history of popular culture.  
[ashby@wsu.edu](mailto:ashby@wsu.edu)

**Mary Bloodsworth**, Women's Studies: Contemporary continental philosophy, feminist theory and philosophy, lesbian and gay studies.  
[bloodswo@wsu.edu](mailto:bloodswo@wsu.edu)

**John Bodley**, Anthropology: History and theory of anthropology, ethnography.  
[bodleyj@wsu.edu](mailto:bodleyj@wsu.edu)

Joan Burbick, English: American literature and culture of the 19th century, women writers of the West.  
[burbick@wsu.edu](mailto:burbick@wsu.edu)

**Kim Christen**, Comparative Ethnic Studies.  
[kachristen@wsu.edu](mailto:kachristen@wsu.edu)

**Lisa Guerrero**, Comparative Ethnic Studies.  
[laguerre@wsu.edu](mailto:laguerre@wsu.edu)

**Alexander Hammond**, English: Nineteenth and twentieth century American literature and culture.  
[hammonda@wsu.edu](mailto:hammonda@wsu.edu)

**Michael Hayes**, Teaching and Learning: Cultural studies, native studies, social theory, media studies, and topics in education.  
[mthayes@wsu.edu](mailto:mthayes@wsu.edu)

**Linda Zuniga Heidenreich**, Women's Studies: Chicana/o studies and history; queer studies.  
[lheidenr@wsu.edu](mailto:lheidenr@wsu.edu)

**Wendy Dasler Johnson**, English, WSU Vancouver: History and theory of rhetoric as a cultural and historical context for nineteenth century American women's poetry.  
[johnsonw@vancouver.wsu.edu](mailto:johnsonw@vancouver.wsu.edu)

**Michelle R. Kendrick**, English, WSU Vancouver: Race, gender, and cyberculture; history of technology; war and (new) media. [kendrick@vancouver.wsu.edu](mailto:kendrick@vancouver.wsu.edu)

**John E. Kicza**, History: Latin American history, early imperialism, comparative colonialism, ethnic relations.

*jekicza@wsu.edu*

**Susan Kilgore**, General Education: American literature and culture, modern poetry, feminist literary criticism.

*skilgore@wsu.edu*

**Richard King**, Comparative Ethnic Studies: Racial politics of culture.

*crking@wsu.edu*

**Alex Kuo**, English: Twentieth century American literature, Native American literature, and African American literature.

*kuo@wsunix.wsu.edu*

**David Leonard**, Comparative Ethnic Studies: Los Angeles and civil rights coalitions; video games; race and the NBA.

*djl@wsu.edu*

**Carmen R. Lugo-Lugo**, Comparative Ethnic Studies: Feminism and the literary works of contemporary women writers in the third historia.

*elugo@wsu.edu*

**Faith E. Lutze**, Criminal Justice: Rehabilitative nature of shock incarceration programs; women of color in prison; violence toward women.

*lutze@wsu.edu*

**Laurie Mercier**, History, WSU Vancouver: Workers and labor; identity; gender; region and community.

*mercier@vancouver.wsu.edu*

**Yolanda Flores Niemann**, Comparative Ethnic Studies: Chicana/o studies; ethnic studies as an approach to American cultural studies.

*yniemann@wsu.edu*

**Rory J. Ong**, Comparative Ethnic Studies: Race and ethnicity theory; cultural and critical theory; Asian American literature and popular culture.

*rjong@mail.wsu.edu*

**Jacqueline Peterson**, History: Native American history and public history.

*peterson@vancouver.wsu.edu*

**T.V. Reed**, English: Cultural theory, contemporary American fiction, digital diversity, popular culture.

*reedtv@wsu.edu*

**Camille Roman**, English: Twentieth century American and British literature and theory.

*roman@wsu.edu*

**Michael Salvador**, Communications: Critical analysis of public messages, organizational communication, environmental rhetoric, cross-cultural rhetoric.

*salvadorm@wsu.edu*

**Carol Siegel**, English, WSU Vancouver: Feminist theory, French poststructuralism, women's postmodernism, Victorian literature.

*siegel@vancouver.wsu.edu*

**John Streamas**, Comparative Ethnic Studies: Ethnic studies, Asian/Pacific American studies.

*streamas@wsu.edu*

**Noel A. Sturgeon**, Women's Studies: Intersections of race, class, and gender; feminist theory; race, gender, and nature in American culture.

*sturgeon@wsu.edu*

**Orlan J. Svingen**, History: Public history, United States history, Native American history.  
*svingen@wsu.edu*

**Victor Villanueva, Jr.**, English: Rhetorical and composition studies.  
*victorv@wsu.edu*

**Albert J. Von Frank**, English: Colonial and nineteenth century American literature.  
*vonfrank@mail.wsu.edu*

### **American Studies**

500 Colloquium 1 May be repeated for credit; cumulative maximum 12 hours. Current research in American studies. S, F grading.

501 Readings in American Studies I 3 May be repeated for credit; cumulative maximum 6 hours. Readings in key texts in American culture, beginnings to 1865.

502 Readings in American Studies II 3 May be repeated for credit; cumulative maximum 9 hours. Readings in key texts in American culture, 1865 to present.

503 Contemporary Theories of Race and Ethnicity 3 Prereq graduate standing. Major theoretical readings and key recent texts in United States and transnational ethnic studies scholarship.

504 Contemporary Feminist Theories and Practices 3 Prereq graduate standing. Major theoretical readings and key recent texts in U.S. and transnational feminist scholarship.

513 Theory and Method in American Studies 3 Same as Engl 513.

514 Interdisciplinary Research Methods 3 Major methods used in interdisciplinary cultural analysis including critical ethnography, oral history, rhetorical and textual analysis and other qualitative approaches.

520 Colonization, Globalization and Decolonization 3 Topics in the critical study of colonialism, neocolonialism, imperialism, globalization and resistance to these forces.

521 Critical Studies in Sexuality 3 Topics in the critical analysis of normative sexualities and forces shaping US and global cultures.

522 Digital Cultures, Digital Divides 3 Critical analysis of the social and cultural dimensions of the "digital divide" and use of digital technologies by dominant and subaltern communities.

523 Environmental Justice Cultural Studies 3 Critical analysis of the cultural dimensions of environmental justice and injustice.

524 Culture Studies in Popular Culture 3 Interdisciplinary approaches to historical and contemporary trends and issues in US popular culture.

525 Social Movements in American Cultures 3 Theoretical and historical study of the role of social movement in United States culture.

590 Seminar in American Studies 3 May be repeated for credit; cumulative maximum 9 hours. Interdisciplinary topics in American culture.

596 Topics in American Studies 3 May be repeated for credit; cumulative maximum 9 hours. Graduate level counterpart of Am St 496; Same as Engl 596. Credit not granted for both Am St 496 and 596. (SS)

600 Special Projects or Independent Study Variable credit. S, F grading.

700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.

702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.

800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading. Graduate students may also take courses from any of our ten affiliated departments.

## Department of Animal Sciences

www.ansci.wsu.edu

Degrees offered **M.S., Ph.D.**

Faculty working with students **19**

Students **25**

Students receiving assistantships or scholarships **90%**

Priority deadline **Fall - January 10**

**Spring - July 1**

Campuses **Pullman**

Test required **GRE; TOEFL or IELTS (international students only)**

### Admission Requirements

Undergraduates considering graduate study in the Department of Animal Sciences should major in animal science, biology, zoology, or a closely related field. To apply, please follow the directions on the Graduate School application site.

### Program Description

Graduates from our program are employed in a wide range of careers from applied animal production to teaching and research in molecular mechanisms in humans and both domestic and companion animals. Graduate students acquire cutting-edge knowledge and techniques in disciplines that are vital to the improvement of quality of life for animals and humans. Examples of ongoing basic research include:

- the genetic manipulation of bovine spermatogonial stem cells;
- the endocrine control of skeletal muscle growth and development in mammals and fish;
- Identification of quantitative trait loci and comparative genomics to improve livestock efficiency and health.

Examples of important applied research include:

- minimizing the impact of animals on the environment;
- altering animal nutrition to enhance meat quality;
- and strategies to enhance and understand animal behavior and well-being.

The department's dairy, feedlot, beef cow-calf unit, swine center, feed mill, research laboratories, experimental animal building, and meats laboratory provide the foundation for the department's bench-to-commodity focus.

### Contact Information

Kristen Johnson, Ph.D.

Chair, Graduate Studies

Department of Animal Sciences

126 ASLB,

PO Box 646351

Pullman, WA 99164-6351  
Telephone: 509-335-4131  
Fax: 509-335-1082  
E-mail: johnsoka@wsu.edu

### **Program Description**

The graduate program in animal sciences has a long history of excellence in graduate education. Graduates from our program are employed in a wide range of careers from applied animal production to teaching and research in molecular mechanisms in humans and both domestic and companion animals. Graduate students acquire cutting-edge knowledge and techniques in disciplines that are vital to the improvement of quality of life for animals and humans. Examples of ongoing basic research include: the genetic manipulation of bovine spermatogonial stem cells; the endocrine control of skeletal muscle growth and development in mammals and fish; identification of quantitative trait loci and comparative genomics to improve livestock efficiency and health. Examples of important applied research include minimizing the impact of animals on the environment; altering animal nutrition to enhance meat quality; and strategies to enhance and understand animal behavior and well-being. The department's dairy, feedlot, beef cow-calf unit, swine center, feed mill, research laboratories, experimental animal building, and meats laboratory provide the foundation for the department's bench-to-commodity focus. Over 80% of our graduate students have teaching or research assistantships that include tuition, health insurance, and a monthly stipend. Our alumni occupy positions in research, teaching, and extension programs at universities, in the federal government, and private industry, and prestigious postdoctoral positions in highly regarded national laboratories.

### **Graduate Opportunities**

National agricultural laboratories  
Postdoctoral positions in prestigious laboratories  
Management, allied and agricultural industries  
Extension and Technical positions

### **Positions Held by Recent Graduates**

Research scientist, Agricultural Research Service, Miles City, MT  
Research scientist, USDA Human Nutrition Lab, Grand Forks, ND  
Associate professor, Kansas State University  
National program leader, USDA, Washington, D.C.  
Senior endocrinologist, National Zoo  
Postdoctoral fellow, University of Pennsylvania, Philadelphia  
International consulting Worldwide Genetic Resources  
Director, Human in vitro Fertilization Lab, University of Michigan, Ann Arbor

### **Faculty Interests**

**Jan Busboom:** Meat science. The effects of diet, management systems (e.g. pasture versus feedlot), and genetics on the fatty acid composition, cutability, and eating quality of beef, pork, and lamb.  
*busboom@wsu.edu*

**Michael Dodson:** Muscle cell biology. Mechanisms by which myosatellite and adipose cells interact, grow, and develop.  
*dodson@wsu.edu*

**Larry Fox:** Dairy management and reduction of mastitis. Focus on mastitis and its control to develop intervention strategies that can be directly applied to dairy farm management.

*fox@wsu.edu*. Not accepting graduate students at this time.

**Charles Gaskins:** Cattle genetics and computer modeling of livestock production systems. Genetics of Wagyu and other breeds for production and carcass traits, including the fatty acid content of the meat.*gaskins@wsu.edu*

**Joe Harrison:** Livestock nutrient management with emphasis on dairy nutrition, whole farm nutrient management, and forages.*jhharrison@wsu.edu*

**Zihua Jiang:** Comparative genome biology. Evolutionary make-up of mammalian genomes, animal model genomics, and the development of cutting-edge genomics and bioinformatics tools, reagents, and databases.*jiangz@wsu.edu*

**Kristen Johnson:** Ruminant nutrition and energy metabolism. Understanding variation in animal energy use from uncoupling proteins in the inner mitochondrial membrane to whole animal energy expenditure in beef cattle; understanding and mitigating animal effects on air quality.

*johnsoka@wsu.edu*

**Ron Kincaid:** Mineral metabolism in livestock. The role of trace elements in health and performance of ruminants; dietary requirements of minerals during production cycles; strategies to reduce excretion of minerals by livestock.*rkincaid@wsu.edu*

**Jason Mann:** Processed meat science and food safety. The impact of various processing parameters, non-meat ingredients, and anti-microbial interventions on the microbiological safety of finished meat products. The use of existing and novel non-meat ingredients in processed meat products and the effect these ingredients may have on product quality and safety. *jason\_mann@wsu.edu*

**Derek McLean:** Germ cell transplantation, testis tissue grafting and genomics. Biological activity of spermatogonial stem cells and their supporting somatic cells in the mammalian testis.

*dmclean@wsu.edu*

**John McNamara:** Regulation of metabolism in lactation and growth. Studies of mechanisms of regulation in lactation to improve efficiency of energy and protein use in dairy cattle and lactating sows.*mcnamara@wsu.edu*

**Holly Neibergs:** Animal Genomics. Mammalian comparative and functional genomics in the search for genes of economic significance. Identification of genes involved in disease resistance and production traits with the use of linkage, epidemiological, and functional approaches. *neibergs@wsu.edu*

**Don Nelson:** Beef cattle extension; providing beef cattle producers with the tools and training to build an environmentally sound and sustainable production enterprise that is profitable.

*nelsond@wsu.edu* Not accepting graduate students at this time.

**Mark Nelson:** Ruminant nutrition. Manipulating ruminal fermentation to optimize animal productivity; study of cell wall chemistry, ruminal microbiology, and the associative effects of feedstuffs.

*nelsonm@wsu.edu*

**Ruth Newberry:** Animal well-being. Understanding the effects of different environmental conditions and previous experience on animal behavior and well-being.

*rnewberry@wsu.edu*

**Jerry Reeves:** Reproductive endocrinology. Development of an LHRH fusion protein, sterilization vaccine for cattle. *reevesjj@wsu.edu*

**Dan Rodgers:** Molecular endocrinology and animal genomics. Defining the underlying mechanisms responsible for the hormonal regulation of somatic tissue growth and development.

*danrodgers@wsu.edu*



**Raymond Wright, Jr.**, Chair: Early embryo development. Early embryo metabolism and the utilization of energy substrates. Improving the success rate and simplicity of the freezing procedure for embryos; various aspects of in vitro fertilization.

*raywright@wsu.edu*

### **Graduate Level Courses**

AS 500 - Seminar in Animal Sciences  
AS 504 - Special Topics  
AS 507 - Advanced Nutrient Metabolism  
AS 508 - Ruminant Nutrition  
AS 513 - Mineral and Vitamin Metabolism  
AS 520 - Preparation of Scientific Literature in Animal Sciences  
AS 551 - Endocrine Physiology  
AS 558 - Molecular and Cellular Reproduction  
AS 573 - Advanced Dairy Management  
AS 582 - Seminar in Reproductive Biology  
AS 588 - Perspectives in Biotechnology  
AS 598 - Advanced Topics in Animal Sciences  
AS 600 - Special Projects or Independent Study  
AS 700 - Master's Research, Thesis, and/or Examination  
AS 800 - Doctoral Research, Dissertation, and/or Examination

## **Department of Anthropology**

<http://libarts.wsu.edu/anthro>

Degrees offered **M.A., Ph.D.**

Faculty working with students **20**

Students **69**

Students receiving assistantships or scholarships **70%**

Priority deadline **Fall - January 10**

Campuses **Pullman**

Test required **GRE; TOEFL or IELTS (international students only)**

### **Admission Requirements**

To apply, submit the online Graduate School application, current curriculum vitae, statement of your educational and professional goals, official transcripts of all post-secondary education, contact information of three references, and official GRE scores. References will be contacted electronically for their support of your application to our program. They should note how familiar they are with you and your work, and should provide an evaluation of your promise for success in graduate studies, research, and a career in either archaeology, cultural anthropology, or evolutionary anthropology. You may submit one or two undergraduate papers to document your research and writing abilities. If you have completed an M.A. or M.S. you must submit a copy of your thesis or master's research paper this can be emailed as a PDF file directly to our Academic Coordinator Joy Strunk at [jmstrunk@wsu.edu](mailto:jmstrunk@wsu.edu).

## **Program Description**

Graduate programs are offered in archaeology, sociocultural anthropology, and evolutionary anthropology, each with its own requirements for advanced degrees.

- The program in archaeology emphasizes western North American, including Alaska. Methodological specialties include quantitative methods, modeling and simulation, lithic and ceramic analysis, geoarchaeology, paleoecology/palynology and zooarchaeology.
- The sociocultural program emphasizes issues in international development, psychological anthropology, cultural ecology, medical anthropology, and power and gender. A master's program in environmental anthropology, called the master's international, is offered in collaboration with the Peace Corps.
- The evolutionary anthropology program emphasizes evolutionary psychology, behavioral ecology, evolutionary cultural anthropology, evolutionary archaeology, and paleoanthropology.

## **Contact Information**

Archaeology Program

Dr. Karen Lupo

Telephone: 509-335-2304

E-Mail: klupo@mail.wsu.edu

Cultural Anthropology Program

Dr. Nancy McKee

Telephone: 509-335-0981

E-Mail: npmckee@wsu.edu

Evolutionary Anthropology Program

Rob Quinlan

Telephone: 509-335-5400

E-Mail: rquinlan@wsu.edu

## **General Department**

Telephone: 509-335-3441

Fax: 509-335-3999

Email: jmstrunk@wsu.edu

## **Graduate Opportunities**

University faculty; community college faculty; museum curator; museum technician; National Park Service; USDA Forest Service; Bureau of Land Management; private archaeological contracting; NGO; National Institute of Child Health and Human Development

## **Positions Held by Recent Graduates**

Assistant professor; state archaeologist; archaeologist; postdoctoral researcher; principal investigator; project director; cultural resource specialist

## Faculty Interests

**Lillian A. Ackerman**, cultural anthropologist: Family organization, land tenure, gender studies, and descent with emphasis on native Plateau peoples of the inland Pacific Northwest.

*shusha@mail.wsu.edu*

**Robert Ackerman**, archaeologist: Arctic and Subarctic of North America and Asia; earliest hunter-gatherers; late Pleistocene and early Holocene cultural adaptations.

*rackerma@mail.wsu.edu*

**William Andrefsky**, Chair, field-oriented archaeologist: Working in the Plateau, Arctic, and the Northern Great Basin on hunter-gatherer organization, lithic analysis, Neolithic transition, and cultural resource management.

*and@wsu.edu*

**John Bodley**, cultural anthropologist: Indigenous peoples, cultural ecology, and contemporary issues including relationships of power and scale.

*bodleyj@wsu.edu*

**Andrew Duff**, archaeologist: Emphasizing prehistoric archaeology in the American Southwest, with research on the formation of communities, organizational transitions associated with increasing population consolidation, questions of social and ethnic identity, and migration.

*duff@wsu.edu*

**Melissa Goodman-Elgar**, geoarchaeologist: Working in South America and western North America on advent of complex social and religious communities and the prehistory of sustainability.

*mage@wsu.edu*

**Barry Hewlett**, cultural anthropologist, WSU-Vancouver: Primary area Africa; cultural contexts of infant development and tropical diseases, the impact of new African tropical forest parks and reserves on the local people, and on cultural transmission and biocultural evolution.

*hewlett@vancouver.wsu.edu*

**John G. Jones**, palynologist in archaeology program: Mesoamerica and the New World tropics; origins of agriculture; historic landscape reconstruction; forensic palynology.

*jonesjg@wsu.edu*

**Tim A. Kohler**, archaeologist and member of evolutionary faculty: U.S. Southwest, Neolithic villages worldwide, the evolution of cooperation, agent-based modeling, and settlement systems.

*tako@wsu.edu*

**William D. Lipe**, archaeologist, emeritus faculty: The North American Southwest, archaeological method and theory, and cultural resource management. *lipe@wsu.edu*

**Karen Lupo**, zooarchaeologist and coordinator of the evolutionary program: Ethnoarchaeological study of bone assemblages, East African hunter-gatherers, Great Basin, evolutionary ecology, hunter-gatherer studies, faunal analysis and taphonomy. *klupo@mail.wsu.edu*

**Jessica Lynch Alfaro**, primatologist and member of the evolutionary faculty: Male social behavior and endocrinology in capuchin monkeys in Brazil; population genetics and evolutionary ecology.

*jwalfaro@wsu.edu*

**Jeannette Mageo**, cultural anthropologist: The Pacific, especially Samoa; cultural psychology, cultural history, religion, sex and gender, self, power, and transvestism. *jmageo@wsu.edu*

**Nancy McKee**, cultural anthropologist, linguist, and coordinator of cultural program: Working-class women and higher education in the inland Northwest; ethnicity, language and culture, culture and inequality, and gender. *mckee@wsunix.wsu.edu*

**Robert Quinlan**, biocultural anthropologist and member of the evolutionary program: Caribbean area, behavioral ecology, medical anthropology, life histories, ethnography.

*rquinlan@wsu.edu*

**Linda Stone**, cultural anthropologist: South Asia, international development, religion, kinship and gender, natural resource conservation, introduction of modern medical options.

*lstone@wsu.edu*

**Steven Weber**, archaeologist, WSU-Vancouver: U.S. Southwest, India, Pakistan and Washington; adoption of new subsistence strategies, paleoethnobotany, and interdisciplinary study of human interaction with the natural environment. *weber@vancouver.wsu.edu*

**Clare Wilkinson-Weber**, cultural anthropologist, WSU-Vancouver: Art, gender relations, organization of work, and film; regional expertise in India, Pacific Northwest. *weberc@vancouver.wsu.edu*

**William Willard**, cultural anthropologist, emeritus faculty: Native North America and Mexico, medical anthropology, and development anthropology. *wwillard@mail.wsu.edu*

### **Anthropology**

500 Field Methods V 2 (0-6) to 8 (0-24) Prereq permission by application. Training in gathering and analyzing field data. (SS)

501 History of Anthropological Theory 3 Prereq 6 hrs Anth. Development of theories in cultural anthropology; contributions of specific individuals; representative classics. Credit not granted for both Anth 401 and 501.

502 Cross-cultural Gender and Kinship 3 Prereq Anth 101 or Soc 101. Principles of kinship in anthropology applied to questions of cross-cultural gender definition. Credit not granted for both Anth 402 and 502.

504 Tribal Peoples and Development 3 Global and historic perspectives on the complex issues surrounding the problem of tribal peoples and development.

507 Advanced Studies in Culture Theory 3 May be repeated for credit; cumulative maximum 6 hours. Prereq 6 hrs Soc S. Evaluation of major theories and methods and their relationship to problems in cultural-social analysis.

510 Fundamentals of Cultural Anthropology 3 Overview of basic concepts and theory in cultural anthropology based on in-depth analysis of selected theoretical and ethnographic materials.

513 Lithic Technological Organization 4 (3-3) Methods and theory of lithic technology.

514 Ceramic Analysis 4 (3-3) Prereq graduate standing or permission of instructor. Basic concepts, methods, and approaches used in the analysis of archaeological pottery.

519 International Development and Human Resources 3 History of and recent changes in international development emphasizing anthropological perspectives.

528 Historical Ethnography 3 May be repeated for credit; cumulative maximum 9 hours. Prereq 3 hours Anth. Culture history, ethnography, theoretical and contemporary problems of selected culture areas. Credit not granted for both Anth 428 and 528.

529 Seminar in Ethnography 3 Prereq standing. Methodological, stylistic and craft issues in the process and product of ethnography.

530 Archaeological Method and Theory 3 History of archaeological method and theory; analysis of current literature.

535 Cultural Resource Management 3 Prereq graduate standing. Role of archaeology in historic preservation and resource conservation; legal and institutional frameworks; research and interpretation in a CRM context. Cooperative course taught by WSU, open to Idaho students (Anthr 535).

536 Ethnoarchaeology 3 Multidisciplinary approach (archaeology, ethnography and history) to the interpretation of man's past human cultures. Credit not granted for both Anth 436 and 536.

537 Quantitative Methods in Anthropology 4 (3-3) May be repeated for credit; cumulative maximum 8 hours. Prereq undergraduate Stat course. Sampling, exploratory data analysis, inferential statistics, microcomputer and use of SAS in anthropological research with emphasis on archaeology.

539 Prehistory of the Southwest 3 Prehistory of the American Southwest; emphasis on Pueblo, Mogollon and Hohokam traditions and relationships to historic native groups.

540 Prehistory of the Northwest Coast 3 Prehistoric cultures, chronologies and interrelationships on the Northwest Coast of North America.

542 Prehistory of Alaska and Eastern Siberia 3 Prehistoric cultural developments in the Arctic and sub-Arctic zones of Asia and North America.

543 Prehistory of the Plateau and Basin 3 Prereq graduate standing. Archaeology of the interior Northwest and Great Basin.

545 Historical Archaeology 3 Excavation and analysis of historical archaeological sites; acculturational implications. Cooperative course taught by UI (Anthr 531), open to WSU students.

547 Models and Simulation 3 Models and model-building as an anthropological approach to present and past cultures.

548 Hunters and Gatherers: Past and Present 3 Prereq graduate standing. Introduction to hunter-gatherer studies in anthropology and archaeology exploring uses of evolutionary approaches to modeling and reconstruction hunter-gatherer behavior in contemporary and prehistoric contexts.

550 Descriptive Linguistics 3 Introduction to analysis and description of natural languages; phonological, syntactic, and semantic analysis of data from a variety of languages. Credit not granted for both Anth 450 and 550. Cooperative course taught by WSU, open to UI students (Anthr 550).

554 Anthropological Field Methods Seminar 3 Prereq Anth 450/550. Elicitation, recording techniques and analysis of sociocultural and linguistic field data.

561 Current Trends in Physical Anthropology 3 May be repeated for credit. Prereq Anth 465. Intensive review of major current trends in physical anthropology.

562 Evolutionary Method and Theory in Anthropology and Archaeology 3 Prereq permission of instructor. A graduate-level seminar-based course focusing on the evolutionary analysis of past and present human behavior. Anthropology of Life and Death 3 Graduate level counterpart of Anth 463; additional requirements. Human population biology, dynamics of evolution, human ecology, and their relationship to the problem of human racial variation. Credit not granted for both Anth 463 and 563. Cooperative course taught jointly by WSU and UI (J 412/512).

564 Advances in Evolution and Human Behavior 3 Prereq one biology or biological anthropology course; one upper-division behavioral science course; graduate standing. Recent trends in the study of evolution and human behavior.

565 Human Evolution 3 Prereq Anth 260. Graduate level counterpart of Anth 465; additional requirements. Human origins in the light of the fossil record and evolutionary theory. Credit not granted for both Anth 465 and 565. Cooperative course taught jointly by WSU and UI (J 411/511).

566 Human Osteology 3 (2-3) Prereq Anth 260. Graduate level counterpart of Anth 466; additional requirements. Observations and measurements of human skeleton; variations based on age, sex, and race; comparisons with fossil man and higher primates. Credit not granted for both Anth 466 and 566. Cooperative course taught jointly by WSU and UI (J451/551).

568 Paleoanthropology 4 (3-3) Prereq Anth 565. An in-depth survey of the fossil evidence for human evolution, incorporating research methods and theory.

569 Evolutionary Cultural Anthropology 3 Prereq graduate standing. Evolutionary nature of culture and its interactions with human biology (genes) and ecology.

- 570 Sediments in Geoarchaeology 4 (3-3) Sediment-forming processes, sedimentological techniques, reconstruction of quaternary environments, and sedimentology of site-forming processes.
- 573 Zooarchaeology 4 (2-6) Identification of animal bones from archaeological sites, methodological and theoretical techniques for interpreting faunal remains. Cooperative course taught by WSU, open to Idaho students (Anthr 573).
- 576 Palynology 4 (3-3) Pollen and spore morphology, evolution, production, dispersal, and preservation; index fossils, dating, archaeology, and vegetational history. Field trip required.
- 581 Comparative Biology of Social Traditions 3 Prereq Anth 260 or Biol 106; senior or graduate standing. Phylogenetic and modeling perspectives used to examine the evolution of social learning and cultural transmission in humans and other animals.
- 591 Special Topics in Anthropology 3 May be repeated for credit; cumulative maximum 9 hours. Examination of current areas of anthropological theory and research.
- 592 Special Topics in Anthropology 3 May be repeated for credit; cumulative maximum 9 hours. Examination of current areas of anthropological theory and research.
- 593 Publishing and Professional Communication 3 Preparation of original research reports in anthropology; survey of types of professional communication, and of standards and techniques.
- 596 IPEM Seminar 1 Prereq IGERT fellow. Symposia and project work sessions for the WSU/UW IGERT: Program in Evolutionary Modeling.
- 598 Advanced Anthropology Internship V 1-15 Prereq graduate standing. May be repeated for credit; cumulative maximum 30. Participation as archaeological or cultural anthropological intern in public or private sectors; requires special arrangement with faculty advisor. S, F grading.
- 599 Archaeological Field School V 2-8 (0-6) - (0-24) Prereq graduate standing and permission of instructor by application. Training in methods of archaeological data recovery and analysis.
- 600 Special Projects or Independent Study Variable credit. S, F grading.
- 700 Master's Research, Thesis and/or Examination Variable credit. S, F grading.
- 800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

### **Department of Apparel, Merchandising, Design and Textiles**

<http://amdt.wsu.edu>

Degree offered **M.A.**

Faculty working with students **8**

Students **13**

Students receiving assistantships or scholarships: **85%**

Priority deadline **Fall - May 1**

**Spring - November 1**

Campuses **Pullman**

International test **TOEFL or IELTS**

### **Admission Requirements**

To apply, please submit the following:

- A personal statement addressing the applicant's interest in pursuing a master of arts, anticipated career path, and specific areas of research interest;
- Three letters of recommendation written by college level professors or advisors, or professional or personal references that address the applicant's ability for intellectual engagement, creative thinking, attitude, and motivation;

- Three written essays that demonstrate writing capabilities and creativity;
- A portfolio for the design emphasis may be required; official transcripts;
- All other requirements as outlined by the Graduate School.

### **Program Description**

The master's program provides students with opportunities to pursue research and/or design scholarship with emphasis on design, merchandising, or socio-cultural and historic aspects. The faculty mentor graduate students throughout the graduate study process from coursework to graduate scholarship activities. A multidisciplinary perspective is used to integrate disciplinary knowledge, scholarship, and professional practice within a business and industry context. Courses and committee members from allied disciplines provide options for augmenting theory, skills, and methodologies. These connections allow students to individualize the program to meet their personal strengths and interests. While adding multi-disciplinary expertise and understanding, the program deepens apparel, merchandising, and textile disciplinary knowledge.

### **Contact Information**

Tina Eads  
 Washington State University  
 PO Box 642020  
 Pullman, WA 99164-2020  
 Telephone: 509-335-1233  
 Fax: 509-335-7299  
 E-mail: amdt@wsu.edu

### **Graduate Opportunities**

Graduates of the Department of Apparel, Merchandising, Design & Textiles have many career opportunities including: university teaching, fashion design, technical design, retail management, retail buying, doctoral studies; museum management, community development, and entrepreneur development.

### **Positions Held by Recent Graduates**

Instructor, Oregon State University; assistant retail buyer, Cold Water Creek; product development manager, Native American Culture; quality control director, Nordstrom; accessory designer, Sara Truitt Textiles; designer, Nordstrom; product engineer, Nordstrom; assistant fashion designer, Woman's Wear, New York; apparel buyer, Tokyo Japan; department manager, Nordstrom; market analyst, Parisian.

### **Faculty Interests**

**Joan Anderson:** Data mining methodologies and their applications in decision-making; use of these technologies to aid in decision-making and strategic planning within the retail arena.

*joana@wsu.edu*

**Linda Arthur:** Intersections between culture, gender, and dress in both Western and non-Western societies; meanings underlying traditional textiles and clothing in ethnic subcultures.

*larthur@wsu.edu*

**KyeongSook Cho:** Aesthetic/technical aspects of apparel product development, including wearable art, computer aided design, functional apparel design, and development of a model for design education. *kcho@wsu.edu*

**Patricia Fischer:** Applied surface design, including hand and machine embroidery; focus on historic textiles, apparel products, and product development. *pfischer@wsu.edu*

**Lombusa Khoza:** Social psychology research in material culture, cross-cultural learning styles, and textile and apparel industries in developing economies. *lskhoza@wsu.edu*

**Carol Salusso:** The people-product interface, especially fit, sizing, visual effect, textile characteristics, and wearer satisfaction with product and their own body; resource development to enhance knowledge base in textile and apparel disciplines. *salusso@wsu.edu*

**Carole Urquhart:** Illustration and design, focusing on visual literacy as it applies to the apparel industry; applied design theory in illustration techniques, visual merchandising, and pattern development; professional product development culminating in an annual professional fashion show. *curquhart@wsu.edu*

### **Apparel, Merchandising, Design and Textiles**

#### **Required Core: 19 credits**

**AMT 508**, 3 credit, Fall Semester  
Readings in Apparel, Merchandising & Design

**AMT 517**, 3 credit, Spring Semester  
Apparel Merchandising Analysis

**AMT 518**, 3 credit, Fall Semester  
Critical Perspectives on Appearance

**AMT 519**, 3 credit, Spring Semester  
Research Methods

**AMT 520**, 3 credit, Spring Semester  
Readings in Apparel Merchandising & Textiles

**ED PSY 508**, 4 credit, Every Semester

Educational Statistics

#### **Complete Master's Scholarship: 5 credits minimum**

\***AMT 700** Master's Research, Thesis, and/or Examination or

\***AMT 702** Master's Special Problems, Directed Study and/or Examination

**Select 2-7 additional credits to reach minimum total of 21 (thesis) or 26 (project) graded credits and cumulative total of 30 credits.**

**AMT 512**, 3 credit, Every Semester  
Apparel Product Development

**AMT 598**, 1-3 credit, Every semester  
Topics In Apparel and Textiles

**AMT 528**, 1-6 credits, Variable  
International Experience in Apparel/Textiles

**AMT 596**, 3 credits, Fall & Spring Semester  
Advanced Instructional Practicum



**AMT 600**, 3 credit, Every Semester  
Special Projects or Independent Study

## **School of Architecture and Construction Management**

[www.arch.wsu.edu](http://www.arch.wsu.edu)

Degrees offered **Pullman (M Arch), Spokane (M Arch and M.S. Arch)**

Faculty working with students **16**

Students **35**

Students receiving assistantships or scholarships **25%**

Priority deadline **Fall - January 10**

Campuses **Pullman, Spokane**

Tests required **TOEFL or IELTS**

### **Program Description**

Selection of students is made during the spring semester with initial coursework beginning the following fall semester. The NAAB accredited master of architecture is offered in three tracks:

- Track 1 is a 1 1/2 year program specially designed for students who have a B.S. in architectural studies from WSU or professional undergraduate degrees from other institutions.
- Track 2 (2 ½ years) is for students who have an undergraduate degree in architecture or its equivalent from another U.S. university. Students in Track 2 will be in Spokane.
- Track 3 (3 ½ years) is for students who have an undergraduate degree in a field other than architecture. Students in Track 3 will be in Pullman.

The master of architecture is a professional degree that prepares students for architectural practice. The school also offers a Master of Science degree in architecture through the Spokane campus. For detailed requirements see [www.arch.wsu.edu](http://www.arch.wsu.edu).

### **Contact Information**

Chris Allen

Box 642220

Pullman, WA 99164-2220

Telephone: 509-335-0105

Fax: 509-335-6132

E-mail: [callen@acm.wsu.edu](mailto:callen@acm.wsu.edu)

### **Faculty Interests**

**John Abell:** Architectural design; material technologies, generative processes, and investigative practices of design; histories and theories of design, aesthetic experience and representation, spatial empathy, and urban material culture.

**Deborah Ascher-Barnstone:** Transparency in 20th century architecture, specifically transparency in postwar West Germany and in politics and architecture of East and West Berlin.

**Rob Barnstone:** The exploration of the boundaries between sculpture and building; new applications in envelope design, framing techniques, and material uses.

**Ken Carper:** Forensic engineering: failures and performance problems of constructed facilities; natural hazards: fire, flood, wind, and seismic events; structural systems in timber, steel, and concrete.

**Matt Cohen:** Architectural proportional systems in the works of Filippo Brunelleschi; American vernacular architecture and urban morphology; the development of new, observation-based research methodologies.

**Phil Gruen:** American architecture and urbanism; the use (and abuse) of early-twentieth and late-nineteenth-century architecture in tourism and promotion of cities.

**Tom Heustis:** The management of field and corporate operations for commercial, hospitality and multi-unit residential building construction. Professional interests center on the implementation of collaborative construction project delivery systems.

**Paul Hirzel:** The influence of landscape on architectural design; projects include books, buildings, and exhibitions on ordinary places and the application of advertising to convey information.

**Bashir Kazimee:** Sustainable development and housing; recent work focuses on the architecture and urban structure of Eastern Islamic cities.

**Katherine Keane:** Issues related to healthy environments through process and practice, including building materials and systems, tectonics, and process analysis.

**Greg Kessler:** Sensual aspects of material, structure and landscape; current work includes a collection of narratives related to human experiences of architecture and landscape.

**Taiji Miyasaka:** Materials from a cultural perspective and how the perception of materials influences architectural design; establishing innovative uses of materials in design.

**Keith Diaz Moore:** The transaction between socio-cultural factors and design, with interest in the design of therapeutic settings for those experiencing Alzheimer's Disease.

**Anna Mutin:** Morphology of urban structure, including social, economic, and political conditions underlying planning decisions leading to urban density, visual power, and future planning.

**Kim Singhrs:** The digital arts and presentation, including computer animation and digital video which complement teaching in computer animation and studio-based CAD.

**David Wang:** Architectural theory and philosophy of aesthetics; East/West philosophies of architecture; research methods for architects and designers.

## **Master of Architecture**

**510 Design Studio 6** Prereq Arch 403. Faculty directed studio for first semester students in the 1.5 year program.

**511 Design VIII/Graduate Design Project 6 (0-12)** Prereq Arch 403. Studio course focuses on preliminary design of graduate project.

**513 Graduate Design Project 6 (0-12)** Prereq Arch 511,515. Final graduate design studio focusing on individualized topics.

**515 Research Methods & Programming 3** Prereq Arch 403. Exploration of traditional research methods and investigations for architects.

**525 History & Theory 3** History and theory of 20th Century Architecture focusing on cultural philosophical principles related to design.

**527 Site and Landscape Design 3** Exploration of issues of site context analysis, topography, planning and landscape design.

**531 Advanced Tectonics 3** Prereq Arch 330, 403. Tectonic theory of concrete and metal construction with focus on skin design and technology as formative elements in architecture.

- 542 Issues in Architecture** 3 Prereq graduate standing; Arch 409, 525. Examination of issues in architecture related to society, culture, environment, politics and philosophy.
- 563 Structures III** 3 Prereq Arch 351, 352. Wind and seismic loads on architectural structures; high-rise structure systems; reinforced con-crete and masonry structures.
- 570** 6 Fall semester graduate design studio 2.5 year program.
- 571** 6 Spring semester graduate design studio 2.5 year program.
- 573 Ethics & Practice** 3 Prereq Arch 472. Ethical and professional practice issues related to the business and practice of architecture; investigations into marketing Client and business orientation.
- 577 Theories and Methods of Urban Construction** 3 Prereq graduate standing. Morphology, theoretical concepts, planning and spatial structure of cities and analysis of the transformation of the city core in Europe and America.
- 580 Architecture Internship** 4 Prereq graduate student in M. Arch degree program. Placement in an approved industrial, professional, or governmental position for specialized or general experience.

### **Master of Science in Architecture**

- 520 Directed Topics in Architecture V 1-3 May be repeated for credit; cumulative maximum 6 hours. Topics related to areas of emphasis in the program and student specialization.
- 530 Philosophies & Theories of the Built Environment 3 Focuses on systematic thought that may describe the behavior of the built environment.
- 534 Theory Case Studies 3 In depth exposure to the literature of selected theory typologies covered in Arch 530 (Necessity Empirical Observation, History, Comparison, etc.)
- 535 Design/Theory Case Studies 3 In depth analysis of social-cultural-technological factors affecting designs of the built environment.
- 540 Research Methods 3 Covers a variety of research methods, from quantitative to technical to philosophical, directed towards qualitative research.
- 546 Computer Animation II 3 Prereq Arch 446. Advanced computer animation techniques; advanced specialization in building/design simulation, art animation, science/engineering animation. May be repeated for credit; cumulative maximum 9 hours.
- 550 Design Applications 2 Emphasizes the cognitive and behavioral practices of design. Exploration in terms of content and the value.
- 551 Design/Build Firm Management 3 Introduction to design/build firm management procedures, policies, and strategies.
- 552 Design/Build Project Management 3 Introduction to policies, contracts and joint venture organizational structures related to management of design build policies.
- 553 Design and Construction Law 3 Introduction to contract law affecting the design and construction industry.
- 554 Design/Build Case Studies 3 Design/Build Case Studies 3 Prereq graduate standing. Case studies of specific design/build projects from legal, economics, technology, or firm management perspectives.
- 560 Interdisciplinary Seminar 3 Explores approaches to design thinking in the topic areas of people and place, istory, theory and criticism, and physical design.
- 561 Interdisciplinary Seminar II 2 Builds upon the knowledge gained from ARCH/ID/LA 560. Expected to conduct an in-depth investigation of a specific aspect of dwelling.
- 570 Advanced Architectural Studio/Laboratory 6 (0-12) In-depth study of design problems relating to cultural, environmental, technological and other issues as related to the student's area of emphasis.
- 580 Architecture Internship V 1-4 May be repeated for credit. Prereq graduate student in the MS in Arch degree program. Placement in an approved industrial, professional, or governmental situation for specialized or general experience.
- 600 Special Projects or Independent Study Variable credit. S, F grading.

- 700 Master's Research, Thesis and/or Examination Variable credit. S, F grading.  
701 Thesis Project Variable Credit. Prereq Graduate Standing. Thesis work comprising a design component along with a research component.  
702 Thesis Project V 1-6 Prereq graduate standing. Thesis work comprising a design component along with a research component.

### **Asia Program**

There are no advanced degrees offered in Asia Program; however, the following course is available as a supporting course for degrees in other fields.

536 Politics in Japan 3 Same as Pol S 536.

## **School of Biological Sciences**

<http://sbs.wsu.edu/>

Degree offered **Zoology and Botany, M.S., Ph.D. , Biology, M.S. only**

Faculty working with students **33**

Students **57**

Students receiving assistantships or scholarships: **100%**

Priority deadline **Fall - January 10**

**Spring - July 1**

Campuses **Pullman, Tri-Cities (Bio M.S. only), Vancouver (Bio M.S. only)**

Test required **GRE; TOEFL or IELTS (international students only)**

### **Admission Requirements**

Apply to the Graduate School which includes three letters of recommendation and official transcripts from each university-level school attended as well as all scores such as GRE and TOEFL. Applicants must submit their applications to the Graduate School and the School of Biological Sciences by January 10 for summer or fall semester and by September 15 for spring semester. Foreign applicants should note the WSU Graduate School deadlines on the Application for Admission. Forms are available online.

### **Program Description**

The School of Biological Sciences offers MS and Ph.D. degree programs in Botany and Zoology with a non-thesis MS option in Biology. We provide research specialties in ecology and evolution, physiology, systematics, and molecular biology for plant and animal systems.

A major strength of our program is the facilities available to graduate students for their research. For example students have access to extensive support facilities including an electron microscope center, herbarium, natural history museum, vivarium, greenhouses, and growth chambers.

Off campus, our graduate students may utilize several field research sites such as the Hudson Biological Reserve at Smoot Hill and Meyers Point Field Station.

All of our graduate students are fully-funded; most receive teaching assistantships, and some receive research assistantships and fellowships. A major focus for the faculty in our school is graduate research and we welcome you to directly contact individual faculty members or direct your questions to the graduate secretary within the School of Biological Sciences

**Contact Information**

Graduate Coordinator  
School of Biological Sciences  
Washington State University  
PO Box 644236  
Pullman, WA 99164-4236  
Telephone: 509-335-1666  
Fax: 509-335-3184  
E-mail: sbs@wsu.edu

**Biological Systems Engineering**

<http://www.bsyse.wsu.edu>

Degrees offered **M.S. and Ph.D. in Biological and Agricultural Engineering**

Faculty working with students **12**

Students **52**

Students receiving assistantships or scholarships **Majority of students are granted assistantships**

Priority deadline **Fall - January 10**

**Spring - July 1**

Campuses **Pullman**

Test required **TOEFL (international students only)**

**Admission Requirements**

Students should have a B.S. or M.S. in engineering or a closely related degree, with a GPA above 3.0.

**Program Description**

The Department of Biological Systems Engineering offers graduate programs in five areas.

- Biomass processing and bioproducts engineering: Develop engineering processes to produce useful, high-value products from the byproducts of agricultural operations and other sources of plant biomass.
- Food engineering: The application of engineering to the production of safe, nutritious food.
- Land, Air, Water Resources and Environmental Engineering (LAWREE): Engineering applications related to hydrologic processes at the field level or at the scale of large watersheds. Application of engineering and biological principles to the study of the environmental impact of managed biological systems, including agriculture, confined-animal operations, aquaculture, and natural resources.
- Bio-environmental engineering: Application of engineering and biological principles to the study of the environmental impact of managed biological systems, including agriculture, confined-animal operations, aquaculture, and natural resources.
- Agricultural Automation: Develop engineering solutions for processes and equipment to meet the needs in specialty crop production

## Contact Information

Joan Hagedorn  
Department of Biological Systems  
Engineering  
Washington State University  
PO Box 646120  
Pullman, WA 99164-6120  
Telephone: 509-335-1578  
Fax: 509-335-2722  
E-mail: hagedorj@wsu.edu

## Program Description

Facilities available for research include controlled-environment facilities, facilities for radio-biological research, gas exchange equipment for monitoring whole plants under a variety of controlled environmental conditions, garden and greenhouse facilities, and a well-equipped electron microscope center. The Ownbey Herbarium is one of the important regional plant collections in the nation, and vertebrate collections are housed in the Charles R. Conner Museum. Cooperation with numerous other campus units and the University of Idaho extends research opportunities.

## Positions Held by Recent Graduates

Postdoctoral positions in nationally renowned laboratories; faculty positions at tier-one research universities and outstanding undergraduate institutions.

## Faculty Interests

Detailed information regarding faculty research interests and current projects may be found at <http://www.bsye.wsu.edu/core/Graduate%20Studies/engr-grad06.htm>

**Michael Alfaro:** Evolutionarily important factors that influence the morphological, mechanical, functional, and ecological richness of a group. [alfaro@wsu.edu](mailto:alfaro@wsu.edu)

**Al Black:** Plant ecology and physiological ecology. [blackra@wsu.edu](mailto:blackra@wsu.edu)

**Patrick Carter:** Evolution of the integrated phenotype. [pacarter@wsu.edu](mailto:pacarter@wsu.edu)

**Mark Dybdahl:** Genetics of populations and their ecological and evolutionary consequences. [dybdahl@mail.wsu.edu](mailto:dybdahl@mail.wsu.edu)

**Gerald Edwards:** Photosynthesis, including effects of environmental stress and potential global climate change. [edwardsg@wsu.edu](mailto:edwardsg@wsu.edu)

**R. David Evans:** Carbon, nitrogen, and water dynamics in terrestrial ecosystems. [rdevans@wsu.edu](mailto:rdevans@wsu.edu)

**Richard Gomulkiewicz:** The evolutionary responses of organisms to their environments. [gomulki@wsu.edu](mailto:gomulki@wsu.edu)

**Howard Hosick:** Mechanisms of breast cancer development. [hosick@wsu.edu](mailto:hosick@wsu.edu)

**Larry Hufford:** Flowering plant systematics and evolution. [hufford@mail.wsu.edu](mailto:hufford@mail.wsu.edu)

**Kenneth Kardong:** The evolution of complex systems and the evolutionary processes involved in marine and terrestrial organisms. [kkardong@wsu.edu](mailto:kkardong@wsu.edu)

**Michael Laskowski**

mlaskow@uidaho.edu

**Raymond W. Lee:** Ecological physiology with emphasis on adaptations of marine invertebrates to extreme environments. rlee@mail.wsu.edu

**Richard N. Mack:** The organization and maintenance of natural communities, especially those subjected to biological invasions. rmack@wsu.edu

**Jon M. Mallatt:** Systematics of the major groups of invertebrates and vertebrates. jmallatt@mail.wsu.edu

**Andrew McCubbin:** Inter- and intra-cellular signaling in plant reproduction. amccubbin@wsu.edu

**Stacia B. Moffett:** Mechanisms of regeneration of the nervous system, using the nervous system of a snail as a model system. smoffett@wsu.edu

**David F. Moffett:** Ion transport across insect epithelia. dmoffett@wsu.edu

**Charlotte K. Omoto:** Eukaryotic cilia and flagella (the axoneme); mechanisms of regulation of axonemal motion using mutants and nucleotide analogs. omoto@wsu.edu

**John L. Paznokas:** paznokas@wsu.edu

**Eric H. Roalson:** Understanding processes that lead to speciation and diversification of flowering plant groups. roalson@mail.wsu.edu

**Charles T. Robbins:** Nutrition and energetics of larger wild mammals. ctrobbins@wsu.edu

**Hubert Schwabl:** Behavioral biology, endocrinology, and ecology. huschwabl@wsu.edu

**Andrew Storfer:** Phylogeography and life history of amphibians in the Pacific Northwest. astorfer@wsu.edu

**Mechthild Tegeder:** Molecular identification and functional characterization of transport processes controlling the partitioning of organic molecules. tegeder@wsu.edu

**Gary H. Thorgaard:** Basic and applied genetic research in fishes, especially trout and salmon. thorglab@wsu.edu

**Paul A. Verrell:** Evolution of diversity in the sexual behavior of animals. verrell@wsu.edu

**Michael S. Webster:** Issues in evolution, behavioral ecology, and conservation biology. mwebster@wsu.edu

**Vancouver faculty**

**Dawn Banker:** bankerd@vancouver.wsu.edu

**John Bishop:** Molecular evolution and plant population biology. bishop@vancouver.wsu.edu

**Steve Bollens:** Ecology of marine and estuarine zooplankton and fish. bollens@vancouver.wsu.edu

**Christine Portfors:** The neural mechanisms used by bats and mice to analyze complex sounds. portfors@vancouver.wsu.edu

**Cheryl Schultz:** Conservation biology, plant and animal ecology. schultzc@vancouver.wsu.edu

**Brian Tissot** tissot@vancouver.wsu.edu

## **BSysE**

**510 Fundamentals of Research** 3 Prereq graduate standing. The research process and the graduate research project; objectives, techniques, and challenges; scientific method and the design process; use of literature; creativity; writing and speaking about research; preparation of a research proposal. Cooperative course taught by UI (For 510), open to WSU students.

**512 Research and Teaching Methods 2** (1-3) Prereq graduate standing. Analysis and scientific communication.

**541 Instrumentation and Measurements 3** (2-3) Prereq Math 172; Phys 102 or 202. Instrumentation systems and measurement concepts, electronic signal-conditioning components and circuitry, digital electronics and microprocessor basics. Cooperative course taught by UI (AgE 541), open to WSU students.

**551 Advanced Biological Systems Engineering Topics V** 1-4 May be repeated for credit; cumulative maximum 6 hours. Directed group study of selected advanced topics in biological systems engineering. Cooperative course taught by WSU, open to UI students (AgE 561)

**552 Advanced Biological Systems Engineering Topics V** 1-4 May be repeated for credit. Directed group study of selected advanced topics in biological systems engineering. Cooperative course taught by WSU, open to UI students (AgE 561).

**555 Natural Systems for Wastewater Treatment** 3 Prereq senior or graduate standing. Principles and design procedures of natural systems for wastewater treatment for agricultural and non-agricultural applications.

**556 Surface Hydrologic Processes and Modeling** 3 (2-3) Graduate-level counterpart of BSysE 456; additional requirements. Credit not granted for both BSysE 456 and 556.

**557 Design for Watershed Management** 3 (2-3) Prereq junior or graduate standing. Modeling water movement and mass transport; design for balance between animal, plant, soil, water, and air resources in watershed. Cooperative course taught by WSU, open to UI students (BSyE 457).

**558 Fluid Mechanics of Porous Materials** 3 Statics and dynamics of multi-flow systems in porous materials, properties of porous materials; steady and unsteady flow. Cooperative course taught by UI (AgE 558), open to WSU students.

**562 Systems in Integrated Crop Management** 3 (2-3) Same as Entom 562. Credit not granted for BSysE 462 and 562.

**581 Advanced Physical Properties of Foods** 3 Prereq BSysE 481, Math 315. Analysis, modeling, and experimental procedures to measure food physical properties for use in food processing system design.

**582 Food Process Engineering Design** 3 Prereq BSysE 386 or Ch E 330. Design of food processing systems; design and simulation of sterilization and pasteurization processes in foods. Credit not granted for both BSysE 482 and 582. Cooperative course taught by WSU, open to UI students (AgE and FST 587).

**583 Food Separation Processes Design** 3 Prereq BSysE 482. Design of food separation unit operations including concentration, dehydration, and membrane processes. Credit not granted for both BSysE 483 and 583. Cooperative course taught by WSU, open to UI students (AgE 583).

**584 Thermal Processing of Foods** 3 (2-3) Prereq Ch E 332 or M E 404; graduate standing. Principles and practices of food preservation methods based on application of heat.

**586 Food Rheology** 3 (2-3) Prereq BSysE 386. Principles and applications on the rheology of foods, including fundamental and empirical equations; viscoelasticity; normal forces, time dependency and instrumentation. Credit not granted for both BSysE 486 and 586. Cooperative course taught by WSU, open to UI students (BSyE 586).



**587 Food Plant Design** 3 Graduate level counterpart of BSysE 487; additional requirements. Design of food processing systems; food properties; thermal and physical processes. Credit not granted for both BSysE 487 and 587. Cooperative course taught by WSU, open to UI students (FST 587)

**588 Food Powders** 3 Engineering principles applied to handling and processing of food powders, including particle size distribution, morphology, physical properties, agglomeration, attrition, segregation. Credit not granted for both BSysE 488 and 588. Cooperative course taught by WSU, open to UI students (BSyE 588).

**589 Food Quality Instrumentation** 3 (2-3) Instrumentation used in food quality assessment; classification of assessment techniques by product properties and evaluation methods. Cooperative course taught by WSU, open to UI students (BSyE 589).

**594 Advanced Topics in Bioprocessing and Biotreatment** 3 Analysis of bioprocessing and biotreatment processes including energetics, stoichiometry, species competition, process infiltration, product separation and optimization.

**595 Groundwater Flow and Contaminant Transport** 4 (3-3) Prereq Math 315; BsysE 351 or C E 351 or Geol 475. Physics of flow and contaminant transport in saturated porous media including governing equations, well hydraulics and computer modeling.

**598 Graduate Seminar** 1 May be repeated for credit. Required of all graduate students in agricultural engineering. S, F grading.

**600 Special Projects or Independent Study** Variable credit. S, F grading.

**700 Master's Research, Thesis and/or Examination** Variable credit. S, F grading.

**702 Master's Special Problems, Directed Study, and/or Examination** Variable credit. S, F grading. **800 Doctoral Research, Dissertation and/or Examination** Variable credit. (for PhD in engineering science only.) S, F grading.

### Requirements

This is an agriculture degree program, and requires that you have an academic background in or closely related to agriculture and science. To apply, fill out the online application at the WSU Graduate School and send transcripts of all college course work to the Graduate School. In addition, submit three letters of reference and a personal statement describing your intent and interest area(s) to the address below. Letters of reference and personal statement may be submitted by mail or e-mail. If you are an international student, contact the Office of International Students and Scholars for guidance on the application process.

Applications will be reviewed by the admission committee only when the file is complete and contains all materials. The review committee meets at least twice per semester. Please follow the WSU Graduate School calendar for graduate admission deadlines.

### Program Description

The Master of Science in agriculture program is a significant departure from other graduate programs offered within the College of Agricultural, Human, and Natural Resource Sciences. The emphasis of the program is on the agricultural professional, practitioner, and educator; its applications reflect the increased need for prepared individuals to apply new and emerging technologies and scientific findings. This degree offers practitioners the opportunity to continue their education while they continue employment either inside or outside of the Pullman area. The program is also designed for currently enrolled WSU students, at a distance and on campus, who wish to prepare for or further their careers in agriculture. A large number of electives are permitted to enable the student to emphasize one or two fields or otherwise tailor the curriculum to fit particular needs.

This program is based at WSU Pullman and is transmitted cooperatively through the distance degree program to various off-campus sites within the state and region using a variety of instructional

technologies. This exposes students to the technologies of the future and to multiple teaching faculties. A variety of distance learning formats will be employed; including two-way audio-video interactive classrooms, video conferencing, and Internet based instruction, pre-produced video, computer-aided instruction, computer-generated visual aids, and state-of-the-art instructional technologies. Both individual and group instruction techniques will be used.

### **Graduate Opportunities**

Graduates have the opportunity to develop a breadth of knowledge across the wide disciplines of agriculture and beyond by interacting with colleagues and faculty working in research areas outside of their own specific interests.

### **Positions Held by Recent Graduates**

Our alumni occupy positions in business and industry, production and business management, teaching, extension, federal and state government, community colleges, school administration, and as owners of independent businesses.

### **Contact Information**

Michael K. Swan, Ph.D.  
Chair, Graduate Studies  
Agricultural Technology and Education  
255 Johnson Hall  
Washington State University  
PO Box 646420  
Pullman, WA 99164-6420  
Telephone: 509-335-2899  
Fax: 509-335-2722  
E-mail: [mswan@wsu.edu](mailto:mswan@wsu.edu)

### **Faculty Interests**

**Carter Clary:** Microwave vacuum dehydration (MIVAC), production, harvesting and handling of fruits and vegetables, food processing, application of dehydration technology.  
[cclary@wsu.edu](mailto:cclary@wsu.edu)

**James Durfey:** Agricultural technology and management, precision agriculture, water quality in agriculture, agricultural safety, metal fabrication, mobile hydraulics.  
[jedurfey@wsu.edu](mailto:jedurfey@wsu.edu)

**Marvin Kleene:** Technology in the classroom, distance education, teaching methods in agricultural education, supervising student teachers.  
[kleenem@wsu.edu](mailto:kleenem@wsu.edu)

**Michael Swan:** Distance education, learning styles/models of teaching, international extension/technology transfer. [mswan@wsu.edu](mailto:mswan@wsu.edu)

Additional faculty from across the college and university participate in the program and have a variety of teaching interests and research areas. Some of the participating faculty are located at WSU Research Stations and Extension Offices.

## **AgEd**

- 504 Special Topics in Vocational Education V1-3 Special topics in agricultural education or agriculture that will provide advanced training for teachers of agriculture.
- 508 Foundations of Vocational Education 2 Historical philosophical, social, political and economic factors that influence education in vocational environments.
- 511 Seminar in Vocational Education 1 or 2 Prereq graduate standing. Seminar addressing new and emerging legislation and educational programs in vocational education.
- 536 Microcomputers in the Vocational Classroom 3 (2-3) Implications and applications of microcomputers for experienced classroom teachers.
- 597 Cooperative Education Programs 3 Program principles and design; teacher coordination procedures and responsibilities; classroom and on-the-job instruction; public relations; teacher administrative responsibilities.
- 600 Special Projects of Independent Study Variable credit. S, F grading.
- 700 Master's Research, Thesis and/or Examination Variable credit. S, F grading.
- 702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.

## **Program in Business Administration**

### **Accounting**

[www.cbe.wsu.edu/graduate](http://www.cbe.wsu.edu/graduate)

Degree offered: **Master of Accounting**

Faculty working with graduate students: **10**

Graduate students: **35**

Students receiving assistantships or scholarships: **40%**

Deadline **Fall—January 10**

**Spring—July 1**

Tests required: **GMAT; TOEFL (international students only)**

### **Requirements**

Applicants must meet the following requirements to be considered for admission:

Minimum GMAT score: 500

Minimum GPA: 3.0 on a 4.0 scale

Minimum TOEFL score: 580 or 237c

The accounting department will score applications to the master's program according to the following admissions index formula:  $(\text{GPA} \times 200) + \text{GMAT} = 1150$  or higher

The admissions index score must be a minimum of 1150 for admissions consideration.

### **Program Description**

The Department of Accounting offers the master of accounting degree to prepare students for careers as professional accountants in financial institutions, government industry, nonprofit organizations, and public practice. It is the department's primary degree for public accounting careers and is one of only two accounting master's degrees in the state of Washington with AACSB accreditation. The master of accounting program offers students several benefits: greater breadth and depth in accounting than is possible in baccalaureate or MBA programs; additional preparation for the CPA examination; additional credit hours targeted to professional accounting to meet the 150 credit hours necessary for CPA examination eligibility; and the additional recognition accorded the master of

accounting degree.

### **Graduate Opportunities**

Opportunities for master of accounting graduates include public accounting, external auditing, internal auditing, corporate accounting, tax accounting, and preparation for the Certified Public Accounting examination.

### **Positions Held by Recent Graduates**

Graduates have found jobs in public accounting with such firms as Deloitte, Ernst & Young, PricewaterhouseCoopers, KPMG, Moss Adams, Sweeney Conrad, Clark Nuber, and Berntson Porter. Graduates have also found jobs with the Washington Department of Revenue, the Washington State Auditor's Office, and the Internal Revenue Service.

### **Contact Information**

Chuck Munson, Ph.D., Associate Dean  
Graduate Programs in Business  
PO Box 644744  
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Telephone: 509-335-7617  
Fax: 509-335-4735  
E-mail: [gpbusadmin@wsu.edu](mailto:gpbusadmin@wsu.edu)

### **Faculty Interests**

**Charlie Bame-Aldred:** Auditing, forensic accounting, judgment and decision-making processes, planning and control systems, public accounting, fraud, securities fraud, auditors' detection of financial statement fraud, auditors' risk assessments and planning systems; finance: corporate governance and financial institutions; management: negotiation and conflict.  
*bamealdred@cbe.wsu.edu*

**Albert Frakes:** Accounting valuation and pension accounting. *frakes61@wsu.edu*

**Susan Gill:** Financial accounting, managerial/cost accounting. *gills@wsu.edu*

**Robert R. Greenberg,** Chair: Cost measurement. *greenberg@wsu.edu*

**Thomas R. Nunamaker:** Financial accounting; governmental and nonprofit accounting.  
*nunamaker@wsu.edu*

**Deborah L. Sanders:** Taxpayer decision-making behavior and tax compliance behavior; current professional tax topics resulting from changes in the tax laws.  
*dsanders@wsu.edu*

**John T. Sweeney:** Ethics and behavioral issues in accounting *jtsweeney@wsu.edu*

**Steven W. Thornburg:** Professional regulation and public policy, management accounting, ethics, and literary aspects of accounting. *thornburg@wsu.edu*

**Richard B. Toolson:** Retirement planning, tax accounting, taxation of investments.  
*toolson@wsu.edu*

**Bernard Wong-On-Wing:** Behavioral accounting; judgment and decision making.  
*wow@wsu.edu*

## **Required**

Acctng 537 Professional Research  
B Law 511 Business Law II  
Acctng 702 Master's Special Problems\*

## **Electives:** (select four)

530 Accounting Theory  
532 Contemporary Accounting Cases and Problems  
535 (536) Advanced Taxation  
538 Seminar in Cost/Managerial Accounting  
539 Seminar in Public Accounting and Auditing

## **Master of Business Administration**

[www.mba.wsu.edu](http://www.mba.wsu.edu)

Degree offered **MBA (2-Year Option and Accelerated Option)**

Faculty working with graduate students **25**

Graduate students **54**

Deadline **Fall—January 10**

Tests required **GMAT (all applicants); TOEFL, MELAB, or IELTS (international students only)**

### **Requirements**

Applicants must meet the following requirements to be considered for admission:

Minimum GPA: 3.0 on a 4.0 Scale

Minimum TOEFL score: 580, (237c BT 92-93), IELTS 6.5, or MELAB 82.

Applications to the MBA program will be scored according to the following admissions index formula:  
(GPA x 200) + GMAT = 1150 or higher.

The admissions index score must be a minimum of 1150 for admissions consideration.

Additionally, applicants must submit transcripts, test scores, three academic or professional letters of reference, a resume, and a statement of purpose. Students from any academic major are encouraged to apply. Work experience, though desired, is not a requirement for admission. All entering MBA students are required to have their own wireless laptop prior to the first day of classes.

### **Program Description**

The full-time MBA program reflects that of other elite programs in the nation, while maintaining a small and personal touch. Pullman MBA students engage in spirited case discussion led by nationally prominent faculty. Live case policy studies and plant tours bring business to life. The combination of team-based learning and hands-on experiences develops highly capable leaders with the skills to manage innovation, from the early planning stages to the initial marketplace offering and beyond. Following an engaging and enjoyable three-week pre-program review, students complete interdisciplinary coursework, sequenced to maximize career preparation for managers of the future.

Real-world highlights imbedded in every student's experience include entry in the business plan competition, corporate consulting project, service learning project, Executive Education Seminar Series, "live" marketing policy case study with executives, and field trips to tour plants.

## **Graduate Opportunities**

Today's MBA students are tomorrow's business leaders. Washington State University MBA graduates join management teams at top corporations. Firms in diverse industries value the program's emphasis on a collaborative, problem-solving approach to management. Examples of positions the WSU MBA will prepare you for include management consultants, project managers, strategic marketing directors, technology entrepreneurs, fixed income traders, portfolio managers, global high performance computing managers, telecom/communication sector lead product managers, patent attorneys, senior consulting managers, supply chain managers, sales representatives, senior buyers, enterprise auditors, real estate developers, logistics analysts, directors of facilities and space management, and more.

## **Positions Held by Recent Graduates**

Recent MBA graduates have been recruited to fill mid- to upper-level management positions at Accenture, Boeing, Ernst & Young, Fairmont Hotels & Resorts, FedEx-Kinko's, Goodyear, John Deere, KPMG, Marriott, and Microsoft Protiviti.

## **Contact Information**

Graduate Programs in Business  
Washington State University  
PO Box 644744  
Pullman, WA 99164-4744  
Telephone: 509-335-7617  
Fax: 509-335-4735  
E-mail: mba@wsu.edu

## **Curriculum**

### **August Before Entering**

Three weeks full-time training that includes professional development, business writing, oral presentations, case analysis preparation, challenge course teamwork development, multi-cultural communication, spreadsheet design and modeling in Excel, calculus, statistics, research skills, and using library resources.

2-Year MBA Program

### **Year One—Fall Semester (16 credits)**

Acctg 550- Introduction to Financial and Managerial Accounting  
Econ 555- Managerial Economics for Decision Making  
MgtOp 591- Statistical Analysis for Business Decisions  
MgtOp 593- Managerial Leadership and Productivity  
Mktg 505- Survey of Marketing  
MgtOp 702- Master's Directed Study-1 credit (Executive Education Seminar Series)

### **Year One—Spring Semester (15 credits)**

Acctg 533- Administrative Control  
Fin 525- Advanced Financial Management  
MgtOp 581- Operations Management  
MIS 580- Information Systems Management

Mktg 506- Marketing Management and Administrative Policy

**Summer (1-4 credits)**

*Required*

MgtOp 600- Independent Study (3 credits). Supervised summer internship with student written and oral reports along with company feedback. Minimum 8 weeks.

*Optional\** IBus 600- Independent Study (3 credits). Study abroad—3 weeks

**Year Two—Fall Semester (15 credits)**

B Law 510- Business Law and Ethics

Fin 526- Problems in Financial Management

HBM 581- Services Management

MIS 576- Emerging Technologies

Elective Course

**Year Two—Spring Semester (13 credits)**

MgtOp 590- Strategy Formulation and Organizational Design

MgtOp 600- Independent Study (3 credits) Business Plan Competition

MgtOp 702- Master’s Directed Study, 2 credits (Executive Education Seminar Series)

Elective Course

Elective Course

\*One second-year elective may be dropped if IBus 600 is taken over the summer.

**Accelerated MBA Option**

Prior to starting the summer semester in the program, students must have completed the following prerequisite Business foundation courses from an AACSB accredited or approved business program and have earned an average of a 3.0 GPA on a 4.0 scale with no more than two grades below a B in the following courses:

**Business Foundation Courses**

Introduction to Financial and Managerial Accounting (Acctg 230 and 231)

Managerial Economics for Decision Making (Econs 101 and 102)

Business Law and Ethics (B Law 210)

Advanced Financial Management (Fin 325)

Operations Management (MgtOp 340)

Statistics (MgtOp 215)

Survey of Marketing (Mktg 360)

\*\*Contact the Office of Graduate Programs with questions regarding course equivalencies.\*\*

This program is located on the Pullman campus and includes a comprehensive graduate business curriculum including the following content/experiences:

**Summer (6-9 credits)**

MgtOp 591: Statistical Analysis for Business Decisions

MgtOp 593: Managerial Leadership and Productivity

Optional: Study Abroad, 3 weeks (IBus 580: Study in Switzerland, 3 credits), Internship (BA 600:

Independent Study, 1 credit), or additional coursework

### **Three-week Orientation**

August Before Fall Semester:

Case Analysis Preparation, Oral Presentations, Interviewing, Business Writing, Challenge Course Teamwork Development, Business Writing, Multi-cultural communication, Spreadsheet Design and Modeling in Excel, Calculus, Research Skills, and Using Library Resources

### **Year One Fall Semester (16 credits)**

Fin 526: Problems in Financial Management

HBM 581: Services Management

BA 702: Executive Education Seminar Series (1 credit)

Elective Course

Elective Course

Elective Course

### **Year One Spring Semester (16 credits)**

Acctg 533: Administrative Control

MgtOp 590: Strategy Formulation and Organizational Design

MIS 580: Information Systems Management

Mktg 506: Marketing Management and Administrative Policy

Entrp 501: Business Plan Competition

BA 702: Executive Education Seminar Series (1 credit)

\*One elective may be dropped if IBus 580 is taken over the summer

\*\*Recently offered electives:

Entrp 588

Fin 527

Fin 581

IBus 580 (International Human Rights)

## **Finance**

[www.cbe.wsu.edu/fire/index.html](http://www.cbe.wsu.edu/fire/index.html)

Degree offered: **Ph.D.**

Faculty working with graduate students: **10**

Graduate students: **14**

Students receiving assistantships or scholarships: **83%**

Tests required: **GMAT; TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

### **Admission Requirements**

Prerequisites: Three semesters of college calculus, one semester of mathematics for economists, one semester of linear algebra, two semesters of probability and statistics, one semester of intermediate microeconomics, one semester of intermediate corporate finance, one semester of investments, one semester of financial markets and institutions.



To apply send three strong letters of recommendation, official GMAT score, and a statement of purpose identifying your area of interest, experiences, and intended research focus. Minimum criteria for admission: GMAT suggested minimum of 600; GPA 3.25 on a 4.00 scale; for international students TOEFL 580 (237c, IBT 92-93), IELTS 6.5 or MELAB 82.

### **Program Description**

The goal of the doctoral program in finance is to provide rigorous instruction in finance theory, empirical methods, and the application of quantitative tools to finance problems. Upon completion of the program, graduates should have a comprehensive understanding of theoretical and applied finance and have a command of quantitative and econometric methods sufficient to produce high quality research at universities or perform competitively in the finance industry. Students are required to complete general business foundation requirements, after which an academic advisor will be assigned to assist in completing the required 48 credit hours of course work. Students will be able to work closely with a faculty advisor to identify the specific research and major and minor courses in their area of study. Classes are designed to lead doctoral candidates to their preliminary written and oral examinations administered by graduate faculty.

### **Contact Information**

Graduate Programs in Business  
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E-mail: [finance@cb.wsu.edu](mailto:finance@cb.wsu.edu)

### **Faculty Interests**

**Swaminathan Kalpathy:** Executive compensation and corporate finance: includes executive stock options, executive stock option repricing earnings management.

*swamik@wsu.edu*

**Gene Lai:** Risk management, insurance, corporate finance, and market efficiency: alternative risk financing, efficiency issues, underwriting cycles, stock repurchase, and dividend policy.

*genelai@wsu.edu*

**Michael J. McNamara:** Risk management and insurance: organizational structure and efficiency in the insurance industry and risk management issues.

*MJMcNam@wsu.edu*

**John Nofsinger:** Behavioral finance, international finance, investments, investor herding, and investor psychology: behavioral finance, international firms cross-listing on foreign exchanges, and investor behavior in Japan. *john\_nofsinger@wsu.edu*

**Donna L. Paul:** Corporate governance, corporate investment decision making, corporate investment policy. *donna\_paul@wsu.edu*

**Richard Sias:** Investments, investor herding, and portfolio management: market efficiency, institutional and individual investors, and investments. *sias@wsu.edu*

**Harry Turtle:** Investment theory, portfolio management, international finance, and capital markets: failure risk; investment theory and performance measurement. *hturtle@wsu.edu*

**David Whidbee:** Banking, corporate governance, financial institutions, commercial banking.

*whidbee@wsu.edu*

## **Information Systems**

[www.cbe.wsu.edu/mis/index.html](http://www.cbe.wsu.edu/mis/index.html)

Degrees offered: **Ph.D. in Business Administration (concentration in Management Information Systems)**

Faculty working with graduate students: **12**

Graduate students: **10**

Graduate students receiving assistantships or scholarships: **93%**

Tests required: GMAT; TOEFL or IELTS (international students only)

Deadline: **Fall—January 10**

**Spring—July 1**

### **Requirements**

Requirements include foundation courses in business, plus extensive coursework in MIS research, statistics, and research methods.

### **Program Description**

Our faculty are nationally recognized in the MIS discipline, having served on the editorial boards of the field's top journals, chaired the field's top national and international conferences, won the field's top national research awards, and served on the national MIS curriculum and accreditation task forces. The research focus of our program is on organizational, managerial, and behavioral issues surrounding information technology design, implementation, adoption, and use. Our doctoral program is a full-time program requiring that you live here in Pullman. This rigorous program usually takes three or four years to complete depending on your previous course work.

### **Graduate Opportunities**

Our goal is to place our graduates in IS programs in peer or better Carnegie Foundation research extensive universities. Program requirements in this area are intended to develop proficiency in the student's major field of study. These requirements are focused on MIS Research and on MIS Core knowledge, and are shown below:

a) MIS Research (9 credits)

MIS 596: MIS Research Foundations

MIS 598: MIS Research Topics

MIS 599: MIS Research Proposal Development

In addition to the research seminars shown above, students must also demonstrate proficiency in the following courses, being registered for at least 3 of the 4:

b) MIS Core (9 credits)

MIS 572 Database Management Systems

MIS 574 Business Telecommunications

MIS 582 Systems Analysis and Design

### **Positions Held by Recent Graduates**

University of Virginia, California State University-Fresno, Washington State University, SUNY Albany.

## Contact Information

Department of Information Systems  
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Fax: 509-335-4275  
E-mail: MIS@cbe.wsu.edu

## Faculty Interests

**Pratim Datta:** Modular infrastructure design, information systems performance, and knowledge management process modeling; also virtual reality interfaces, cybertrust, information economics, and technology strategies for developing countries.

**Mauricio Featherman:** Consumer decision-making processes when adopting Internet technologies that are potentially risky to use; how consumers perceive artifacts of the computer interface; and the interplay between consumer perceptions and social influences.

**Mark A. Fuller:** Virtual teamwork, and how factors such as group composition and technology features influence group performance in project teams; technology mediated learning; trust formation in computer mediated and ecommerce environments; social presence in human computer interfaces.

**Traci Hess:** How multimedia characteristics affect user evaluations and decision-making performance with information systems; user involvement, trust, and task/technology fit with multimedia interfaces; equity issues in user acceptance and resistance of information systems.

**Kshiti Joshi:** Knowledge management, IT workforce, and gender related issues; how individuals within an information system development team transfer and share knowledge; recruitment and retention of IT personnel.

**Kent Marett:** Electronic transmission of deceptive communication and how that can affect decision-making in a business environment; the role of information technology in group decision outcomes and the influence of human biases.

**Saonee Sarker:** Virtual teams and computer-mediated groups; technology adoption by groups; leadership, knowledge transfer, trust, and group collaboration in global software development teams and IT offshore outsourcing projects.

**Suprateek Sarker:** Use of qualitative methodologies to study phenomena such as BPR/ERP implementation, global virtual teamwork, information systems development, and mobile commerce.

**Joe Valacich:** Computer-mediated communication on group performance, including outcomes like decision making, creativity, and group satisfaction; virtual teamwork, technology and learning, and the effects of ecommerce interface designs on user behavior.

**John Wells:** Electronic commerce interface design and how website characteristics influence a consumer's ability to evaluate organizations, as well as the experiential attributes associated with the product/service offering; eCommerce strategy and IT-enabled customer relationship management (CRM).

## Management and Operations

### Marketing

[www.cbe.wsu.edu/marketing/index](http://www.cbe.wsu.edu/marketing/index)

Degree offered: **Ph.D. in Business Administration**

Numbers of faculty working with graduate students: **12**

Graduate students: **9**

Students receiving assistantships or scholarships: **100%**

Tests required: **GMAT; TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

### Requirements

To apply, submit three letters of recommendation, a personal statement, and official transcripts.

### Program Description

The Ph.D. in business administration (with an emphasis in marketing) at Washington State University is designed to prepare graduates for careers in research and teaching. The primary goal of the marketing Ph.D. program is to train academics for placements at AACSB-accredited peer institutions (preferably with a doctoral program of their own) throughout the United States and abroad. Those with a completed master's degree in a business discipline can complete the Ph.D. in 4 years of full-time resident study. The program encompasses a variety of formal and informal interactions and projects with faculty and others, as well as course work, comprehensive exams, and dissertation research. It enables students to develop substantial competencies in the theory, practice, and research methodology essential to the advancement of marketing knowledge, while accommodating individual backgrounds, experiences, and objectives. Course work covers topics associated with the scholarly pursuit of marketing as well as topics from supporting fields of inquiry such as psychology, sociology, and management. Extensive coverage of research methods and statistics associated with the social sciences also is a large component of the program. In addition to specific coursework, the marketing Ph.D. program also provides an environment in which students can develop research competencies in close association with the marketing faculty and other Ph.D. students.

### Positions Held by Recent Graduates

Faculty positions at universities such as University of Montana, Oklahoma State University, Illinois State, UNLV, University of Nebraska, and Georgia Tech.

### Contact Information

David Sprott, Ph.D.

Department of Marketing

PO Box 644730

390 Todd Addition

Pullman, WA 99164-4730

Telephone: 509-335-6896

Fax: 509-335-3865

E-mail: [dsprott@wsu.edu](mailto:dsprott@wsu.edu)

## **Faculty Interests**

**Joe Cote:** Analytic frameworks for strategic planning, the effects of design on logos and type-face, the validation of measurement scales, and various consumer behavior topics.

**Kristine Ehrich:** Judgment and decision making, with special emphasis on the impact that internal tensions or conflicts have on consumer decision making, the strategies that are used to manage these conflicts, and the biases that result.

**Joan Giese:** Consumer satisfaction, influence of word-of-mouth communication on consumer choice, design influences on consumer responses, and the role of affect and the interaction with cognition in consumer decision-making.

**Yany Gregoire:** Customer retaliation: efforts made by customers to punish and cause inconvenience to a service firm; the effects of a prior relationship on the desire for retaliation or vengeance experienced by customers after service failures.

**Pamela Henderson:** The drivers of strategic effectiveness for the design of the visual elements of the marketing mix, including logos, typestyles, packaging, and other design elements; aesthetics, affect, and memory; how disruptive innovations be identified through research; research methods, strategy, company growth.

**Jean Johnson:** Management of new product development processes; organizational learning; strategic flexibility; the development of partnering capabilities between firms in buying-selling relationships; management of strategic alliances.

**Darrel Muehling,** Department Chair: Consumer responses to various forms of advertising communications including nostalgic advertising, imagery in radio advertising, and positive/negative message framing.

**Eric Spangenberg:** Consumer skepticism toward advertising; effects of marketplace cues (e.g., stimuli such as music, olfactory stimuli, and tactile cues) on consumer attitudes and self-prophecy (testing theory and effects regarding making a prediction about one's own future behavior); measure development.

**David Sprott:** Psychology within the domain of consumers: social influence, branding, retail pricing, and various topics related to marketing and society.

**Donald E. Stem, Jr.:** Survey methodology: scaling and questionnaire design, statistical analysis for measurement of consumer attitudes and behavior, cross-cultural applications; methods for measurement of sensitive subjects and the reduction of normative response; marketing on the Internet and the consumer behavioral differences from traditional channels.

**Patriya Tansuhaj:** The impact of globalization on business and society: international marketing strategy, especially export marketing and use of e-commerce for accessing foreign markets; societal and ethical issues surrounding firms' international business conduct.

**U.N. Umesh:** Entrepreneurial marketing, technology start-ups, conjoint analysis, marketing of computers and information systems, channels of distribution; new products marketing, trademarks, patents, and copyrights; stock market reactions to marketing actions; applications of quantitative models in marketing.

## **Hospitality Business Management**

### **Accounting**

- 530 Accounting Theory 3 Prereq Acctg 430. Recent developments with respect to the determination of income and the valuation of assets.
- 531 Federal Taxation 3 Prereq Acctg 335. Overview of federal taxation of individuals, partnerships, corporations, estates and gifts.
- 532 Contemporary Accounting Cases and Problems 3 Prereq Acctg 430. Accounting theory applied to external financial reporting practices.
- 533 Administrative Control 3 Prereq enrollment in the MBA program. Managerial evaluation of budgeting, cost accounting, and financial analysis techniques; their utilization in control of operations.
- 535 Advanced Taxation 3 Prereq Acctg 335. Federal income tax impact on corporations, S corporations, partnerships, estates, trusts and their beneficial owners.
- 537 Professional Research 3 Methodology used by accounting professionals to research applied problems in taxation, accounting, and auditing; communicate results.
- 538 Seminar in Cost/Managerial Accounting 3 Cost concepts, cost and managerial accounting systems; current issues and research in cost and managerial accounting.
- 539 Seminar in Public Accounting and Auditing 3 Prereq Acctg 439. Public accounting and auditing to present; current issues including statistical sampling and computers.
- 550 Introduction to Financial and Managerial Accounting 3 Prereq enrollment in the MBA program. Fundamentals of financial and managerial accounting; primarily for graduate students who wish to meet the MBA core requirements in accounting.
- 596 Doctoral Topics 3 May be repeated for credit; cumulative maximum 15 hours. Advanced topics in accounting.
- 600 Special Projects or Independent Study Variable credit. S, F grading.
- 702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.
- 800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

### **Business Administration**

- 594 Seminar in Research Techniques 3 Advanced doctoral-level topics in research techniques.
- 596 Doctoral Topics V 1-4 May be repeated for credit; cumulative maximum 15 hours. Advanced topics in management and operations.
- 598 Research and Professional Development 1 May be repeated for credit; cumulative maximum 6 hours. Ph.D.-level professional development colloquium designed to improve research, teaching and presentation skills to provide professional socialization.
- 600 Special Projects or Independent Study V 1-18 May be repeated for credit. S, F grading.
- 702 Master's Special Problems, Directed Study, and/or Examination V 1-18 May be repeated for credit. S, F grading.
- 800 Doctoral Research, Dissertation, and/or Examination V 1-18 May be repeated for credit. S, F grading.

## **Business Law**

510 Business Law and Ethics 3 Prereq enrollment in the MBA program. Legal process and reasoning; commercial, managerial, and employment law; government regulations; contracts, torts, crimes; ethical conflicts and ethical decision making.

511 Business Law II 3 prereq B Law 210 or 510. Law of partnerships, corporations, securities regulations, negotiable instruments, secured transactions, property, insurance and bankruptcy; government regulation of businesses and professions.

## **Entrepreneurship**

501 Technology Entrepreneurship 3 Basic business concepts and processes applied to technology commercialization and venture creation.

588 Management of Innovation 3 Prereq graduate standing. Same as MgtOp 588.

## **Finance**

Fin

500 Economic Theory I 3 Same as EconS 500.

501 Economic Theory II Same as EconS 501.

502 Economic Theory III Same as EconS 502.

503 Economic Theory IV 3 Same as EconS 503.

504 Economic Theory V 3 Same as EconS 504.

510 Statistics for Economists 4 Same as EconS 510.

511 Econometrics I 3 Same as EconS.

512 Econometrics II 3 Same as EconS

521 Interest Rates and Financial Markets 3 Prereq Fin 325 or 525. Real and nominal interest rates; bond pricing; term and risk structure of interest rates; investment and commercial banking; financial futures.

524 (502) Financial Management 3 Prereq Acctg 550; EconS 101. Financial management of the firm; capital budgeting, working capital management, capital acquisition, and dividend policy.

525 Advanced Financial Management 3 Prereq enrollment in the MBA program. Theory of financial management; quantitative analysis of financial problems of the firm; empirical studies on financing modern corporations.

526 Problems in Financial Management 3 Prereq enrollment in the MBA program; Fin 325 or Fin 525. Application of financial principles to problems in financial management; credit policy, capital budgeting, leasing and mergers, cash management.

527 Investment Analysis 3 Prereq Fin 325 or Fin 525. A decision-making approach to the problems of asset management for personal and business portfolio.

528 Portfolio Theory and Financial Engineering 3 Prereq Fin 325 or Fin 525; Fin 427 or 527. The theory of portfolio management and the use of derivative securities in portfolio risk management.

529 Financial Management for High-Tech Firms 3 Prereq Fin 325 or Fin 525. Application of finance principles to firms in high-tech industries; financing, risk management, capital investment, and mergers/acquisitions.

542 (R E 522) Advanced Topics in Real Estate 3 Basic forces that motivate and affect investors in their use and possession of real estate.

581 International Finance 3 Same as I Bus 581.

590 Advanced Topics in Mathematical and Quantitative Methods 3 Same as EconSon 590.

591 Advanced Topics in Monetary and Public Economics V 1-6 Same as EconS 591.

592 Advanced Topics in International and Development Economics V 1-6 Same as EconS 592.

- 593 Advanced Topics in Health, Education, Labor, and Demographic Economics V 1-6 Same as EconS 593.
- 594 Advanced Topics in Markets and Industrial Organization V 1-6 Same as EconS 594.
- 595 Advanced Topics in Resource and Production Economics V 1-6 Same as EconS 595.
- 596 Advanced Topics in Financial Economics V 1-6 May be repeated for credit; cumulative maximum 12 hours. Prereq Fin 504 and 512 or permission of instructor. Topics may include financial theory and empirical methods as applied to financial management, investments, international finance, and markets/institutions.
- 600 Special Projects or Independent Study Variable credit. S, F grading.
- 702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.
- 800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

### **International Business**

- 580 International Business Management 3 Decision-making in the international environment; political, cultural, and economic risk management.
- 581 International Finance 3 Prereq Fin 325 or Fin 525. Principles of international finance; the financial management of multinational corporations; international investments.
- 582 International Marketing Management 3 Prereq Mktg 505. Principles of international marketing; marketing decision making in international environments; problems of adapting marketing programs to international marketing.
- 595 Seminar in Research and Theory Development 3 Theory development and research on business in a global context.
- 596 Doctoral Topics 1 May be repeated for credit; cumulative maximum 6 hours. Prereq graduate standing. Advanced topics in international business.
- 600 Special Projects or Independent Study Variable credit. S, F grading.
- 800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

### **Management and Operations**

- 501 (Mgt) Management of Organizations 3 Leading, organizing, decision making, planning, controlling, conflict management, and behavior in work organizations.
- 516 (Dec S) Time Series 3 Prereq MgtOp 515 or Stat 443. ARIMA models; identification, estimation, diagnostics, and forecasting; seasonal adjustments, outlier detection, intervention analysis and transfer function modeling.
- 517 (Dec S) Quality Improvement for Management 3 Philosophy and evolution of quality control, control charts, process capability analysis, applications.
- 518 (Dec S) Techniques of Sampling 3 Prereq MgtOp 591. Sample surveys for business use; theory and application with emphasis on appropriate sample types and the estimation of their parameters.
- 519 (Dec S) Applied Multivariate Analysis 3 Prereq MgtOp 591 or Stat 443. Principal components, factor analysis, discriminant function, cluster analysis, multivariate normal distribution, Hotelling's T<sup>2</sup> and MANOVA.
- 540 (Dec S) Deterministic Business Models 3 Prereq MgtOp 340. Decision analysis, linear optimization models, nonlinear models, network analysis including PERT, and dynamic programming as applied to business.
- 542 (Dec S) Applied Stochastic Models 3 Prereq MgtOp 215. Stochastic processes, Markov models, stochastic dynamic programming, queues and simulation applied to business problems.
- 581 (Dec S) Operations Management 3 Prereq enrollment in the MBA program.. Analytical approach to solving problems in production and operations management.
- 582 (Mgt) Personnel and Human Resource Management 3 Human resources and personnel administration; selection, training, compensation, performance appraisal, labor relations, health and



safety, EEO legislation.

583 (Mgt) Organization Design 3 Development and design of contemporary systems of organization and management.

585 (Mgt) Negotiation Skills 3 Graduate counterpart of MgtOp 485; additional requirements. Credit not granted for both MgtOp 485 and 585.

586 (Dec S) Applied Multiple Time Series Analysis 3 Prereq MgtOp 516. Approaches to modeling and analysis of multiple time series.

587 Professional Ethics and Practice in Business 3 Prereq MgtOp 451 or 591. Ethical issues faced by business in the current environment, traditional sources for discerning professional and ethical practices.

588 Management of Innovation 3 Prereq Graduate standing. Technological transitions and technology strategy; knowledge and creativity in organizations; managing innovation processes, technical employees, and cross-functional cooperation.

589 (Mgt 586) Seminar in Management 3 May be repeated for credit; cumulative maximum 6 hours. Prereq admission to MBA program. Special topics in management, organization behavior, organization theory, human resource management and strategic management.

590 (Mgt) Strategy Formulation and Organizational Design 3 Prereq enrollment in the MBA program. Relationship between the formulation of strategy and the selection of effective organizational structures and systems.

591 (Dec S) Statistical Analysis for Business Decisions 3 Prereq enrollment in the MBA program. Analytical skills for decision-making; data collection and analysis, sampling, inferential, regression methodologies, experimental design, time series, forecasting analysis.

592 Modeling Skills 3 Prereq MgtOp 451 or 591. Abstracting the essential features of a situation in a model; debugging a model effectively and translating model results into insights.

593 (Mgt) Managerial Leadership and Productivity 3 Prereq enrollment in the MBA program. Organizational behavior and human motivation in the workplace; organization and leadership theories, studies, projects and models leading to improved productivity.

596 Doctoral Topics V 1-4 May be repeated for credit; cumulative maximum 15 hours. Advanced topics in management and operations.

597 Doctoral Topics 3 May be repeated for credit; cumulative maximum 15 hours. Advanced topics in management and operations.

598 (Mgt) Research and Professional Development 1 May be repeated for credit; cumulative maximum 6 hours. Ph.D.-level professional development colloquium designed to improve research, teaching, and presentation skills and to provide professional socialization. S, F grading.

600 (Mgt) Special Projects or Independent Study Variable credit. S, F grading.

702 (Mgt) Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.

800 (Mgt) Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

### **Information Systems**

507 Computers and Systems for Managers 3 Data base concepts, management information systems, design of application programs, and computer concepts.

572 Database Management Systems 3 Prereq admission to MBA program. Database management, data modeling, system design and implementation; the application of DBMS technologies to organizational and business problems.

574 Telecommunications and Networking in Business 3 Prereq admission to MBA program. Business applications of data communications, infrastructure, protocols, topologies and management, wired and wireless solutions, and related research issues.

575 Electronic Commerce and the Internet 3 Prereq admission to the MBA Program. Technologies underlying electronic commerce and the internet; strategies and implementation plans for managing

the implementation of electronic commerce systems.

576 Emerging Technologies 3 Prereq enrollment in the MBA Program. Special and advanced topics in MIS.

580 Information Systems Management 3 Prereq enrollment in the MBA program. Data processing organization; operations, application development, computer selection, management of computer personnel and systems.

582 Systems Analysis and Design 3 Prereq admission to MBA program. Research on and application of systems analysis, design, development and management of information systems; systems development life cycle.

596 Doctoral Topics 3 May be repeated for credit; cumulative maximum 9 hours. Prereq graduate standing. Advanced topics in management information systems.

600 Special Projects or Independent Study Variable credit. S, F grading.

800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading

### **Marketing**

505 Survey of Marketing 3 Prereq enrollment in the MBA program. Marketing management; relevance of marketing to company profitability and consumer satisfaction; decision regarding price, product, promotion, and distribution.

506 Marketing Management and Administrative Policy 3 Prereq enrollment in the MBA program. Marketing management and administrative policies as they relate to concepts, strategies, and decision making.

560 Research Methodology 3 Prereq Dec S 215 of 591. Types of data needed and available, collection and analysis of data as they relate to decisional research.

561 Technology and New Product Marketing 3 Prereq Mktg 360 of 505. Introduction of new products that are based on new technology, exploration of actual products in the market.

565 Seminar in Marketing 3 May be repeated for credit; cumulative maximum 9 hours. Marketing structure and behavior from economic and behavioral perspectives; social evaluation and behavioral implications of marketing strategy.

567 Consumer Behavior Theory 3 Prereq Mktg 505. Theory in consumer and buyer behavior; conceptual and empirical research role of purchase and consumption behavior on society and marketing.

590 Seminar in Consumer Behavior 3 Advanced, doctoral-level topics in consumer behavior.

591 Seminar in Marketing Management 3 Advanced, doctoral-level topics in marketing management.

592 Seminar in Marketing Theory 3 Advanced, doctoral-level topics in marketing theory.

593 Seminar in Research Design 3 Advanced, doctoral-level topics in research design.

594 Seminar in Research Techniques 3 Advanced, doctoral-level topics in research techniques.

596 Doctoral Topics 3 May be repeated for credit; cumulative maximum 15 hours. Advanced topics in marketing.

600 Special Projects or Independent study Variable credit. S, F grading.

702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.

800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

### **Real Estate**

522 Advanced Topics in Real Estate 3 Basic forces that motivate and affect investors in their use and possession of real estate.

600 Special Projects or Independent Study Variable credit. S, F grading.

702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.

## **Hospitality Business Management**

- 535 International Tourism Strategy and Planning 3 Tourism components; social, economic, and cultural effects on societies; the management of tourism businesses.
- 580 Hospitality Services Marketing 3 Prereq Mktg 505. Services marketing concepts and principles applied to hospitality organizations; strategies to market services and control quality.
- 581 Hospitality Services Management 3 Prereq enrollment in the MBA program. Design and management of service systems in hospitality operations; control of customer interaction, personnel activities, and inventory.
- 597 Special Topics 3 Strategic business policy, concepts, and practices in hospitality management.
- 600 Special Projects or Independent Study Variable credit. S, F grading.

## **School of Chemical Engineering and Bioengineering**

[www.che.wsu.edu/home/](http://www.che.wsu.edu/home/)

Degrees offered **M.S., Ph.D.**

Faculty working with graduate students **14**

Graduate students **25**

Students receiving assistantships or scholarships **100%**

Tests required **TOEFL or IELTS (international students only)**

Deadline **Fall—January 10**

**Spring—July 1**

### **Admission Requirements**

The minimum requirement for admission into the Graduate School is a bachelor's degree with at least a 3.0 grade point average (on a 4.0 scale). Normally, students who are admitted into the chemical engineering graduate program exceed this requirement and are expected to have a bachelor's degree in chemical engineering. A conversion program is set up to accommodate individuals possessing degrees in chemistry or other scientific/engineering disciplines. Applicants whose native language is not English must submit TOEFL scores; a minimum score of 580 is required for admission to the graduate program in chemical engineering.

### **Program Description**

Faculty research is broadly focused in three synergistic areas: Sustainable Energy Systems, Bimolecular Engineering, and Biomechanics. Within these areas, projects are focused on:

chemical and biological catalysis and kinetics; chemical and biological fuel cells; biofilm engineering; novel sensor technologies; cardiac and reproductive molecular engineering; and molecular, cellular, and musculoskeletal mechanics.

Specialized equipment includes a dynamic x-ray diffractometer, a colloidal characterization lab with field scattering capabilities, large scale fermentors, GC, LC, LC/MS chromatographic systems, and Atomic Force and other optical microscopes.

The graduate programs are flexible, allowing students to develop a program that fits individual needs. A master of science is typically completed in 12-15 months, and a doctorate in 3-4 years after completion of the Bachelor of Science degree. Many doctoral students also participate in training programs, such as the NIH-sponsored protein biotechnology training program.

**Contact Information**

Diana Thornton, Principal Assistant  
PO Box 642710  
Washington State University  
Pullman, WA 99164-2710  
Telephone: 509-335-3811  
Fax: 509-335-4806  
E-mail: thorntd@che.wsu.edu

**Graduate Opportunities**

With a graduate degree in chemical engineering, students can work as research, production, or consulting engineers for industrial, academic, or governmental employers. Chemical engineers with higher degrees are employed in a variety of fields, including environmental engineering and clean-up, biotechnology, fuels processing, or pharmaceuticals, to name a few.

**Positions Held by Recent Graduates**

Our former graduate students work for a variety of industry and government employers, including Micron, Intel, British Petroleum, the Idaho National Engineering and Environmental Laboratory, Battelle, and CH2M-Hill.

**Contact Information**

Diana Thornton, Principal Assistant  
PO Box 642710  
Washington State University  
Pullman, WA 99164-2710  
Telephone: 509-335-3811  
Fax: 509-335-4806  
E-mail: thorntd@che.wsu.edu

**Faculty Interests**

**Su Ha:** Catalysis; electro-chemical engineering and its application to alternative power generation; organic fuel cell systems.  
*suha@wsu.edu*

**Cornelius Ivory:** Biological separations: electrophoresis and electrochromatography fractionation of organelles from *S. cerevisiae*; protein transport in ion exchange resins; electrophoretic enantiomer fractionation; dynamic field gradient focusing; fast preparative isoelectric focusing; preparative field-gradient focusing; micropreparative purification of protein isoforms; mass balancing of low-abundance proteins; membrane separations; electro-ultrafiltration process stability; hydrodynamic and electrical instabilities; spatial patterning in conductive films and membranes.  
*ivory@mail.wsu.edu*

**James Lee:** Production of foreign proteins from transgenic plant suspension cultures.  
*jmllee@wsu.edu*

**KNona Liddell:** Electropolymerization and characterization of conducting polymers. Electrodeposition of thin-layer magnetic materials; novel methods for redox or electrode kinetics and mechanisms; convective diffusion models; convective diffusion models; tank waste handling and processing; mineral reactions; models for reactive flow in geologic media; metal ion separations.  
*liddell@che.wsu.edu*

**David Lin:** Integrated mechanical properties of skeletal muscle and spinal reflexes; makeup of the peripheral neuromuscular system that interacts to stabilize posture while encountering a perturbation; rehabilitation medicine, specifically disorders of the nervous system, such as stroke or spinal cord injury, and investigating the underlying mechanisms of abnormal posture and movement; force-generating characteristics of different muscle fiber types.  *davidlin@wsu.edu*

**Reid Miller:** Chemical processing and thermodynamics courses; technology sorption of volatile organics on solids; thermophysical properties of fluids and fluid mixtures.  
 *millerrc@wsu.edu*

**Bernie Van Wie:** Biochemical engineering: Design and characterization of novel biochemical reactors for mammalian cell cultures to produce monoclonal antibodies. Biochemical sensor technology: Neuron-based solid-state biosensors. Bioprocessing: Separation techniques for biochemical and biomedical products. Control and control systems: Control of a continuous centrifugal blood separation apparatus and a continuous centrifuge. Fluid dynamics and mechanics: Modeling of the fluid mechanical aspects of cell separations. Thermodynamics: Data evaluation, assessment of data needs, measurement of data.  *bvanwie@che.wsu.edu*

**Anita Vasavada:** Biomechanics; neuroscience, orthopaedics; mechanics of the musculoskeletal system (bones, joints, and muscles) with the goal of improving our understanding and treatment of clinical disorders of movement; computer modeling of activity, strength, and motion in humans.  
 *vasavada@wsu.edu*

**Richard Zollars:** Bioseparations: Affinity chromatography, field flow fractionation. Chemical engineering: Multiphase chemical reactor design with simultaneous heat and mass transfer, fine particulate processing, cryogenic processing conditions, and chemical vapor deposition. Interfacial phenomena: Analysis of instabilities (waves) at interfaces, adsorption of surface active materials. Polymer science and engineering: Relationships of polymer structure and composition to reactor type and conditions, especially for heterophase polymerization Surface and colloid science: Adsorption of surface active species, affinity separations, stability of colloids to Brownian and shear-induced coagulation, light scattering methods for the measurement of colloidal particle size, microcellular and micellar generation of particles.  *rzollars@che.wsu.edu*

### **Bioengineering**

525 Biomechanics 3 Prereq B E 320, C E 215 or MSE 301; Math 315. Graduate-level counterpart of B E 425; additional requirements. Credit not granted for both B E 425 and 525.

### **Chemical Engineering**

ChE 510 Transport Processes 3 Transport of mass energy and momentum; steady states as applied to chemical processing; macroscopic and microscopic analyses.

ChE 525 Polymer Reactor Engineering 3 Reaction engineering applied to polymerization reactions; effects on polymerization rate molecular weight and copolymer composition.

ChE 527 Advanced Chemical Engineering Thermodynamics 3 Equilibria in physical and chemical systems generalized prediction of thermodynamic properties, non ideal systems.

ChE 529 Chemical Engineering Kinetics 3 Interpretation of kinetic data and design of non ideal chemical reactors; fundamentals of heterogeneous catalyst preparation, characterization, and theory.

ChE 541 Chemical Engineering Analysis 2 Mathematical analysis of chemical engineering operations and processes; mathematical modeling and computer application.

ChE 560 Biochemical Engineering 3 Chemical engineering applied to biological systems; fermentation processes, biochemical reactor design, downstream processing, transport phenomena in biological systems, biochemical technology.

ChE 574 Protein Biotechnology 3 Same as BC/BP 574 Biotechnology related to the isolation, modification, and large scale commercial production, patenting and marketing of useful recombinant proteins and products.

ChE 581 Advanced Topics in Chemical Engineering V 1-3 May be repeated for credit; cumulative maximum 9 hours. Filtration, reaction engineering, two-phase flow, non-Newtonian fluids, interfacial phenomena, fluidization, novel separations, biomedical engineering.

ChE 596 Research Methods I 2 Course seeks to establish sound practices for graduate research and presentation of results. Techniques used for performing thorough literature searches and establishing and testing research hypotheses.

ChE 597 Research Methods II 2 Establishing sound practices for presentation of research programs and research results.

ChE 598 Research Seminar 1 May be repeated for credits. Seminar presentations on current topics in chemical engineering research. S, F grading.

ME 515 Advanced Heat Transfer V 1-3 Derivation of the energy conversion equation; laminar and turbulent forced convective heat transfer with internal and external flow; free convection.

ChE 700 Master's Research, Thesis, and/or Examination V 1-18 May be repeated for credit. S or F grading.

ChE 702 Master's Special Programs, Directed Study, and/or Examination V 1-18 May be repeated for credit. S,F grading.

ChE 800 Doctoral Research, Dissertation, and/or Examination V 1-18 May be repeated for credit. S,F grading.

## Department of Chemistry

[www.chem.wsu.edu](http://www.chem.wsu.edu)

Degrees offered **M.S., Ph.D.**

Faculty working with graduate students **25**

Graduate students **67**

Graduate students receiving assistantships or scholarships **100%**

Degree offered **Pullman, TriCities (M.S. only)**

Tests required **GRE; TOEFL or IELTS (international students only)**

Deadline **Fall—January 10**

**Spring—July 1**

### Admission Requirements

Apply to the Graduate School, including three letters of recommendation, official transcripts, and a statement of your research interests.

### Program Description

Most chemistry graduate students at the University are working toward a doctorate. Some complete a master's degree first, either here or elsewhere, while others go directly from a bachelor's degree to work on their doctorate. Four to five years of full-time enrollment beyond the bachelor's degree are required for the doctorate. The doctorate degree centers around a substantial research project and a resulting thesis. Thesis research is a full time activity during the latter part of the student's graduate career.

Seminar groups play an important part in the learning experience of doctoral students. Students are also expected to become aware of the current literature in their field. Program requirements may differ somewhat depending on the student's area of study. Thirty-four hours of graded graduate level courses are required in the total doctoral program. In every case, there is a test of competence in the student's area of study, generally a comprehensive written preliminary examination and an oral defense of an original proposal. At least one year of teaching is required of each student who is completing a graduate degree.

### Contact Information

Graduate Admission Committee  
Department of Chemistry  
305 Fulmer Hall  
PO Box 644630  
Pullman, WA 99164-4630  
Telephone: 509-335-8866  
Fax: 509-335-8867  
E-mail: chemistry@wsu.edu

### Faculty Interests

**Paul Benny:** Radiopharmaceutical chemistry, development and characterization of radioactive metal complexes for diagnosis and treatment of biological diseases. *bennyp@wsu.edu*

**Cliff Berkman:** Use of protease inhibitors in diagnostic and therapeutic applications; development of chemoaffinity probes for profiling the specificity of enzyme inhibitors.  
*cberkman@wsu.edu*

**James Brozik:** Physical chemistry, laser spectroscopy, biophysics. *brozik@wsu.edu*

**Jim Bruce:** Bioanalytical and biophysical development and applications of mass spectrometry; proteomics research; enzyme-substrate relationship, posttranslational modification and noncovalent interaction profiling of biological systems. *james\_bruce@wsu.edu*

**Aurora Clark:** Interests within the realm of computational and theoretical chemistry, however each has its basis in a fundamental problem associated with current technological and materials science applications. *auclark@wsu.edu*

**Sue B. Clark,** Chair: Environmental radiochemistry, chemistry of lanthanides and actinides, mechanisms controlling metal speciation in environmental systems. *sclark@mail.wsu.edu*

**Philip Garner:** Total synthesis of bioactive (natural product and "natural product-like") small molecules, development of new reaction methodology for organic (especially asymmetric) synthesis, and invention of novel gene-targeting drug platforms. *ppg@wsu.edu*

**Herbert H. Hill:** Trace organic analysis, development and design of selective ionization detection systems, chromatography, mass spectrometry, ion mobility spectrometry.  
*hhhill@wsu.edu*

**Kerry W. Hipps:** Chemistry and spectroscopy of solids and surfaces; scanning probe microscopy and single molecular spectroscopy; material science of deposited films.  
*hipps@wsu.edu*

**James K. Hurst:** Solar photoconversion, reactions in microphases, coordination complex catalysis of small molecule reactions, oxidative chemistry of white blood cells.  
*hurst@wsunix.wsu.edu*

**Jeffrey P. Jones:** Benign synthetic pathways for the oxidation of hydrocarbons; prediction of metabolic

disposition of drugs and environmental contaminants in humans. *jpj@wsu.edu*

**ChulHee Kang:** Studies of RNA/DNA-protein interactions by X-ray crystallography and molecular biology. *chkang@wsunix.wsu.edu*

**David M. Kramer:** Light reactions of photosynthesis, mechanism of biochemical redox reactions and proton pumps, non-invasive probes of biochemical reactions in vivo. *dkramer@wsu.edu*

**Alexander (DeQuan) Li:** Molecular design, materials synthesis, functional biological/synthetic nanosystems, nanoporous polymers, molecular self-assembly, supramolecular systems, metal oxides, catalysis and surface chemistry. *dequan@wsu.edu*

**Ursula Mazur:** Surface vibrational techniques applied to chemisorption and catalysis, thin film synthesis, microstructural and mechanical properties of electronic materials, chemical sensors. *umazur@wsu.edu*

**Jeanne L. McHale:** Vibrational and electronic spectroscopy for the study of electron transfer, semiconductor nanoparticles, chromophore aggregation, and solar photoconversion. *jmchale@wsu.edu*

**G. Patrick Meier:** Development of new methodology and approaches to the synthesis of organic compounds of biological interest; synthesis and biological studies of analogs of xanthate and perillyl alcohol (anticancer activity), biologically generated halo aromatics, and small molecule inhibitors of ice crystal formation. *meiergp@wsu.edu*

**Ken Nash:** Thermodynamics and kinetics of reactions of lanthanides and actinides in solutions; design and characterization of new complexants and their application in separation science; all aspects of the nuclear fuel cycle. *knash@wsu.edu*

**Kirk A. Peterson:** Accurate ab initio quantum mechanics applied to the spectroscopic properties and photochemistry of small molecules; solvation effects on chemical reactivity; excited state potential energy surfaces. *kipeters@wsu.edu*

**Rob Ronald:** The chemistry and synthesis of natural products. *rcr@wsu.edu*

James D. Satterlee: Chemical, biochemical and biophysical studies of heme proteins, environmental chemistry. *hemeteam@wsu.edu*

**James O. Schenk:** Spectroscopy and electroanalytical chemistry developed to study in vitro and in vivo neurotransmitter transport and the mechanisms of action of neurotoxins, antipsychotic drugs, and drugs of abuse. *geni@wsu.edu*

Scot Wherland: Kinetics and electron transfer in inorganic and organometallic systems; solvent effects and reactions in room temperature ionic liquids. *scot\_wheland@wsu.edu*

**Ming Xian:** Development of new synthetic methods; total synthesis of natural products; protein molecular recognition and interaction. *mxian@wsu.edu*

**Choong-Shik Yoo:** Extreme materials research at P,T-conditions of the Earth's and Jovian planetary interiors, on fundamental materials of quantum solids, molecular solids, covalent and ionic solids, and f- and d-electron transition metals as well as functional materials such as nanoparticles, hydrogen storage materials, high correlated systems, bulk metallic glass, reactive materials, and high energy density materials, utilizing static and dynamic high-pressure technologies coupled with state-of-the-art laser spectroscopy and x-ray diffraction and spectroscopy technologies at the national synchrotron facilities. *csyoo@wsu.edu*

### **Inorganic Chemistry**

501 Advanced Inorganic Chemistry 3 Rec Chem 332. Periodic table survey, typical compounds and their reactivity; models and reactivity, acid-base, oxidation-reduction, and electronic structure contributions.



- 502 Advanced Inorganic Chemistry II 3 Rec Chem 501. Transition metal chemistry.
- 503 Advanced Topics in Inorganic Chemistry 1-3 May be repeated for credit. Rec Chem 501. Recent significant developments. Cooperative course taught by WSU, open to Idaho students (Chem 503).
- 504 Organometallic Chemistry 3 Prereq Chem 501. Structure, bonding, and reaction chemistry of organotransition metal compounds; applications to homogenous catalysis. Cooperative course taught by UI (Chem 568), open to WSU students.
- 507 Topics in Coordination Chemistry 3 Rec Chem 501. Principles, complex ions and coordination compounds; theory of acids and bases; bonding theory, nonaqueous solvents; familiar elements; periodicity. Cooperative course taught by UI (Chem 564), open to WSU students.
- 508 Topics in Inorganic Chemistry V 1-9 Rec Chem 501. Coordination compounds; halogens; less familiar elements; cathrate, interstitial, nonstoichiometric compounds; chemical bonding; inorganic reaction mechanisms. Cooperative course taught at UI (Chem 565), open to WSU students.
- 551 Nuclear Magnetic Resonance Spectroscopy 3 Rec Chem 332. Theory and practice of nuclear magnetic resonance spectroscopy; application in solution-state and solid-state and imaging.

### **Analytical, Environmental, and Radiochemistry**

- 510 Introduction to Proteomics 2 Prereq graduate standing or permission of the instructor; introductory biochemistry, MBios 303 or equivalent. Techniques and applications for the analysis of the proteome.
- 512 Bioanalysis 2 Rec Chem 220 or 425. Methods for the measurement of biological compounds.
- 514 Mass Spectrometry 2 Prereq Chem 425. Current methods, techniques and interpretation of mass spectrometric analysis.
- 515 Trace Element Analysis 2 Rec Chem 425. Techniques for the analysis of inorganic materials at trace levels. Credit not granted for both Chem 415 and 515.
- 517 Chromatography 2 Prereq Chem 425.
- 518 Electrochemistry 2 Prereq Chem 425.
- 520 Advanced Analytical Chemistry 3 Prereq Chem 425. Statistics in chemical analysis; sampling; control of contamination and losses in analysis; electrochemical methods; separation in analysis; spectroscopic techniques.
- 521 Radiochemistry and Radiotracers 2 Prereq Chem 331. Credit not granted for both Chem 421 and 521.
- 522 Radiochemistry Laboratory 1 (0-3) Prereq Chem 222, 331; Phys 202. Credit not granted for both Chem 422 and 522.
- 524 Activation Analysis 2 (1-3) Prereq Chem 331 or 421. Credit not granted for both Chem 424 and 524.
- 527 Environmental Chemistry 2 Natural water chemistry, Agri processes, kinetics, thermodynamics, modeling in lake, river, and sea water.
- 529 Selected Topics in Analytical Chemistry V 1-3 May be repeated for credit. Selected current developments.
- 550 Special Topics in Nuclear Processes and Radioactive Waste Management V 1-3 May be repeated for credit; cumulative maximum 6 hours. Prereq permission of instructor. Fundamental chemistry of the nuclear industry, chemical processing and waste management.
- 581 Environmental Chemistry I 3 Prereq graduate standing. chemistry of natural and pollutant species and their reaction sin the atmospheric environment. Graduate level counterpart of Chem 481; additional requirements. Credit not granted for both Chem 481 and 581.

### **Physical Chemistry**

- 509 Chemical Group Theory 3 Rec Chem 332. Mathematical definitions of groups and representations, applications to chemical structure and spectra, ligand field theory, chemical reactions

and selection rules.

531 Advanced Physical Chemistry I Prereq Chem 331 or equivalent. Classical physical chemistry including basic thermodynamics and kinetics; an introductory discussion of surface chemistry and electrochemistry is included.

532 Advanced Physical Chemistry II 3 Prereq Chem 332 or equivalent. Introduction to quantum mechanics; postulates of quantum mechanics; exact solutions and approximation methods are introduced.

534 Chemical Statistical Mechanics 3 Rec Chem 531, 532. Statistical theory of thermodynamic variables and chemical equilibrium; calculation of equilibrium properties from spectral data; fluctuations about equilibrium; quantum statistics.

535 Computational Quantum Chemistry 3 Rec Chem 332 or Phys 303. Computer simulation of chemical behavior using latest methods; theory and practice of quantum chemistry.

536 Quantum Chemistry 3 Prereq Chem 532 or equivalent. Quantum mechanics applied to chemical problems: states of atoms and molecules, transitions and spectra, ladder operators and many electron methods.

537 Advanced Topics in Physical Chemistry V 1-3 May be repeated for credit. Selected subjects; irreversible thermodynamics; chemical bonding; NMR; ligand field theory; x-ray diffraction; neutron diffraction. Cooperative course taught by WSU, open to UI students (Chem 537).

561 Atomic and Molecular Phenomena 3 Graduate level counterpart of Chem 461; additional requirements. Credit not granted for both Chem 461 and 561.

564 Molecular Phenomena 3 Rec Chem 461 or 561, 509; Phys 450. Phenomena which yield information on structure, energy levels, and interactions of molecules in solid, liquid, and gaseous phases.

### **Organic Chemistry**

540 Organic Reaction Mechanisms 3 Rec Chem 331,342. The major classes of organic reaction mechanisms and their significance; kinetics and introductory theory.

541 Advanced Organic Chemistry 3 Rec Chem 540. Reactions of organic compounds; fundamental theory and reaction mechanisms.

542 Advanced Organic Chemistry 3 Rec Chem 540. Synthesis of organic compounds; recent developments from current literature.

543 Theoretical Organic Chemistry 3 Rec Chem 540. Relationship of reactivity to molecular structure; mechanisms of organic reactions.

544 Advanced Topics in Organic Chemistry V 1-3 May be repeated for credit. Rec Chem 540. Current research in organic chemistry. Cooperative course taught by WSU, open to UI students (Chem 544).

545 Chemistry of Functional Groups 3 Prereq graduate standing. Modern synthetic reactions and physical methods used in exploring reaction mechanisms.

546 Spectroscopic Identification of Organic Compounds 3 Structural interpretation of mass spectrometry and IR, UV-VIS and NMR spectrometry of small molecule organic compounds.

Problems, Seminar, Research and Thesis

555 Teaching Chemistry I Teaching chemistry, some workshops for new graduate teaching assistants in chemistry focusing on tutorials and labs.

590 Introduction to Research Topics 1 Presentation and description of research areas and projects of current interest to faculty. S, F grading.

591 Seminar in Inorganic Chemistry 1 May be repeated for credit. Presentation and discussion of topics in inorganic chemistry taken from research in progress or current literature.

592 Seminar in Analytical Chemistry 1 May be repeated for credit; cumulative maximum 6 hours. Presentation and discussion of topics in analytical chemistry taken from research in progress or the

current literature.

593 Seminar in Physical Chemistry 1 May be repeated for credit; cumulative maximum 6 hours. Prereq graduate standing. Presentation and discussion of topics in physical chemistry taken from research in progress or current literature.

594 Seminar in Organic Chemistry 1 May be repeated for credit; cumulative maximum 6 hours. Presentation and discussion of topics in physical chemistry taken from research in progress or current literature.

600 Special Projects or Independent Study Variable credit. S, F grading.

700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.

702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.

800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

Child, Consumer and Family Studies

(See Human Development)

## Department of Civil and Environmental Engineering

[www.ce.wsu.edu](http://www.ce.wsu.edu)

Degrees offered **M.S.: Environmental Engineering; M.S. Civil Engineering; Ph.D. Civil Engineering**

Faculty working with students **25**

Students **68**

Students receiving assistantships or scholarships **96%**

Priority deadline **Fall - January 10**

**Spring - July 1**

Campuses **Pullman, Tri-Cities (M.S. in Env Engr only)**

Test required **TOEFL or IELTS (international students only)**

### Admission Requirements

Official transcripts from all colleges and universities attended; one-page statement of purpose; three letters of recommendation; copy of application and assistantship forms.

### Program Description

Civil engineering is a profession that utilizes our nation's natural resources to improve the quality of life for all, while at the same time preserving and protecting the environment.

Nearly every aspect of everyday life involves the use of facilities and infrastructure that are designed and maintained by civil and environmental engineers.

Examples are water facilities and wastewater disposal plants in cities and towns; hydraulic structures and electric energy generation; transportation systems such as highways, railroads and airports; buildings and bridges of all kinds; community planning; and solid and hazardous waste disposal.

The scientific advancement, design, and preservation of our nation's infrastructure, which is the essence of the civil and environmental engineering profession, requires a fundamental grounding in physics, mathematics and chemistry.

Using these fundamentals as a common building block, the C.E.E. discipline is traditionally divided into sub-disciplines or programs of concentration.

At Washington State University we offer the following programs of concentration: environmental engineering; geotechnical and transportation engineering; hydraulic and water resources; and structural engineering and materials.

Graduate students select a particular program of interest and concentrate all course work and research in that area.

Approximately 80 graduate students are in residence; typically one-third of these are Ph.D. candidates and the remainder is pursuing an M.S. degree.

### **Contact Information**

Maureen C. Clausen, Graduate Coordinator  
101 Sloan Hall  
Washington State University  
PO Box 642910  
Pullman, WA 99164-2910  
Telephone: 509-335-2576  
Fax: 509-335-7632  
E-mail: [mclausen@wsu.edu](mailto:mclausen@wsu.edu)

### **Faculty Interests**

**Michael Barber:** Water quality and quantity modeling; hydrology; surface-ground water interaction; constructed wetlands and wet ponds, decision support systems. [meb@wsu.edu](mailto:meb@wsu.edu)

Don Bender: Design and construction of timber structures; engineering properties of wood; nondestructive evaluation. [bender@wsu.edu](mailto:bender@wsu.edu)

**Marc Beutel:** Lake and reservoir management; saline lakes; lake mixing, aeration, and oxygenation; mercury cycling in lake ecosystems; exchange of compounds between profundal sediments and water column; natural treatment systems; constructed wetlands for nitrate removal; pesticide uptake and degradation in natural treatment systems; enhancing ammonia removal in natural treatment systems. [mbeutel@wsu.edu](mailto:mbeutel@wsu.edu)

**Candis Claiborn:** Atmospheric aerosols: sampling methods and chemical characterization; receptor modeling; atmosphere-biosphere interactions: field, laboratory, and modeling experiments; airborne particulate matter: emission measurements and windblown dust. [claiborn@wsu.edu](mailto:claiborn@wsu.edu)

**William Cofer:** Structural mechanics; numerical methods applied to linear, nonlinear, and dynamic structural analysis. [wcofer@wsu.edu](mailto:wcofer@wsu.edu)

**J. Daniel Dolan:** Dynamic loads on low-rise buildings (seismic and wind); dynamic response of light-frame buildings (seismic, wind, and vibration); full-scale static, cyclic, and dynamic testing of structural assemblies (walls, floors, and roofs); response of dowel connections; numerical modeling of structural and material response to static and dynamic loading (finite element analysis and closed-form numerical modeling). [jddolan@wsu.edu](mailto:jddolan@wsu.edu)

**Akram Hossain,** WSU Tri-Cities: Groundwater flow, contaminant transport modeling. [ahossain@tricity.wsu.edu](mailto:ahossain@tricity.wsu.edu)

**Rafik Itani:** Structural analysis and design, timber research, dynamic analysis of low rise buildings. [itani@wsu.edu](mailto:itani@wsu.edu)

**Tom Jobson:** Atmospheric chemistry related to air pollution and climate change; biogeochemical cycling of organic gases; trace gas measurement techniques; organic aerosol formation; mass

spectrometry instrumentation; field and laboratory experiments. *tjobson@wsu.edu*

**Marie Laborie:** Wood adhesion; polymer viscoelasticity; morphology and properties of wood/polymer interphases; bio-based polymers. *mlaborie@wsu.edu*

**Brian Lamb:** Regional grid modeling of photochemical air quality and windblown dust; application of atmospheric tracer techniques; biogenic emissions; three-dimensional turbulence modeling; greenhouse gas emissions. *blamb@wsu.edu*

**David McLean:** Behavior and design of reinforced concrete, masonry, and timber structures; seismic response and strengthening of structures; infrastructure rehabilitation; experimental testing of structural systems and components. *mclean@wsu.edu*

**George Mount:** Radiative transfer; molecular physics; trace gas measurements in troposphere and stratosphere; atmospheric spectroscopy; spectroscopic instrumentation. *gmount@wsu.edu*

**B. Muhunthan:** Thermomechanics and constitutive modeling; bifurcations and instabilities in geomechanics; microstructure characterization and simulation of geomaterials; pore-scale modeling of fluid flow; micropiles; fundamentals of soil behavior: critical state soil mechanics, micromechanics of soils, and physico-chemical behavior of clays. *muhuntha@wsu.edu*

**Thomas Papagiannakis:** Pavement-vehicle interaction, pavement mechanistic response and performance, pavement material characterization. *pappa@wsu.edu*

**David Pollock:** Nondestructive evaluation; performance of connections; design provisions for wood structures. *dpollock@wsu.edu*

**Adrian Rodriguez-Marek:** Geotechnical earthquake engineering; site response analysis; performance based design of geotechnical structures; constitutive modeling of geomaterials; transport properties of geomaterials. *adrian@wsu.edu*

**Laith Tashman:** Microstructure characterization of highway materials using X-ray computed tomography and image analysis techniques; constitutive modeling of highway materials; laboratory testing of highway materials; computer simulation of fluid flow in porous media. *ltashman@wsu.edu*

**Joseph Vaughan:** Design, implementation and evaluation of air-quality modeling systems for regional forecasting and environmental management; integration of satellite and *in situ* monitoring results for air-quality forecasting system uses. *jvaughan@mail.wsu.edu*

**Richard Watts:** Physicochemical treatment processes, particularly chemical oxidations applied to the treatment of contaminated soils and groundwater; hazardous and industrial wastes. *rjwatts@wsu.edu*

**Hal Westberg:** Measurement of trace organic species in the atmosphere; mechanism of atmospheric oxidation reactions; greenhouse gas emissions. *westberg@wsu.edu*

**Mike Wolcott:** Composite material development; extrusion processing; viscoelasticity and rheology; adhesion; anisotropic elasticity. *wolcott@wsu.edu*

**Vikram Yadama:** Mechanics of wood and wood composites; modeling of engineered wood composites; structure and behavior of wood joints; industrial extension/outreach in forest products. *vyadama@wsu.edu*

**David Yonge:** Physical and chemical wastewater treatment process: adsorption phenomena, metal partitioning, precipitation, facilitated metal transport mechanisms, vapor extraction of chlorinated solvents; adsorption and desorption of hazardous organics and metals on soil and activated carbon; removal of metals from industrial waste streams; fate and transport of highway runoff contaminants. *yonge@wsu.edu*

**Jinwen Zhang:** Bio-based wood thermoplastic composites and foams; bio-based adhesives; packaging films from biopolymers; spun fibers of bio-based polymeric materials. *jwzhang@wsu.edu*

### **Course information**

CE501 Advanced Topics in Transportation Engineering V 2-4 May be repeated for credit; cumulative maximum 9 hours. Prereq C E 322; statistics course. Analysis, planning, design, and evaluation of transportation modes and systems. Cooperative course taught jointly by WSU and UI (CE 571).

CE507 Seepage and Earth Dams 3 Principles of earth-dam design, failures, considerations in construction; principles governing flow of water through soils. Cooperative course taught by UI (Geol E 535), open to WSU students.

CE508 Air Pollution Control Engineering 3 Prereq graduate standing. Graduate-level counterpart of C E 408; additional requirements. Credit not granted for both C E 408 and 508.

CE509 Numerical Modeling of Geomaterials 3 Prereq graduate-geotechnical engineering-related field, or by interview only. Modeling of the response of geomaterials to changes in imposed stresses or strains under both static and dynamic conditions.

CE510 Advanced Geomaterial Characterization 3 Advanced mechanics of geomaterials; compressibility, concept of stress and strain; shear strength, stress/strain and time-dependent behavior; dynamic properties.

CE511 Advanced Topics in Geotechnical Engineering V 2-4 May be repeated for credit; cumulative maximum 9 hours. Prereq C E 317. Soil dynamics, geotechnical earthquake engineering, theoretical soil mechanics, numerical methods in soil mechanics, and geohydrology, engineering geology, cold regions geoengineering. Cooperative course taught jointly by WSU and UI (CE 569).

CE512 Dynamics of Structures 3 Equations of motion, free vibration, damping mechanisms, harmonic, impulse, and seismic loading; shock and seismic response spectra, time and frequency domain analysis, modal analysis, structural dynamics in building codes. Cooperative course taught jointly by WSU and UI (CE 543).

CE514 Advanced Mechanics of Materials 3 Elastic stress-strain relations, shear center, unsymmetrical bending, curved beams, elastic stability, elastically supported beams, energy methods, thin plates, shells. Cooperative course taught jointly by WSU and UI (CE 510/ME 539).

CE515 Environmental Measurements 3 (1-6) Graduate-level counterpart of C E 415; additional requirements. Credit not granted for both C E 415 and 515.

CE517 Mechanics of Sediment Transport 3 Cohesive and non-cohesive sediments; initiation of sediment motion; sediment transport; suspended and bed load entrainment; models of sediment transport for alluvial and gravel bed streams, sediment-flow interaction; river morphology and ecological restoration.

CE518 Hazardous Waste Engineering 3 or 4 Prereq graduate standing. Graduate-level counterpart of C E 418; additional requirements. Credit not granted for both C E 418 and 518.

CE519 Hazardous Waste Treatment 3 Prereq C E 518. Graduate-level counterpart of C E 419; additional requirements. Credit not granted for both C E 419 and 519.

CE521 Fundamentals of Fluid Flow 3 Prereq C E 315 or M E 303. Fundamental equations of compressible viscous flow, Newtonian viscous-flow equations, laminar boundary layers, stability of laminar flows, incompressible turbulent flow.

CE524 Geotechnical Earthquake Engineering 3 Faulting and seismicity; site response analysis; influence of soil on ground shaking; soil liquefaction; probabilistic seismic hazard assessment; seismic earth pressures; seismic slope stability. Cooperative course taught by WSU, open to UI students (CE 566).

CE525 Soil and Site Improvement 3 Prereq C E 317. Graduate-level counterpart of C E 425; additional requirements. Credit not granted for both C E 425 and 525. Cooperative course taught by WSU, open to UI students (CE 567) .

CE527 Advanced Soil Mechanics 3 Prereq C E 317. Effective stresses and lateral earth pressures; interrelationships of applied stresses, permeability, strain and shear strength of soils. Cooperative course taught by UI (CE 561), open to WSU students.

CE528 Advanced Foundation Engineering 3 Prereq C E 317. Consolidation theories, bearing capacity, and settlements of foundations, pile group behavior, theory of subgrade reaction, materials foundations, laterally loaded piles. Cooperative course taught by UI (CE 562), open to WSU students.

CE529 Soil Dynamics 3 Prereq graduate standing. Vibration theory; analysis of machine vibrations; wave propagation through soils; dynamic loading of soils; liquefaction. Cooperative course taught by UI (CE 565), open to WSU students.

CE530 Advanced Design of Steel Structures 3 Prereq C E 431. Plate girder design; local and global buckling; plastic collapse analysis; shear and Moment-resisting connections; eccentrically-loaded connections.

CE531 Probability and Statistical Models in Engineering 3 Engineering applications of probability and statistics; Monte Carlo simulation; model estimation and testing; probabilistic characterizations of loads and material properties; risk and reliability analyses. Cooperative course taught jointly by WSU and UI (CE 541).

CE532 Finite Elements 3 Theory of finite elements; applications to general engineering systems considered as assemblages of discrete elements. Cooperative course taught jointly by WSU and UI (CE 546).

CE533 Advanced Reinforced Concrete Design 3 Prereq C E 433. Composite design; slab design; limit state design; footings; retaining walls; deep beams; brackets and corbels; torsion; seismic design; shear walls. Cooperative course taught by WSU, open to UI students (CE 547).

CE534 Prestressed Concrete and Reinforced Masonry Design 3 Graduate-level counterpart of C E 434; additional requirements. Credit not granted for both C E 434 and 534. Cooperative course taught by WSU, open to UI students (CE 442).

CE535 Advanced Finite Elements 3 Prereq graduate standing. Advanced topics in finite elements. Plate and shell analysis; nonlinear solution methods for finite strain/rotation and nonlinear materials.

CE536 Nondestructive Testing of Structural Materials 3 Principles of nondestructive testing applied to wood-based materials, steel, concrete, and masonry.

CE537 Advanced Topics in Structural Engineering 3 May be repeated for credit; cumulative maximum 9 hours. Elastic stability, plates and shells, other relevant topics. Cooperative course taught by WSU, open to UI students (CE 549).

CE538 Earthquake Engineering 3 Prereq C E 512. Seismology, size of earthquakes, seismic ground motion, seismic risk, behavior of structures subjected to earthquake loading seismic response spectra, seismic design codes, lateral force-resisting systems, detailing for inelastic seismic response.

CE539 Advanced Wood Engineering 3 Prereq CE 436 or equiv. Engineering properties of wood materials; theory and design of wood composites, connections and load-sharing systems; performance criteria and durability.

CE540 Instrumental Analysis of Environmental Contaminants 3 (1-6) Prereq C E 415. Theory and methods of analysis of water and water suspensions for contaminants using electro-metric, spectrophotometric, and chromatographic techniques.

CE541 Environmental Engineering Unit Operations 3 Prereq C E 442; Math 315. Theory and design of

physical and chemical unit operations of water and wastewater treatment systems. Cooperative course taught jointly by WSU and UI (CE 531).

CE542 Environmental Engineering Unit Processes 3 Prereq C E 541. Biochemical energetics and kinetics; biological waste treatment processes; nutrient removal; advanced wastewater treatment design. Cooperative course taught jointly by WSU and UI (CE 534).

CE543 Advanced Topics in Environmental Engineering Practice V 1-4 May be repeated for credit; cumulative maximum 9 hours. Analysis and evaluation of air/water/soil pollution problems, new measurement methods, hazardous waste treatment, global climate change, and water/wastewater treatments.

CE549 Instrumentation and Measurements 3 (2-3) Prereq Math 172; Phys 102 or 202. Same as BSysE 541.

CE551 Open Channel Flow 3 Prereq C E 351. Graduate-level counterpart of C E 451; additional requirements. Credit not granted for both C E 451 and 551.

CE552 Advanced Topics in Hydraulic Engineering V 1-3 May be repeated for credit; cumulative maximum 9 hours. Prereq C E 315. Cavitation, air entrainment, hydraulic machinery, similitude, mixing in rivers and estuaries, hydraulic design.

CE555 Natural Treatment Systems 3 Prereq senior or graduate standing. Principles and design procedures of natural systems for wastewater treatment for agricultural and non-agricultural applications.

CE556 Numerical Modeling in Fluid Mechanics 3 Prereq C E 315. Fundamental concepts in development of numerical models for fluid flow with applications to steady and unsteady flows.

CE560 Advanced Hydrology 3 Graduate-level counterpart of C E 460; additional requirements. Credit not granted for both C E 460 and 560.

CE567 Advanced Characterization of Highway Materials 3 Basic and advanced level of the fundamentals of material response to static and repeated loading; emphasis on the deformation and fatigue behavior of asphalt mixtures. Cooperative course taught jointly by WSU and UI (CE 556).

CE571 Meteorology 3 Prereq Math 273, Phys 201 or comparable. Basic meteorology; atmospheric thermodynamics; cloud physics, synoptic meteorology; radiative processes; climate change. Cooperative course taught jointly by WSU and UI (GEOG 504).

CE572 Advanced Pavement Analysis 3 Prereq C E 473. Fundamentals of pavement-vehicle interaction and the mechanics of pavement response and damage.

CE580 Graduate Seminar 1 May be repeated for credit; cumulative maximum 2 hours. Lectures and reports on current developments in research and practice.

CE583 Engineering Aspects of Environmental Chemistry V 2-4 Prereq C E 442; instructor permission. Chemical principles as applied to environmental systems, water supply and pollution control engineering.

CE584 Environmental Microbiology 3 Prereq graduate standing; instructor permission. Provides a fundamental understanding of microbiology to engineering and environmental science students; cell structure and metabolism; microbial ecology and diversity.

CE585 Aquatic System Restoration 3 (2-3) Prereq Chem 345 or C E 583; MBioS 101 or C E 581. Study of natural and damaged water systems with emphasis on water quality protection and restoration.

CE586 Bioremediation of Hazardous Waste 3 Prereq C E 584. Applications of bioremediations to in situ subsurface treatment of hazardous waste; subsurface microbial degradation as related to microbial ecology.



CE588 Atmospheric Turbulence and Air Pollution Modeling 3 Prereq C E 571. Physical aspects of atmospheric turbulence, theoretical developments in atmospheric diffusion, and applied computer modeling with regulatory and research models.

CE589 Atmospheric Chemical and Physical Processes 3 Processes of removal of pollutants from the atmosphere; radical chain reactions, particle formation, model calculations.

CE590 Spectroscopy and Radiative Transfer of the Atmosphere 3 Prereq by interview only. Concepts of radiative transfer and molecular spectra in the troposphere and stratosphere with applications to trace gas measurements.

CE593 Polymer Materials and Engineering 3 Prereq MSE 402. Same as MSE 543. Preparation and structure-property relationship of polymer materials with emphasis on fracture mechanics and toughening.

CE594 Natural Fibers 3 Prereq graduate standing. Same as MSE 544. Structural aspects and properties of natural fibers including anatomy, ultrastructure, and chemistry.

CE595 Polymer and Composite Processing 3 Prereq graduate standing. Same as MSE 545. Polymer and composite processing from fundamental principles to practical applications.

CE596 Engineered Wood Composites 3 Prereq graduate standing. Same as MSE 546. 3 Theory and practice of wood composite materials, manufacture and development. Cooperative course taught by WSU, open to UI students (MSE 550)

CE597 Polymers and Surfaces for Adhesion 3 Prereq MSE 402 or 404. Same as MSE 547. Physical chemistry of polymers and surfaces needed to understand interface morphology, adhesion mechanisms and bond performance. Cooperative course taught by WSU, open to UI students (FORPR532)

CE598 Natural Fiber Polymer Composites 3 Prereq graduate standing. Same as MSE 548. Fundamentals, development and application of composite materials produced from polymers reinforced with natural fibers and wood as major components. Cooperative course taught by WSU, open to UI students (FORPR533)

CE600 Special Projects or Independent Study Variable credit. S, F grading.

CE700 Master's Research, Thesis and/or Examination Variable credit. S, F grading.

CE702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.

CE800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

## School of Communication

[www.libarts.wsu.edu/communication](http://www.libarts.wsu.edu/communication)

Degrees offered: **M.A., Ph.D.**

Faculty working with graduate students: **19**

Graduate students: **63**

Students on assistantships or scholarships: **63%**

Tests required: **GRE; TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

### Admission Requirements

Ph.D.—A 1,000-word statement of purpose, three letters of recommendation, an M.A. in communication or related field with a GPA of 3.5 or above, and official copies of college transcripts.

M.A.—A 500-word statement of purpose, three letters of recommendation, and official copies of college transcripts.

### **Program Description**

The Edward R. Murrow College of Communication provides world class curriculum, faculty, and facilities to prepare students as scholars and educators. The Murrow College has a long history of excellence in graduate education. Faculty members are committed to high quality teaching as well as to scholarly research and publication. Graduate students are involved within and outside the department in leadership roles, participate in a variety of extracurricular activities, and continually receive a variety of awards both on and off campus.

The graduate program focuses on two major areas of study: Media, Health, and Social Issues; and Communication, Organization, and Culture. In the doctoral program students choose a major concentration, with additional coursework in theory, methods, intercultural/international communication, and ethics or persuasion.

### **Contact Information**

Associate Director of Graduate Studies  
Edward R. Murrow School of Communication  
Washington State University  
PO Box 642520  
Pullman WA 99164-2520  
Telephone: 509-335-7333  
Fax: 509-335-1555  
E-mail: grad.communication@wsu.edu

### **Faculty Interests**

**Erica Austin:** Issues of media in decision making and social development, in particular, the interplay of media and parental influences in children's decisions about health, politics, and social reality.*eaustin@wsu.edu*

**Rick Busselle:** Processes through which information observed in news and fictional television programs influences people's judgments and perceptions about the real world.  
*busselle@wsu.edu*

**Dave Demers:** Origins and consequences of corporate media structure and global mass media systems.*ddemers@wsu.edu*

**Jolanta A. Drzewiecka:** Formation of cultural identities in transnational contexts and dynamics of intercultural relationships.  
*jolanta@wsu.edu*

**Doug Blanks Hindman:** Relationships among social institutions, community social structure, and mass communication.*dhindman@wsu.edu*

**Elizabeth Blanks Hindman:** How the media are held accountable through law and ethics; the intersection of legal and ethical philosophy; first amendment issues.*ehindman@wsu.edu*

**Stacey Hust:** Mass media effects and health communication; sexual and reproductive health, gender stereotypes; alcohol, tobacco, and other substance abuse prevention; health information campaigns; entertainment education.*sjhust@wsu.edu*

**Lincoln James:** Direct marketing systems and their effects, including the information content of

messages.*eljames@wsu.edu*

**Glenn Johnson:** Broadcast news, emergency and disaster communications, and management.  
*galjohns@wsu.edu*

**Roberta Kelly:** Teaching of writing and analysis of the writing process.*rkelly@wsu.edu*

**Elizabeth Kruegar:** Regulatory issues, public broadcasting, distance-education, and communication education.*eakruegar@wsu.edu*

**Moon Lee, Public Relations:** Investigating/explaining the impact of certain aspects of technology on the communication process.*moonlee@wsu.edu*

**Tien-tsung Lee:** Political ideology, political communication and advertising, internet usages, and media criticism.*ttlee@wsu.edu*

**Mary M. Meares,** organizational: Intercultural group development, diversity in the workplace, and perceptions of voice in intercultural communities.*mmmeares@wsu.edu*

**Robert Nofsinger:** Language and social interaction, everyday conversation, and interactive talk in the media.*nofsinger@wsu.edu*

**Jeffrey Peterson:** Participatory communication in the social change process. The intercultural perspective to the study of social influence.*petersonjc@wsu.edu*

**Bruce Pinkleton:** Communication campaigns and decision-making processes, including the role of individual motivation in information source use and potential behavioral outcomes associated with message exposure and media use.*pink@wsu.edu*

**Joey Reagan:** Technology adoption and quantitative research methods.*reagan@wsu.edu*

**Susan Dente Ross:** The roles of media and law in social change, social fragmentation, conflict and cooperation, paying particular attention to minorities and disenfranchised groups.  
*suross@wsu.edu*

**Mike Salvador,** organizational: The communication process surrounding environmental impact, focusing on how differences in cultural backgrounds impact our discussion of environmental problems.*salvadam@wsu.edu*

**Mija Shin:** Cognitive and emotional responses to mediated messages. Employing psychophysiological measures to study cognitive processes such as attention and memory, as well as emotional processes.*mija\_shin@wsu.edu*

**Patty Sias,** organizational: Organizational communication, focusing on workplace relationships and relational development, as well as employee uncertainty and information seeking processes.*psias@wsu.edu*

**Alex Tan:** Communication and socialization of cultural minorities; communication strategies for reducing racial stereotyping and prejudice.*alextan@mail.wsu.edu*

### Communication

COM 500	(1 credit)	Introduction to Graduate Study, offered every fall
COM 501	(3 credits)	Theory Building in Communication, M.A. only, offered every fall
COM 504	(1 credit)	Instructional Practicum, offered every semester
COM 506	(3 credits)	Persuasion and Social Influence, offered every other spring
COM 507 (3 credits)		Communication Ethics Seminar, offered every other spring
COM 509 (3 credits)		Quantitative Research, offered every spring
COM 521 (3 credits)		Foundational Perspectives in Intercultural Communication, offered every other fall
COM 570 (3 credits)		Communication Theory, Ph.D. only, offered every other fall

COM 591 (3 credits) Qualitative Research, offered every fall

**Media, Health & Social Issues (3 credits, one course offered each spring)**

Com 514 Health Communication Theories and Campaigns  
Com 516 Health Communication and Society  
Com 517 Health Communication and Social Development  
Com 550 Media Processes and Effects: Theories and Practice  
Com 552 Current Issues in Media Processes and Effects  
Com 571 Theoretical Perspectives on Media and Society  
Com 572 Mass Media, Social Control, and Social Change  
Com 573 Media and Public Discourse  
Com 580 Topics in Communication  
Com 599 Seminar in Communication

**Communication, Organizations & Culture (3 credits, one course offered each spring)**

Com 522 Theoretical Perspectives on Intercultural Communication  
Com 524 Intercultural Communication and Social Change  
Com 526 Current Topics in Intercultural Communication  
Com 535 Organizational Communication Theory  
Com 537 Organization and Society  
Com 580 Topics in Communication  
Com 599 Seminar in Communication

**Advertising**

581 Advertising Psychology 3 Prereq graduate standing. Examination of social and cognitive psychological theories which have contributed to the practice of advertising.  
582 Advertising Management 3 Prereq graduate standing. Case method approach to appraising market opportunities for the planning, development, implementation, and administration of advertising programs.

**Communication Studies**

573 Avoiding Communication 3 Prereq Com 509. Examines theories about why people avoid communication, data relative to these theories, and extant intervention literature.

**Public Relations**

511 Public Relations Theory and Application 3 Theory and practice of public relations; its function in organizations and its role in society.

**Department of Community and Rural Sociology**

*Professor and Chair, A. Kirschner; Professors, D. Dillman, E. Fiske, K. Gray, W. Gray, R. McDaniel, D. Youmans, J. J. Zuiches; Associate Professors, R. Jussaume, Jr., D. Sonnenfeld; Assistant Professors, L. L. Glenna, M. Ostrom.*

The Department of Community and Rural Sociology does not offer a graduate level degree. However, it does offer the graduate courses listed below. Faculty members work closely with graduate students in departments such as Sociology, Environmental Science and Regional Planning, Human Development, Agricultural and Resource Economics, Anthropology, and Natural Resource Science. This work includes serving as chair and member of graduate student committees.

## **Community and Rural Sociology**

523 Fundamentals of Participatory Research 3 Prereq graduate standing. Principles/methods of involving community/interest group members in knowledge generation to understand local issues while building local capacity. Graduate level counterpart of CRS 423; additional requirements. Credit not granted for both CRS 423 and 523.

535 Resolving Environmental Conflicts 4 (3-1) Prereq graded standing. Introduction to environmental conflict resolution via readings, discussions, simulation role plays and required papers; emphasis on interest-based approaches. Graduate level counterpart of CRS 435; additional requirements. Credit not granted for both CRS 435 and 535.

541 Local Impacts of Global Commodity Systems 3 Prereq graduate standing. Theories of globalization, its social, political and economic dimensions, and its impact on people and communities. Graduate level counterpart of CRS 441; additional requirements. Credit not granted for both CRS 441 and 541.

591 Graduate Special Topics V 1-3 May be repeated for credit; cumulative maximum 6 hours. Prereq graduate standing. Advanced topics in rural sociology or community studies.

600 Special Projects/Independent Study Variable credit. S, F grading.

## **Computer Science**

(See Electrical Engineering and Computer Science)

## **Counseling Psychology**

(See Education)

## **Program in Criminal Justice**

<http://libarts.wsu.edu/crimj/overview/index.html>

Degrees offered: **M.A., Ph.D.**

Faculty working with students: **8**

Graduate students: **41**

Graduate students receiving assistantships or scholarships: **25%**

Tests required: GRE; TOEFL or IELTS (international students only)

Program is offered: **Pullman, Spokane (M.A. only)**

Deadline: **Fall—January 10**

**Spring—July 1**

### **Admission Requirements**

Students considering graduate study in the criminal justice program should have a major in criminal justice, sociology, psychology, liberal arts, or a related field; strong writing and analytical skills; a GPA of at least 3.0; and solid GRE scores.

Master's students considering doctoral studies should possess a master's program GPA of at least 3.5, and must submit GRE scores. International students must also submit TOEFL or IELTS scores.

## **Program Description**

The program in criminal justice emphasizes a multi-disciplinary approach to the understanding of deviant behavior and crime, the nature of law and social control, the organization and management of criminal justice agencies, and the use of research and evaluation for planned change in criminal justice. Graduate education in criminal justice at Washington State University focuses on the creation of new knowledge through the connection between theory, research, and practice in the field of criminal justice.

The program is designed to accommodate students who wish to pursue advanced degrees for the purpose of becoming criminal justice professionals, researchers, or university faculty.

Criminal justice at Washington State University is housed in the Department of Political Science and offers direct access to studies in gender and politics, political psychology, public administration, public policy, public law, comparative politics, international relations, and American politics. Interdisciplinary study and innovative study plans are supported within our graduate program.

### **WSU Pullman Contact Information**

Sisouvanh Keopanapay  
Johnson Tower 801  
Washington State University  
PO Box 644880  
Pullman, WA 99164-4880  
Telephone: 509-335-2544  
Fax: 509-335-7990  
E-mail: [siskeo@wsu.edu](mailto:siskeo@wsu.edu)

### **WSU Spokane Contact Information**

Rachel Young  
Administrative Assistant  
College of Education and  
Criminal Justice Program  
WSU Spokane  
PO Box 1495  
Spokane, WA 99210-1495  
Phone: 509-358-7950  
Fax: 509-358-7933  
E-mail: [reyoung@wsu.edu](mailto:reyoung@wsu.edu)

### **Faculty Interests**

**David Brody:** Criminal law, adjudication process, jury research, and justice policy.  
[brody@wsu.edu](mailto:brody@wsu.edu)

**Martha Cottam:** The impact of political and psychological factors in decision making and negotiations in international politics in general; and inter-communal violence, boarder security, and cross-border drug trafficking. [cottam@mail.wsu.edu](mailto:cottam@mail.wsu.edu)

**Laurie Drapela:** Juvenile delinquency, criminological theory, and community corrections.  
[drapela@vancouver.wsu.edu](mailto:drapela@vancouver.wsu.edu)

**Michael Erp:** Community oriented policing, public administration, and the effects of domestic violence

on children. *erpmj@wsu.edu*

**Noelle Fearn:** Community influences on criminal justice outcomes, the influences of race, gender, and age on sentencing and incarceration; and gender-specific programming for inmates. *nfearn@wsu.edu*

**Nicolas Lovrich, Jr.,** Director of the Division of Governmental Studies and Services: The division provides applied research services to agencies of federal, state and local government, promotes faculty and graduate student research, and publishes reports and produces manuscripts for publication in professional journals in political science and criminal justice.  
*faclovri@wsu.edu*

**Faith Lutze:** Corrections, gender and justice, and drug courts; emphasis on the rehabilitative nature of prison environments, the influence of gender on criminal justice institutions, community corrections supervision, and drug courts. *lutze@mail.wsu.edu*

**Otwin Marenin:** Comparative politics and criminal justice issues; more recently, issues in international and comparative policing, international police assistance and training efforts, criminal justice in Third World countries, and policing in Native American communities.  
*otwin@mail.wsu.edu*

**Travis Pratt:** Macro-level and structural criminological theory and correctional policy; integrating community-level and individual risk factors for explaining crime; prison privatization and correctional rehabilitation. *tcpratt@wsu.edu*

**Thomas Preston:** U.S. national security policy, foreign affairs, political psychology, and leadership and leader advisory groups; has frequently served as a consultant for the U.S. Department of Defense, Central Intelligence Agency, and Defense Intelligence Agency.  
*tpreston@wsunix.wsu.edu*

**Steven Stehr:** Public administration, public policy, and disasters and emergency management; currently researching the social and organizational processes undertaken in victim identification and assistance programs following the collapse of the World Trade Center Towers.  
*stehr@wsu.edu*

**Brian Vila:** Criminology theory development; the impact of bio-physiological, social, and behavioral factors on police performance and discretionary behavior; interdisciplinary research techniques; the evolution of culture in human societies; and street gangs.  
*vila@wsu.edu*

## **Course Requirements**

**Hours:** 32 hours are required for the Master of Arts degree.

### **Required Core Courses (15 credits)**

Crm J 530: Criminal Justice: Process and Institutions

Crm J 555: Seminar in Criminology

Crm J/Pol S 503: Research Methods

Crm J/Pol S 504: Quantitative Methods

Crm J 540/Pol S 541: Seminar in Evaluation Research

### **Required Area Courses (6 credits)**

Select two courses in one of the following three areas:

Policing (such as Crm J 570)  
Corrections (such as Crm J 541)  
Courts (such as Crm J 560)

### **Other Required Courses (11 credits)**

Select one Political Science course  
Select any 500-level Criminal Justice elective  
Crm J 702 (5 credits)

## **Department of Crop and Soil Sciences**

### **Crop Science**

[www.css.wsu.edu](http://www.css.wsu.edu)

Degrees offered: **M.S., Ph.D.**

Faculty working with graduate students: **44 (30 WSU, 14 USDA adjunct)**

Graduate students: **39**

Students receiving assistantships or scholarships: **100%**

Tests required: **TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

### **Admission Requirements**

Undergraduates who anticipate pursuing graduate study in Crop Science at WSU are advised to obtain a background in natural sciences including botany, genetics, chemistry, mathematics, statistics, and plant and soil sciences. In addition to the Graduate School admission requirements, the Department of Crop and Soil Sciences requires a personal statement of the applicant's educational goals and professional expectations. New students are accepted on a competitive basis. Acceptance is dependent upon the applicants' qualifications, and availability of research support funding.

### **Program Description**

The program offers world-class graduate programs that focus in a broad spectrum of basic and applied sciences. Crop science students may specialize in: crop genetics and breeding, turf management, crop and weed ecology/management, cereal chemistry, precision agriculture, sustainable agriculture, and organic farming.

Our goal is to train tomorrow's leaders, scientists, and educators who will be capable of making valuable contributions in their chosen field or endeavor. To achieve this goal, CSS offers students opportunities to develop in-depth knowledge in their chosen field, to develop critical thinking skills, and to conduct original, cutting-edge research in laboratory and field settings.

Students are also provided teaching opportunities in the classroom and in outreach and extension programs. At the same time, students have the opportunity to develop a breadth of knowledge across the varied crop science disciplines and related disciplines (i.e. molecular genetics, plant pathology, bio-chemistry) beyond by interacting with colleagues and faculty working in research areas outside of their own.



### **Contact Information**

Dr. Ian Burke or Dr. Kim Garland Campbell  
c/o Debra Marsh  
Washington State University  
Crop and Soil Sciences  
PO Box 646420  
Pullman, WA 99164-6420  
Telephone: 509-335-2615  
Fax: 509-335-8674  
E-mail: marshdj@wsu.edu

### **Graduate Opportunities**

University faculty; Research leader in public and private sectors; Research technology  
Field representative: agribusiness, seed, fertilizer, and pesticide companies; Crop consultant  
USDA-NRCS agent; USDA-FSA agent; Community college instructor; Extension agent  
International development positions, research, administration; Grounds keepers (turf), golf courses, parks; Farm manager

### **Positions Held by Recent Graduates**

Research leader/manager/administrator: federal, state, private  
College/university positions: faculty, administration  
Extension positions: specialists, agents  
International development positions: research, administration, consultants  
Farm manager

### **Contact Information**

Dr. Steven E. Ullrich  
Washington State University  
Crop and Soil Sciences  
PO Box 646420  
Pullman, WA 99164-6420  
Telephone: 509-335-4936  
Fax: 509-335-8674  
E-mail: ullrich@wsu.edu

### **Faculty Interests**

**Byung-Kee Baik:** End-use quality of wheat, chemistry and processing of cereal grains, chemistry and functional properties of starch and protein. *bbaik@wsu.edu*

**John W. Burns:** Field-based variety testing program for cereal grains, grain legumes, and other relevant crops; the primary mechanism for the evaluation and release of WSU varieties. *burnsjw@wsu.edu*

**Kim Campbell:** Crop breeding and genetics to develop improved cultivars of soft white and club wheat, evaluate and distribute improved wheat germplasm, and improve genetic resistance to disease and environmental stresses. *kgcamp@wsu.edu*

**Clarice Coyne:** Cool season food legume curator with responsibilities for improving, acquiring, preserving, evaluating, documenting and distributing crop germplasm. Mapping and characterization of plant disease resistance and other agronomically important genes and application of genomic tools such as association mapping studies to characterize and utilize food legume germplasm collections. *coynec@wsu.edu*

**Steven C. Fransen:** Alfalfa growth and quality (environmental and plant factors), biosolids as fertilizer and soil amendment for growth of hybrid cottonwoods, and the Northwest Columbia Plateau Wind Erosion/Air Quality Project. *fransen@wsu.edu*

**Kulvinder Gill:** Understand the wheat genome and manipulate it for crop improvement, using modern techniques and tools, and resources from other cereals. *ksgill@wsu.edu*

**An N. Hang:** New crops for irrigated or irrigated dry land rotations in central Washington, including dry bean and sugar beet varieties, and oil crops; investigations of rapeseed/canola. *ahang@beta.tricity.wsu.edu*

**William J. Johnston:** Turfgrass management and grass seed production, including greens-type evaluation, snow mold resistance and control, nitrate movement, emission from post-harvest residue burning, bluegrass germplasm studies, and seed field disease control. *wjohnston@wsu.edu*

**Stephen S. Jones:** Crop breeding and genetics to improve winter wheat varieties using cytogenetic and molecular genetic techniques to identify and transfer genes; wild species as sources for disease resistance. *jones@wsu.edu*

**Stephen T. Kenny:** Short-term development of new cultivars meeting immediate brewery needs for high-yield hops with desirable aroma and bitterness; long-term development of hop cultivars with improved disease and pest resistance. *skenny@beta.tricity.wsu.edu*

**Kimberlee K. Kidwell:** Spring wheat breeding, genetics, and cultivar development; traditional breeding methods and molecular technologies to improve agronomic traits, quality, and disease resistance. *kidwell@mail.wsu.edu*

**Andris Kleinhofs:** Barley, genetics, nitrate reductase, RFLP, regulation, mRNA, cloning, sequencing; barley nitrate reductase gene structure and regulation; barley genome analysis. *andyk@wsu.edu*

**Kevin McPhee:** Pea and lentil genetics and breeding. *kmcphee@wsu.edu*

**Timothy W. Miller:** Biology, ecology, and control of weeds in agricultural/horticultural crops, integrated cultural and chemical approaches to managing weeds; weed control strategies in minor crops. *twmiller@wsu.edu*

**Eric Miltner:** Environmentally sound management of recreational and ornamental turfgrass; projects include nutrient and pesticide fate, organic and synthetic fertilizers, and sports turf management. *miltner@wsu.edu*

**Craig F. Morris:** Molecular-genetic basis of wheat grain quality with emphasis on kernel hardness, polyphenol oxidase, and arabinoxylans; extensive milling. *morrisc@wsu.edu*

**Fred C. Muehlbauer:** Genetics and breeding of crop plants with emphasis on cool season food legumes; developing cultivars and germplasm with resistance to disease; genetic maps for pea, lentil, and chickpea. *muehlbau@wsu.edu*

**Robert Parker:** Weed control methods in irrigated crops. *rparker@wsu.edu*

**William F. Schillinger:** Cropping systems for low precipitation areas, long-term no-till systems; soil water conservation; water use efficiency and reduction of runoff and erosion from frozen soils. *schillw@wsu.edu*

**Dan Skinner**, Wheat Genetics, Quality, Physiology and Disease Research Unit: Developing new advances in cereal chemistry, physiology, pathology and genetics of wheat with the goal of developing improved germplasm and varieties. [dzs@wsu.edu](mailto:dzs@wsu.edu)

**Gwen K. Stahnke**: Effects of preemergence herbicides on turfgrass growth, rooting, and quality; herbicide fate in turfgrass environments. [stahnke@wsu.edu](mailto:stahnke@wsu.edu)

**Mark E. Stannard**: Plant material for drought tolerance, cover cropping for wind erosion control, and riparian area enhancement and revegetation. [stannard@wsu.edu](mailto:stannard@wsu.edu)

**Camille Steber**: Application of molecular genetics model systems of *Arabidopsis thaliana* to crops such as wheat for crop improvement. [csteber@wsu.edu](mailto:csteber@wsu.edu)

**Steven E. Ullrich**: Barley breeding and genetics; improvement of yield, disease and insect resistance, and malting and nutritional quality using several breeding techniques. [ullrich@wsu.edu](mailto:ullrich@wsu.edu)

**Diter von Wettstein**: Biochemical genetics of barley; recombinant DNA studies; cloning structural genes that convert glutamic acid into 5-aminolevulinic acid; genetic improvement of barley lines. [diter@wsu.edu](mailto:diter@wsu.edu)

**Joseph P. Yenish**: Problematic weeds and integrating effective chemical and non-chemical weed management into dryland cropping systems of eastern Washington. [yenish@wsu.edu](mailto:yenish@wsu.edu)

**Frank L. Young**: Wind erosion and air quality in the northwest U.S.; integrated spring cropping systems for semi-arid wheat-fallow regions; and strategies for integrated jointed goatgrass management. [youngfl@wsu.edu](mailto:youngfl@wsu.edu)

## Soil Science

[www.css.wsu.edu](http://www.css.wsu.edu)

Degrees offered: **M.S., Ph.D.**

Faculty working with graduate students: **44 (30 WSU, 14 USDA adjunct)**

Graduate students: **39**

Students receiving assistantships and scholarships: **100%**

Tests required: **TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

### Requirements

Undergraduates who anticipate graduate study in Soil Science at Washington State University are advised to obtain a background in natural sciences including botany, geology, genetics, chemistry, mathematics, physics, statistics, and plant and soil sciences. In addition to the Graduate School admission requirements, the Department of Crop and Soil Sciences requires a personal statement of the applicant's educational goals and professional expectations. Acceptance of qualified applicants is generally dependent upon availability of research support and a suitable advisor.

### Program Description

The Department of Crop and Soil Sciences offers world-class M.S. and Ph.D. graduate programs in a broad spectrum of basic and applied sciences. Soil science students may specialize in land use planning and remote sensing, soil chemistry, soil fertility and nutrient cycling, soil genesis and morphology, soil biology, soil and water management, sustainable agriculture, and organic farming. Our goal is to train leaders, scientists, and educators who will be capable of making valuable contributions in their chosen field or endeavor. CSS offers students opportunities to develop in-depth knowledge in their chosen field, to develop critical thinking skills, and to conduct original, cutting-edge research. Students are

also provided teaching opportunities in the classroom and in outreach programs. At the same time, students have the opportunity to develop a breadth of knowledge across the varied soil science disciplines and beyond by interacting with colleagues and faculty working in research areas outside their own.

### **Graduate Opportunities**

USDA-NRCS: field soil scientist, soil conservationist, area soil scientist  
USDA-Forest Service: field soil scientist, forest soil scientist  
Research technologist: field, lab, greenhouse  
Field representative: agribusiness, seed, fertilizer, and pesticide companies  
Environmental consultant  
University faculty member  
Community college instructor  
International development positions: research, administration

### **Positions Held by Recent Graduates**

Research leader/manager/administrator: federal, state, private  
College/university positions: faculty, administration  
Federal government positions: soil scientist, soil conservationist, administration  
Extension positions: specialists, agents  
International development positions: research, administration, consulting  
Environmental consultant: waste management, water quality, wetland delineation

### **Contact Information**

Dr. James B. Harsh  
Washington State University  
Crop and Soil Sciences  
PO Box 646420  
Pullman, WA 99164-6420  
Telephone: 509-335-3650  
Fax: 509-335-8674  
E-mail: harsh@wsu.edu

### **Faculty Interests**

**Alan J. Busacca:** Pedology and Quaternary studies focusing on rates and processes of soil development, global change, interpreting geologic history, soil genesis from volcanic materials and loess, and soil pollution hazards. *busacca@wsu.edu*

**Colin S. Campbell:** Biophysical instrumentation design and development for soil physics and food science; micrometeorological measurements of field-scale heat and carbon dioxide transport; measuring and modeling energy balance partitioning in flooded fields. *colin@decagon.com*

**Lynne Carpenter-Boggs:** Soil microbiology of sustainable, organic, biodynamic cropping systems, and composting. *lcbogg@wsu.edu*

**Craig G. Cogger:** Organic nutrient management; organic farming systems; use of animal manure, biosolids, and composts in agriculture and urban landscapes; soil quality. *cogger@coopext.cahe.wsu.edu*

**Harold P. Collins:** Understanding of soil organic matter dynamics and C cycling in agro-ecosystems; microbial activities, diversity, and function under agricultural management and selected natural ecosystems. *hcollins@pars.ars.usda.gov*

**Joan R. Davenport:** Soil fertility and plant nutrition for annual and perennial crops in irrigated systems; nutrient management to enhance crop and environmental quality and advancement of precision farming practices. *jdavenport@wsu.edu*

**Markus Flury:** Water and solute transport and colloid and colloid-facilitated transport in the vadose zone; sorption mechanisms of organic solutes and effects on transport; and dye tracers for vadose zone hydrology. *flury@mail.wsu.edu*

**Bruce E. Frazier:** Remote sensing techniques for soils, cropland, and forest vegetation. Investigations include site-specific agriculture, wind erosion, Landsat Thematic Mapper, aerial photography, digital terrain data, soil surveys, and laboratory analysis of soil. *bfrazier@wsu.edu*

**James B. Harsh:** Trace metal contamination of soils; surface chemistry of soil clay minerals, mineral solubility, and colloidal interaction with radionuclides in soils and sediments. *harsh@wsu.edu*

**David R. Huggins:** Optimal integrated cropping systems for the Pacific Northwest for economic and environmental sustainability; cropping systems and rotation design; weed management; and nitrogen and water use efficiency in direct seed systems. *dhuggins@wsu.edu*

**Ann C. Kennedy:** Wind erosion and air quality research in the Columbia Plateau, integrated spring cropping systems for the semiarid wheat-fallow region, effects of burn/low-till on erosion and soil quality, weed suppressive soils. *akennedy@wsu.edu*

**Hans Kok:** Research and extension in conservation tillage and direct-seed systems for improved agricultural sustainability and environmental protection. *hanskok@uidaho.edu*

**Richard T. Koenig:** Applied soil fertility and fertilizer recommendations for dryland, cereal based cropping systems in eastern Washington; documentation and management of soil pH changes in direct seeded cropping systems. *richk@wsu.edu*

**Shiou Kuo:** Soil and water quality as affected by cropping systems, soil nutrient management practices, and input of metal contaminants from various types of soil amendments into soil. *skuo@wsu.edu*

**William L. Pan:** Soil-plant relationships in mineral nutrition, nitrogen cycling by sustainable cropping systems, and crop root growth and development; computer imaging of plant roots. *wlpan@wsu.edu*

**Cathy A. Perillo:** Water quality, sustainable agriculture, and soil conservation; soil management in small farming systems; biosolids management. *cperillo@wsu.edu*

**Frank J. Peryea:** Development of grower-friendly techniques to improve nutrient phytoavailability and effectiveness in irrigated orchards to improve fruit tree performance, fruit quality, and reduce risks of environmental contamination. *fjperyea@wsu.edu*

**John P. Reganold:** Measuring the effects of alternative and conventional farming systems on sustainability indicators, including soil quality, crop yield and quality, financial performance, environmental impact, energy efficiency, and social responsibility. *reganold@wsu.edu*

**Robert G. Stevens:** Best management practices in soil, water, and nutrient management to insure productive, profitable agriculture while protecting the environment. *stevensr@coopext.cahe.wsu.edu*

## Crop Science

- 503 Advanced Cropping Systems 3 Prereq graduate standing. Understanding the management of constraints to crop production and quality; biological, physical, and chemical approaches to crop health management. Field trips required. Graduate level counterpart of CropS 403; additional requirements. Credit not granted for both CropS 403 and 503. Cooperative course taught by WSU, open to UI students. (PI Sc 512).
- 504 Plant Transmission Genetics 3 Prereq GenCB 301. Transmission of genes across generations; detailed study of the basic laws of genetics to predict and describe inheritance. Cooperative course taught by WSU, open to UI students (PISc 507).
- 505 Advanced Classical and Molecular Plant Breeding 3 Prereq Biol 320 or MBioS 303; CropS 445. Characterization and principles of improving crop quality and adaptation traits with emphasis on molecular breeding strategies. Cooperative course taught by WSU, open to UI students (PISc 515).
- 508 Advanced Crop Physiology I 3 Prereq BC/BP 364. Physiological responses of crops to light, water and temperature; physiology of seed germination and root and shoot development. Cooperative course taught by WSU, open to UI students (PISc 508).
- 510 Seminar 1 May be repeated for credit. Literature review; preparation and presentation of reports in crop science.
- 512 Topics in Crop Science V 1-2 May be repeated for credit. Concepts of plant breeding, seed physiology, and technology; crop physiology and management.
- 513 Biology of Weeds 3 Prereq Bot 320 Biology, ecology and physiology of weeds; crop and weed interaction and interference. Graduate level counterpart of CropS 413; additional requirements. Credit not granted for both CropS 413 and 513.
- 520 Plant Cytogenetic Techniques 3 (1-6) Prereq GenCB 301. Plant genes and chromosomes. Cooperative course taught by the University of Idaho (PISc 520), open to WSU students.
- 533 Plant Tissue, Cell and Organ Culture 3 (1-6) Same as Hort 533.
- 536 Plant Genetic Engineering Laboratory 2 (0-6) Prereq Bot 325. Experiments, synthesis and cloning of a gene, expression of a heterologous protein in yeast and barley. (SS)
- 539 Herbicide Fate and Mode of Action 4 Prereq CropS 305, Bot 320, BC/BP 364. Fate of herbicides in plants, soil, and water; physiological and biochemical mode of herbicide action; mechanisms of herbicide resistance. Cooperative course taught jointly by WSU and UI (PISc 539).
- 546 Plant Breeding 3 Prereq GenCB 301. Principles and practices of genetic plant improvement. Cooperative course taught by UI (PISc 546), open to WSU students.
- 547 Biometrics for Plant Scientists 3 Prereq CropS 101 and Stat 212 Biometrical techniques in research with particular emphasis in designing, analyzing, and interpreting agricultural and biological experiments. Cooperative course taught by UI (PISc 547), open to WSU students.
- 554 Chromosome Structure and Function 3 Prereq MbioS 301 or equivalent. Structural and functional organization of eukaryotic chromosomes. Cooperative course taught by WSU, open to UI students (PISc 554).
- 556 Insecticides: Toxicology and Mode of Action 1 Same as Entom 556.
- 557 Herbicides: Toxicology and Mode of Action 1 Same as Entom 557.
- 558 Pesticide Topics 1 Same as Entom 558.
- 600 Special Projects or Independent Study Variable credit. S, F grading.
- 700 Master's Research, Thesis and/or Examination Variable credit. S, F grading
- 702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.
- 800 Doctoral Research, Dissertation and/or Examination Variable credit. S, F grading.

## Soil Science

- 501 Seminar 1 May be repeated for credit. Presentation of research information.
- 502 Advanced Topics in Soils V 1-3 May be repeated for credit; cumulative maximum 6 hours. Interpretation, presentation, and discussion of current research on soils, uses, and management.
- 503 Advanced Soil Analysis V 1-3 May be repeated for credit; cumulative maximum 6 hours. By interview only. Soil research techniques; application of modern instrumentation to soil analysis.
- 504 Research Presentation Techniques 1 Preparation of visual aids and oral presentation of research findings. S, F grading.
- 505 Teaching Practicum 1 May be repeated for credit; cumulative maximum 4 hours. Supervised experience in classroom teaching; classroom preparation for lectures, discussions, laboratories; preparation and grading of exams. S, F grading.
- 513 Soil Physics 3 (2-3) Prereq graduate standing. Characterization of soil properties including water content and potential and hydraulic conductivity; modeling water, solute transport, erosion contamination of groundwater. Credit not granted for both Soils 413 and 513.
- 514 Environmental Biophysics 2 Physical environment of living organisms (temperature, humidity, radiation, wind); heat and mass exchange and balance in plant and animal systems. Graduate level counterpart of Soil S 414; additional requirements. Credit not granted for both Soil S 414 and 514. Cooperative course taught by WSU, open to UI students (Biol 515).
- 515 Environmental Biophysics Laboratory 1 (0-3) Prereq Soil S 514 or c//. Experimental methods and procedures in environmental measurements; temperature, wind, radiation, and humidity measurements in biological environments. Graduate level counterpart of Soil S 415; additional requirements. Credit not granted for both Soil S 415 and 515. Cooperative course taught by WSU, open to UI students (Biol 546).
- 517 Fate and Effects of Environmental Contaminants 3 Same as ES/RP 517.
- 521 Environmental Soil Chemistry 3 Soil constituents; soil solutions; mineral equilibria; absorption reactions; acid/base reactions; oxidation-reduction; soil contaminants. Graduate-level counterpart of Soil S 421; additional requirements. Credit not granted for both Soil S 421 and 521. Cooperative course taught by WSU, open to UI students (Soil 521).
- 526 Soil Mineralogy 2 (1-3) Prereq Soils 421 or 422; 454 or 551. Distribution and significance of soil minerals; weathering and reactivity of mineral structures; techniques of mineral identification; X-ray diffraction, chemical dissolution, optical and electron microscopy. Cooperative course taught by UI (Soils 526), open to WSU students.
- 531 Soil Biochemistry and Microbiology 3 (2-3) Graduate-level counterpart of Soils 431; additional requirements. Credit not granted for both Soils 431 and 531.
- 533 (513) Advanced Vadose Zone Hydrology 2 Prereq Soils 413. Methods and models for water, heat, vapor and solute transport in the vadose zone; functions to describe solute transport; non-linear parameter estimation. Cooperative course taught by WSU, open to UI students (Soils 533).
- 537 Soil Biochemistry 3 Prereq Micro 201; BC/BP 364; Soils 421. Enzyme activity; microbial activity/biomass; rhizosphere; carbon, nitrogen, phosphorus, sulfur, and micronutrient cycles. Cooperative course taught by UI (Soils 537).
- 541 Soil-Plant-Microbial Interactions 3 Prereq Soils 421, 431, or 441. Soil-plant microbial relationships to plant nutrition, plant health, and environmental cleanup; rhizosphere chemistry and microbial ecology. Cooperative course taught by WSU, open to UI students (Soils 541).
- 545 Field Analysis of Sustainable Food Systems 3 Graduate-level counterpart of Soils 445; additional requirements. Credit not granted for both Soils 445 and 545. Cooperative course jointly taught by WSU and UI (Ag 545).
- 547 Soil Fertility Management 3 Prereq Soils 441. Philosophy of fertilizer recommendations based on soil and plant tissue testing. Principles of fertilizer manufacture, placement and use. Cooperative

course taught by UI (Soils 547), open to WSU students.

551 Advanced Pedology 3 Prereq Soils 451. Origin and development of soil; geochemical and biochemical weathering processes; dynamics of organic matter; soil development cycles. Cooperative course taught by WSU, open to UI students (Soils 551).

557 Advanced Soil Genesis and Classification 3 (2-3) Prereq Soils 451. Genesis, classification and interpretation of soils, including field investigation emphasizing existing interrelationships.

Cooperative course taught by UI (Soils 557), open to WSU students.

562 Systems in Integrated Crop Management 3 (2-3) Same as Entom 562. Credit not granted for both Soils 462 and 562.

574 Advanced Remote Sensing 3 (1-4) Digital image processing theory and geographic information systems applied to landscape analysis. Cooperative course taught jointly by WSU and UI (For 572).

575 Seminar in Remote Sensing 1 Presentation of research results and ideas on subjects relating to remote sensing.

600 Special Projects or Independent Study Variable credit. S, F grading.

700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.

702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.

800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

## **Design, Doctor of**

### **Interdisciplinary Design Institute:**

[www.idi.spokane.wsu.edu](http://www.idi.spokane.wsu.edu)

Degree offered **Doctor of Design (D.Des.)**

Faculty working with students **2**

Graduate students **5**

Students receiving assistantships or scholarships **100%**

Priority deadline **Fall - January 10**

Campuses **IDI at WSU Spokane campus**

### **Admission Requirements**

To apply, please submit: a completed Graduate School application; official transcripts from all colleges and universities from which credit has been received; curriculum vita or resume; statement of purpose (not to exceed 1500 words); documentation of two faculty members whose research expertise matches your interest area; three letters of recommendation from educational and/or professional references who can speak to the applicant's research and academic potential and ability to succeed in a doctoral program; GRE scores; for international students, TOEFL (minimum score of 600 paper test, 250 computer test), or IELTS; and an exhibit of work illustrating the applicant's interests and abilities in areas related to the design disciplines at Washington State University. The work may be presented via hard copy reprints, web accessibility, CD, DVD, or combined media as appropriate. (Materials will be returned to the applicant after admission decisions have been made in mid-February. Please include a stamped, self-addressed envelope for the return of these materials).

### **Program Description**

The Doctor of Design (D. Des) is offered through the Interdisciplinary Program at the Interdisciplinary Design Institute, Washington State University Spokane. The D. Des is a unique doctoral degree, on the same level of intellectual rigor as the PhD, but designed expressly for integrating cross-disciplinary research towards design applications.



The D. Des addresses a demonstrated void in design education by specifically bridging education, research, and practice within a philosophical and pedagogical framework of interdisciplinary inquiry and critical synthesis.

For the purposes of this degree, “design” is broadly defined as the creative integration of disparate components of knowledge, resources, and experience towards an applied outcome that contributes to socio-cultural well-being.

Concurrent to the interdisciplinary focus of the program is the development of specific disciplinary goals designed to deepen knowledge and investigative methodologies inherent in and supportive of each of the design professional fields. Each candidate will apply the appropriate philosophical, technical and/or synthetic focus to their study and will develop critical content to their research contributing in innovative and original ways.

### **Contact Information**

Nancy Blossom, MA, FIDEC, IIDA  
Interdisciplinary Design Institute  
Washington State University Spokane  
PO Box 1495  
Spokane, WA 99210-1495  
Telephone: 509-358-7920  
E-mail: blossom@wsu.edu

### **Overview**

The Doctor of Design (DDes) program is intended to advance both the art and science of design within the philosophical and pedagogical framework of interdisciplinary inquiry, critical synthesis, and problem solving that bridges education, research, and practice. As a terminal doctoral degree, the DDes is intended for persons who are well versed and professionally skilled in the design profession and who seek to make substantive, innovative, and original scholarly contributions to their fields. The DDes is the only one of its kind in the State of Washington, as well as the western United States and Canada.

### **Graduate Students**

Graduate students explore advanced design theories, problem-solving techniques, methodologies, and individual research initiatives while pursuing a degree in architecture, landscape architecture, interior design, or a Doctor of Design. Through the interdisciplinary core curriculum, graduate students acquire the skills and knowledge needed to participate effectively as members of interdisciplinary design and research teams, and to advance the body of knowledge in their disciplines.

### **Doctor of Design Program of Study**

Most students will enter with previous master’s degrees and follow the traditional program of study outlined below. However, qualified students may enter the program without a previous master’s degree and will follow an amended program of study referred to as the “fast track option.”

### **Traditional Track-Fall Semester Year 1**

DESGN 561, Design Thinking 3 credits  
DESGN 562, Area Readings 3 credits

**Spring Semester Year 1**

DESGN 563, Directed Readings 3 credits  
(Pre-req completion of DESGN 562)

**Fall Semester Year 2**

DESGN 564, Design Research Methods 4 credits  
DESGN 565, Proposal Prep 2 credits  
(Pre-reqs concurrent enrollment DESGN 562)

**Spring Semester Year 2**

DESGN 570, Research Practicum 3 credits  
(Pre-req completion of DESGN 564/565)  
DESGN 800, Prelim Exam\* (April), 2 credits

**Fall and Spring Semester Year 3**

After successful completion of coursework and preliminary exam, student will advance to candidacy and begin work on the dissertation. Per Grad School policy, the final oral exam can be taken no earlier than 4 months, and no later than 3 years after preliminary exam.

Each DDes student will share the 18 credit core. Additionally, students will take a minimum of 16 graded elective credits, in consultation with his/her advisor. Those credits may include design and/or external discipline research and theory, and/or general supportive electives based on individual areas of interdisciplinary focus for the doctoral dissertation.

An individual program of study (in addition to the core) will be developed for each student, based on degrees, professional experience, and intended research focus. Students may move through at different speeds; however the sequential nature of the core needs to be followed when developing the program of study. In addition to the 34 graded credit requirement, 20 credits of DESGN 800 is required, and a total of 72 credits must be completed.

**Fast Track Master's to DDes Sequence**

For student entering w/o a master's degree

**Fall Semester Year 1**

DESGN 501, Interdisciplinary Seminar 3 credits  
DESGN 530, Philosophies/Theories of the Built and Natural Environment, 3 credits  
Electives (studio, theory, stats, design electives, etc.) (min. 6 credits)

**Spring Semester Year 1**

DESGN 540, Research Methods, 3 credits  
DESGN 550, Applications, 3 credits  
Electives (studio, more methods, design electives, etc.), min. 4 credits

**Fall Semester Year 2**

DESGN 561, Design Thinking, 3 credits  
DESGN 562, Area Readings, 3 credits  
Electives (support courses per interdisciplinary area), min. 6 credits

**Fall Semester Year 3**

DESGN 564, Design Research Methods, 4 credits  
DESGN 565, Proposal Prep, 2 credits

### **Spring Semester Year 3**

DESGN 570, Research Practicum, 3 credits

DESGN 800, Prelim Exam\* (April), 2 credits

### **Fall Semester Year 4/Spring Semester Year 4**

After successful completion of coursework and preliminary exam, student will advance to candidacy and begin work on the dissertation. Per Grad School policy, the final oral exam can be taken no earlier than 4 months, and no later than 3 years after prelim exam.

Students in the fast-track may earn a master's degree by producing an acceptable thesis or series of at least two manuscripts previously published or to be published from core coursework (DESGN 550, 561, 563), per Graduate School guidelines.

### **Courses**

Design (DESGN)

396 Introduction to 3D Modeling

397 3D Digital Modeling & Project Information Management I

410 Light in Buildings

420 Analysis of Design Practice

430 Portfolio and Representation

435 Interdisciplinary Design Perspectives

450 Interdisciplinary Design Studio

467 Regional Landscape Inventory and Analysis

477 Landscape Applications of Geographic Information Systems

497 3D Digital Modeling & Project Information Management II

498 Advanced Digital Visualization

501 Interdisciplinary Seminar

510 Light in the Built Environment

520 Design Practice Case Studies

530 Philosophies and Theories of the Built and Natural Environment

535 Interdisciplinary Perspectives of Design

540 Research Methods

550 Applications: Using Research in the Inquiry Process 3 Prereq Doctoral standing; previous research methods course. Application of scientific research in the advanced design process.

Desgn 561 Seminar in Design Thinking

Desgn 563 Directed Readings

Desgn 564 Design Research Methods

Desgn 565 Dissertation Proposal Planning

Desgn 590 Teaching Practicum

Desgn 598 Topics in Design

Desgn 600 Special Projects or Independent Study

Desgn 800 Doctoral Research, Dissertation, and/or Examination

## **Economic Sciences**

www.ses.wsu.edu

Degrees offered: **M.A, Ph.D.**

Faculty working with graduate students: **34**

Graduate students: **75**

Students receiving assistantships or scholarships: **80%**

Tests required: **GRE; TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

### **Requirements**

Submit a statement of purpose, three letters of reference, copies of all transcripts, GRE scores and (for international students) TOEFL or IELTS scores.

### **Program Description**

The Graduate Program in the School of Economic Sciences has a long tradition of excellence. The school's graduate instructional programs are based on a core of economic theory and quantitative methods, training in fields, and writing a thesis, dissertation, or special project. The strong quantitative training allows for more rigorous research and creates excellent job opportunities for our graduates in academia and industry. Students may specialize in one or more fields, including: Econometrics; Environmental & Natural Resource Economics; International Economics; Industrial Organization; Agricultural Economics (required for Agricultural Economics Ph.D.); Public Economics; and Financial Economics.

The program has a strong tradition of student mentoring, small classes, and accessible advising, which results in a high proportion of academic placements directly into prestigious assistant professor positions and has produced national dissertation and thesis awards. Much of the research work is done collaboratively with students, and many peer-reviewed papers are co-authored by students and faculty every year.

### **Contact Information**

Jill McCluskey, Ph.D.

Chair of Graduate Studies

School of Economic Sciences

101 Hulbert Hall

PO Box 646210

Pullman, WA 99164-6210

Telephone: 509-335-2835

Fax: 509-335-1173

E-mail: mccluskey@wsu.edu

### **Graduate Opportunities**

University faculty; Econometrician for industry (e.g. American Express, JP Morgan) ; Industry analyst ; Government analyst

## Positions Held by Recent Graduates

Assistant Professor, University of Arizona; Assistant Professor, University of Kentucky; Econometrician, American Express; Assistant Professor, University of Illinois; Assistant Professor, Colorado State University

## Faculty Interests

**Gilad Aharonovitz:** Growth of open economies, economic development, economic geography and income inequality. *aharonovitz@wsu.edu*

**Raymond Batina:** The effects of public capital, taxation, and public goods. *rbatina@pullman.com*

Daniel J. Bernardo: Natural resources and production. *bernardo@wsu.edu*

**Kenneth L. Casavant:** Focuses on transportation economics, freight mobility, and transportation policy including transportation planning for all modes of people and product logistics. *casavantk@wsu.edu*

**Andrew Cassey:** International trade, growth and development, industrial organization, and regional economics. *cassey@wsu.edu*

**Seung Choi:** Macroeconomics, growth and development, international trade, asset pricing, money and banking. *choism@wsu.edu*

**Hayley Chouinard:** Consumer demand for differentiated food products, auction and lottery allocation theory, and agricultural and natural resource policy. *chouinard@wsu.edu*

**Ana Espinola:** Environmental economics and game theory; industrial organization, public economics and applied microeconomics. *anaespinola@wsu.edu*

**Gregmar Galinato:** Natural resource and environmental economies in developing economies. *ggalinato@wsu.edu*

**Karina Gallardo:** Agribusiness marketing, consumer demand, value-added food products. *karina\_gallardo@wsu.edu*

**Mark Gibson:** International economics, macroeconomics, and industrial organization. *mjgibson@wsu.edu*

**William Hallagan:** Issues in economic development. *hallagan@wsu.edu*

**Fred Inaba:** The economics of organizations and transportation. *inaba@wsu.edu*

**Eric Jessup:** Improving freight transportation efficiency across all modes and on the spatial characteristics influencing facility location decisions for inter-modal truck/rail investments. *eric\_jessup@wsu.edu*

**Wayne Joerding:** Research focuses on pedagogy. *wjoerding@wsu.edu*

**Heather Johnson:** Strategic management and its impact on firm performance, analysis of how informational differences affect firm strategic behavior, and connection between strategy and firms' competitive positions. *heatherci@wsu.edu*

**Patricia Kuzyk:** Pedagogy, economics of media content, and institutional economics. *pkuzyk@wsu.edu*

**Jeffrey T. LaFrance:** Consumer economics and demand analysis, econometrics, agricultural policy, environmental and natural resource economics. *jtlafrance@wsu.edu*

**Bidisha Mandal:** Health economics and econometrics. *bmandal@wsu.edu*

**Tom Marsh:** Econometrics, agricultural commodity markets, and natural resource economics. *tl\_marshall@wsu.edu*

**Scott C. Matulich:** Individual transferable fishing quotas, regulatory expropriation and rights-based fishery management. *matulich@wsu.edu*

**Jill J. McCluskey:** Product differentiation and market power in food industries, including product quality, food safety, and food labeling issues; environmental damage and land use issues. *mccluskey@wsu.edu*

**Vicki McCracken:** Marketing and price analysis, economics of nutrition and health, applied econometrics. *mccrack@wsu.edu*

**Ron C. Mittelhammer:** Econometric theory with empirical applications to agricultural markets. *mittelha@wsu.edu*

**Felix Munoz:** Microeconomic theory, game theory and behavioral economics, industrial organization and public economics. *fmunoz@wsu.edu*

**Shannon Neibergs:** Economics of livestock production and marketing systems including value-added opportunities for Washington livestock and livestock products. *sneibergs@wsu.edu*

**Mudziviri Nziramasanga:** Economics of changes in growth patterns and the impact of direct foreign investment on firm performance, exchange rates, and self-employment. *nziramasangam@wsu.edu*

**Lane Rawlins:** Labor economics. *rawlins@wsu.edu*

**Robert Rosenman:** Measuring efficiency and quality of care by hospitals, clinics, and physicians; economic costs of ethical decision making in health care. *yamaka@wsu.edu*

**C. Richard Shumway:** Output supply and input demand estimation for multiple output producers; the applicability of economic theory, and predicting producer response to changes in the economic environment. *shumway@wsu.edu*

**Trent Smith:** Economics of obesity and nutrition, utilizing approaches from behavioral economics. *trentsmith@wsu.edu*

**Jennifer Steele:** Applied microeconomics and economic development. *steele@wsu.edu*

Mykel Taylor: Agricultural marketing, consumer demand and food safety, microeconomics. *m\_taylro@wsu.edu@wsu.edu*

**Philip R. Wandschneider:** Non-market valuation, water economics and policy, and the economics of sustainable agriculture. *pwandschneider@wsu.edu*

**Jia Yan:** Transportation economics and econometrics. *jiay@wsu.edu*

**Jonathan K. Yoder:** Natural resource and environmental economics, policy design, and econometrics; the economics of wildfire risk mitigation, agricultural land use contracts. *yoder@wsu.edu*

**Douglas L. Young:** Economics of soil, water, and air quality conservation farming systems; pest control economics; economics of sustainable agriculture; and resource conservation policy. *dlyoung@wsu.edu*

### **Economic Sciences**

500 Macroeconomic Theory I

501 Microeconomic Theory I

502 Macroeconomic Theory II

503 Microeconomic Theory II

504 Production and Consumption Economics

510 Statistics for Economists  
511 Econometrics I  
512 Econometrics II  
513 Econometrics III  
514 Econometrics IV  
521 Topics in Economics Sciences  
525 Master's Econometrics  
526 Master's Microeconomic Analysis  
527 Mathematics for Economists  
529 Research Methods  
531/431 Economic Analysis of Environmental Policies  
532/432 Natural Resource Economics and Policy  
533 International Trade and Policy  
555 Managerial Economics for Decision Making  
571 International Trade  
572 International Development  
581 Natural Resource Economics  
582 Environmental Economics  
583 Public Sector Economics  
593 Applications in Microeconomic Topics  
594 Theory of Industrial Organization  
596 Advanced Topics in Financial Economics  
598 PhD Research Seminar  
599 Special Topics in Economics  
600 Special Projects or Independent Study  
700 Master's Research, Thesis, and/or Examination  
702 Master's Special Problems, Directed Study, and/or Examination  
800 Doctoral Research, Dissertation and/or Examination Variable credit. S, F grading.

## College of Education

Department of Educational Leadership and Counseling Psychology

### Counseling Psychology

[www.educ.wsu.edu/elcp/documents/CounPsy.html](http://www.educ.wsu.edu/elcp/documents/CounPsy.html)

Degrees offered: **M.A. and Ed.M, Ph.D., School counselor certification, School psychologist certification in Washington**

Faculty working with graduate students: **15 (12 WSU and 3 affiliate)**

Graduate students: **M.A., Ed.M., 64, Ph.D., 43**

Students receiving assistantships or scholarships: **50% M.A. and Ed.M., 90% Ph.D.**

Degree offered: **Pullman, Spokane (school psychology certification), Tri-Cities (M.A., Ed.M., school counselor certification)**

Tests required: **GRE; TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

**Admission Requirements**

Admission is based on the following criteria: GRE test results; grade point average in previous academic work; relevance of student goals and interests to the program; letters of recommendation; previous experiences.

**Program Description**

Master's programs in counseling focus on one of two professional options: school counseling, which prepares students for initial certification as K-12 school counselors, and community counseling, which, in combination with the fulfillment of additional post-degree requirements, prepares students for licensure as a mental health counselor. Students who are pursuing certification as school counselors receive additional training to be effective in school settings. The M.A. in education, which requires a thesis, is used by students who plan to pursue a doctoral program or who have interest in conducting research. The Ph.D. program in counseling psychology is accredited by the American Psychological Association. The program was awarded the Suinn Minority Achievement award, which is awarded by the APA to programs that are exemplary in the recruitment and retention of diverse students and in a program focus on cultural diversity.

Students who are pursuing certification as school counselors receive additional training to be effective in school settings.

The Ed.M. program is generally pursued by those who intend to work in a K-12 educational or community/agency setting.

The M.A. in education, which requires a thesis, is used by students who plan to pursue a doctoral program or who have interest in conducting research.

The Ph.D. program in counseling psychology is accredited by the American Psychological Association.

The program was awarded the Suinn Minority Achievement award, which is awarded by the APA to programs that are exemplary in the recruitment and retention of diverse students and in a program focus on cultural diversity.

The graduate certificate program in school psychology represents a joint effort between Washington State University and Eastern Washington University.

Graduates receive an educational staff associate certificate, which allows them to practice school psychology in Washington and, through reciprocal arrangements, throughout the United States.

**Contact Information**

Graduate Coordinator  
Office of Graduate Studies  
Cleveland Hall Room 252  
PO Box 642114  
Pullman, WA 99164-2114  
Telephone: 509-335-9195/335-7016  
Fax: 509-335-2097  
E-mail: gradstudies@wsu.edu



## **Graduate Opportunities**

**Master's:** School counselors, counselors in community mental health centers, other helping professions.;

**Doctoral:** Postdoctoral clinical or research positions, staff psychologist at university counseling centers, university faculty, licensed psychologist in private practice, and in community mental health organizations.

## **Positions Held by Recent Graduates**

**Master's program:** Counselor, Inchelium School (Colville Reservation); Ph.D. student in counseling psychology programs; family wellness manager, Native American Rehabilitation Association of the Northwest.; **Doctoral program:** Psychologist, San Jose State University; assistant professor, De La Salle University (Philippines); mental health specialist, LeRoy Haynes Center for Children (Laverne, CA); behavioral therapist, St. Luke's Rehabilitation Institute (Spokane, WA); postdoctoral position at University of California, Berkeley.

**School psychology certification program:** School psychologists positions in Arizona, California, and many school districts in Washington; Ph.D. programs in school psychology.

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Telephone: 509-335-9195  
Fax: 509-335-2097  
E-mail: [gradstudies@wsu.edu](mailto:gradstudies@wsu.edu)

## **Faculty Interests**

**Arreed F. Barabasz**, Professor of Counseling Psychology  
**Marianne Barabasz**, Professor of Counseling Psychology  
**Stephanie San Miguel Bauman**, Associate Professor of Counseling Psychology  
**A. Timothy Church**, Professor of Counseling Psychology  
**Phyllis Erdman**, Professor of Counseling Psychology, Department Chair  
**Brian French**, Assistant Professor of Educational Psychology  
**Steve Hirsch**, Clinical Professor of School Psychology  
**David Holliday**, Assistant Professor of Educational Psychology  
**Susan Jensen**, Clinical Assistant Professor of Counseling Psychology  
**Laurie D. McCubbin**, Assistant Professor of Counseling Psychology  
**Brian McNeill**, Professor of Counseling Psychology  
**Michael S. Trevisan**, Professor of Educational Psychology

## **Contributing Faculty in Educational Psychology**

**Jennifer Beller**: Moral reasoning in competitive populations, measurement and evaluation of moral and social reasoning; physical education, sport philosophy, and ethics.  
[jbeller@wsu.edu](mailto:jbeller@wsu.edu)

**David Holliday**, WSU Tri-Cities: Research and evaluation. [dholliday@tricity.wsu.edu](mailto:dholliday@tricity.wsu.edu)

**Todd Johnson**: Assessment and evaluation, educational technology. [toddjohnson@wsu.edu](mailto:toddjohnson@wsu.edu)

**Michael S. Trevisan:** Assessment/evaluation, program evaluation, applied measurement, educational assessment. *trevisan@mail.wsu.edu*

**Dennis A. Warner:** Learning and instruction, evaluation of student learning, program evaluation. *dawarner@wsu.edu*

## **Educational Leadership**

[www.educ.wsu.edu/elcp/EdLead/index.html](http://www.educ.wsu.edu/elcp/EdLead/index.html)

Degrees offered: **Ed.M., M.A. Ph.D., Ed.D., certification for principal, superintendent, program coordinator**

Faculty working with graduate students: **13**

Graduate students: **300 (full and part time)**

Graduate students receiving assistantships or scholarships: **80%**

Program offered: **Pullman, Spokane, Tri-Cities, Vancouver**

Tests required: **GRE or Miller Analogy (doctorate only); TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

### **Admission Requirements**

Submit a completed departmental application, current resume, three letters of recommendation, GRE scores (for all doctoral applicants and master's applicants if GPA is below 3.0), TOEFL or IELTS (international only), and transcripts of all past academic work.

**Program Description** The educational leadership program offers graduate studies at the master's and doctoral levels, plus administrator certification programs for the superintendent, residency principal, and residency program administrator certificates.

The master's (M.A. and Ed.M.) and doctoral (Ed.D. and Ph.D.) degree programs offer a specialization in K-12 educational leadership.

Program faculty provide a balance and integration of practical experience, theory, and research and aim to prepare educational leaders who function as scholar-practitioners.

All campuses offer the educational leadership master's degrees, certification programs, and access to the state-wide doctor of education degree; one-year residency is required for the doctor of philosophy degree.

The University's educational leadership program is one of 70 doctoral-granting programs nationwide selected for membership in the University Council for Educational Administration, a national consortium dedicated to the improvement of educational leadership preparation and practice.

The administrator certification programs are organized around the national ISLLC (Interstate School Leaders Licensure Consortium) standards, which have been adopted as the certification standards for Washington State licensure.

The goal of these standards and our programs is to prepare educational leaders who can provide effective leadership to promote learning for all children in K-12 schools.

Washington State University's innovative field-based principal and superintendent certification programs serve certification candidates in a cohort-based program that promotes a close professional network.

### **Contact Information**

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Fax: 509-335-2097  
E-mail: gradstudies@wsu.edu

### **Faculty Interests**

**Eric J. Anctil**, Ph.D.—University of Wisconsin, Madison (ejanctil@wsu.edu)

Media images of education; mass media and education; media literacy for educational leadership, K-20; educational policy analysis; school-community relations

**Gail Furman**, Ph.D.—Washington State University (gfurman@wsu.edu)

Organizational and leadership theory; school as community; moral leadership and ethics; qualitative research methods

**Forrest W. Parkay**, Ph.D.—University of Chicago (fwparkay@wsu.edu)

K-12 educational Leadership; multicultural education; school principals; curriculum and instruction

**Paul Pitre**, Ph.D.—University of Maryland (pep@wsu.edu)

Multicultural education and policy analysis

### **Washington State University, Spokane**

**Gordon Gates**, Ph.D.—Washington State University (gates@wsu.edu)

Principal and teacher leadership; evaluation in school improvement

**Jim Howard**, Ph.D.—University of Oregon (jamesh@mail.wsu.edu)

The principalship; K-12 educational leadership

**Joan Kingrey**, Ph.D.—Washington State University (kingrey@wsu.edu)

Organizational development and learning; K-12 educational leadership

**Dennis Ray**, Ed.D.—Washington State University (dray@wsu.edu)

K-12 educational leadership; the superintendency

**Gene Sharratt**, Ph.D.—Washington State University (gsharratt@wsu.edu)

Leadership and school improvement

Washington State University, Tri-Cities

**Nancy Kyle**, Ed.D.—Washington State University (nkyle@tricity.wsu.edu)

K-12 educational leadership; curriculum and instruction

Washington State University, Vancouver

**Paul Goldman**, Ph.D.—University of Chicago (goldman@vancouver.wsu.edu)

K-12 educational leadership; educational organizations; research methods; politics and policy; sociology of education

**Gay Selby**, Ed.D.—Washington State University (selby@vancouver.wsu.edu)

K-12 educational leadership; superintendency

## Educational Psychology

[www.educ.wsu.edu/elcp/documents/EdPsy.html](http://www.educ.wsu.edu/elcp/documents/EdPsy.html)

Degrees offered: **M.A., Ed.M., Ph.D.**

Number of faculty working with graduate students: **2, three affiliated faculty**

Graduate students: **13**

Graduate students receiving assistantships or scholarships: **100%**

Tests required: **GRE; TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

### Admission Requirements

To apply, please provide the following information: a current resume documenting any related work or research experience; a brief statement of your professional objectives and how you believe they will be promoted by admission to the program (do not exceed two typed single spaced pages); three letters of reference forwarded by persons familiar with your qualifications; transcripts showing all previous college or university coursework; and GRE or (for international students only) TOEFL or IELTS scores. For admission in the doctoral program a minimum GRE score of 1000 (quantitative/verbal) is required. Please also fill out the departmental application form at <http://education.wsu.edu/graduate/apply/edpsychology/>.

### Program Description

The educational psychology program, with core requirements in research, evaluation, and measurement and learning theory, provides students with a solid academic foundation in educational measurement and evaluation. In 2009, the College of Education Assessment and Evaluation Center (formerly the Assessment and Evaluation Center) was established at WSU to provide leadership, training, consultation, and state-of-the-art solutions, to challenging educational research questions at the university, state, national and international levels. Assistantships for educational psychology students in the center provide unique opportunities to apply theoretical concepts and methodologies of program evaluation and educational and psychological measurement to specific practical projects in various educational setting through partnerships with school districts, state agencies, and other social service organizations.

Successful professionals in this field have strong methodological skills, an understanding of researchable topics, the ability to develop a research program, the ability to communicate and work with a wide variety of professionals, and the skills to understand nuance and ambiguity in the work environment. Through faculty and student partnerships across campus, the program provides an exciting, interdisciplinary atmosphere for course and field study. Consistent with the scientist-practitioner model of professional training in psychology, students in the doctoral program in educational psychology are required to integrate the theoretical and research offerings of the university with substantial practicum and internship experiences by completing an internship directly related to the specific area of professional training.

### Contact Information

Graduate Coordinator

Office of Graduate Studies

Cleveland Hall, Room 252

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Washington State University

Pullman, WA 99164-2114  
Telephone: 509-335-9195/335-7016  
Fax: 509-335-2097  
E-mail: gradstudies@wsu.edu

### **Faculty Interests**

**Jennifer Beller:** Sports ethics, moral reasoning in competitive populations, measurement and evaluation of moral & social reasoning. *jbeller@wsu.edu*

**David Holliday:** Evaluation and assessment. *dholliday@tricity.wsu.edu*

**Todd Johnson:** Assessment evaluation, educational technology. *toddjohnson@wsu.edu*

**Mike Trevisan:** Assessment/evaluation, program evaluation, applied measurement, educational assessment. *trevisan@mail.wsu.edu*

**Dennis Warner:** Attentional processes. *dawarner@wsu.edu*

### **Affiliate Faculty**

**David Conley,** College of Sciences: Student assessment, research methodology, science education. *dmc@wsu.edu*

## **Higher Education Administration**

[www.educ.wsu.edu/elcp/HigherEd](http://www.educ.wsu.edu/elcp/HigherEd)

Degrees offered: **M.A., Ed.M, Ed.D., Ph.D.**

Faculty working with graduate students: **4 (8 affiliate faculty)**

Graduate students: **75**

Students receiving assistantships or scholarships: **80%**

Tests required: **GRE (all doctoral and some master's students) and TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

### **Admission Requirements**

Prospective graduate students must apply to both the Graduate School and to the Department of Educational Leadership and Counseling Psychology.

Applications for programs in higher education are considered holistically.

Faculty review application materials and consider: academic potential, recommendations, fit with the program, past academic performance, and availability in the program.

Master's program applications should include the following: Official transcripts from all institutions attended; current resume; three current recommendation letters; application essay; and if your undergraduate GPA is less than a 3.0, the GRE (verbal and quantitative scores combined should be at least 800).

Doctoral program applications should include the following: Official transcripts of all undergraduate and graduate institutions attended; official GRE scores (a score of 1000 verbal and quantitative combined is expected); current resume; three current recommendation letters; application essay; and an academic writing sample.

### **Program Description**

The higher education program is dedicated to meeting students' needs as current and future leaders and faculty in colleges, universities, or in athletic programs throughout the country. The program provides a balance and integration of research, theory, policy, and practical experience. Students examine the range of historical, social, legal, political, economic, and ethical issues that impact the practice and administration of higher education.

The Ed.M. in higher education is designed to prepare students to assume administrative roles within colleges and universities. The M.A. in higher education is recommended for students who plan to continue work at the doctoral level. The Ed.D. is a professional degree typically chosen by students who will occupy positions of leadership and positions in applied specialties in education and related fields.

The Ph.D. degree, with specializations in higher education, student affairs, or higher education administration, is designed to appeal to students who currently work in college or university administration or related fields, and who want to become faculty members or who would like to move into higher-ranking administrative positions.

### **Contact Information**

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Pullman, WA 99164-2114  
Telephone: 509-335-9195 or 509-335-7016  
Fax: 509-335-2097  
E-mail: gradstudies@wsu.edu

### **Faculty Interests**

**Willie J. Heggins III:** Higher education, student affairs, student development, diversity studies, leadership.

**Forrest W. Parkay:** Principal socialization, curriculum theory and research, implementation of educational policies, international education.

**Michael Pavel:** Student development, institutional adaptation, American Indian/Alaskan Native studies.

**Kelly Ward:** Higher education, service learning, faculty issues, service role of colleges and universities.

### **Affiliate Faculty**

**Eric J. Anctil:** Higher education law, mass media and education, policy issues.  
*ejanctil@wsu.edu*

**Jennifer Beller:** Moral development, ethics in competitive environments. *jbeller@wsu.edu*

**Cathryn Claussen:** Legal issues in sport, ethics in sport management, sport sociology.  
*claussen@wsu.edu*

**Phyllis Erdman,** Department Chair: Counseling; marriage and family therapy.  
*perdman@wsu.edu*

**Gail C. Furman:** Educational administration, policy, qualitative research.  
*gfurman@wsu.edu*

**Bernardo Gallegos:** History of education, multiculturalism, globalization, socio-cultural influences in education. *bgallegos@wsu.edu*

**Alton L. Jamison,** Associate Vice President for Educational Development: Policy planning, career services, student support services, student development. *ajamison@wsu.edu*

**Todd Johnson:** Research and evaluation. *toddjohnson@wsu.edu*

**Yong Jae Ko:** Sport management, sport consumer behavior. *yongko@wsu.edu*

**Gerald J. Marczynski,** Associate Vice President for Student Affairs: Student affairs, higher education leadership, student development. *marzyns@wsu.edu*

**Paul E. Pitre:** Higher education, leadership and governance, educational policy.  
*pepitre@wsu.edu*

**Susan L. Poch,** Director, Student Advising and Learning Center: Student development, human development, student transfer. *poch@wsu.edu*

**Robert Rinehart:** Sport sociology, extreme sport, qualitative research. *rerine@wsu.edu*

**John Wong:** Sport consumer behavior, sport history. *john\_wong@wsu.edu*

### **Counseling Psychology**

501 Historical and Philosophical Foundations of Counseling Psychology 3 Prereq admission to Counseling Psychology PhD program. History of counseling psychology; philosophical and psychological systems; current identity of counseling psychology as an academic discipline and a profession.

511 Theories, Research, and Techniques in Counseling Psychology I 3 Philosophical assumptions, theory of personality, counseling process, techniques, and relevant research in the major theories of counseling and personality.

512 Theories, Research, and Techniques in Counseling Psychology II V 3 Prereq CoPsy 511. Advanced study of process techniques and outcome research in the field of counseling and psychotherapy; nonspecific process skills are presented and integrated into specific, empirically validated interventions.

513 Career Development 3 Theories, concepts, methods, and findings in career counseling; vocational assessment and prediction.

515 Ethics and Professional Problems in Counseling Psychology 3 Professional problems; ethical, legal, and training issues; professional practices, and new professional issues.

518 Theoretical Foundations of Group Counseling 3 Prereq CoPsy 512 or c//. History, philosophy and theoretical foundations; the group counselor, members, and issues in group counseling.

522 Introduction to Family Counseling 3 Counseling in the family context; intervention strategies, theoretical models, and professional ethics and issues.

523 Topics in Counseling Psychology V 1-4 May be repeated for credit; cumulative maximum 8 hours. Recent research, developments, issues, and/or applications in selected areas of counseling psychology.

525 Counseling Diverse Populations Prereq CoPsy 512. Research and theories regarding the influence of culture, gender, and lifestyle on counseling processes; applications of appropriate

assessment/treatment strategies.

527 Individual Appraisal I 3 or 4 Prereq EdPsy 508, 509. Cognitive assessment of individuals, with an emphasis on the theoretical background and practical skills needed to administer, score, and interpret individual intelligence tests; assessment of learning disabilities, AD/HD, and individual achievement.

528 Individual Appraisal II 4 Prereq CoPsy 527. Interpretation of representative personality assessment inventories and symptom checklists used in counseling practice; integration of results in psychological reports.

529 Counselor Supervision: Theory, Research, and Practice 3 Prereq admission to Counseling Psychology Ph.D. program. Survey of major theoretical approaches, techniques, and research in models of counselor supervision and training.

531 Current Issues in School Counseling 3 Prereq CoPsy 512, 518. Issues of immediate concern to school counselors: drug abuse, family violence, adolescent suicide, sexual orientations, crisis intervention, consultation and referral.

532 Current Issues in School Counseling II 3 Prereq CoPsy 531. Additional coverage of contemporary issues of concern to school counselors; comprehensive developmental school programs, school community dynamics, parental involvement, consultation.

533 Master's Internship in Community Counseling V 4-8 May be repeated for credit; cumulative maximum 8 hours. Prereq CoPsy 512; 513; 515; 527 or c//; or by interview. Supervised experience in the application of counseling theory and techniques in an agency setting. S, F grading.

535 Master's Internship in School Counseling V 4-8 May be repeated for credit; cumulative maximum 8 hours. Prereq CoPsy 512, 513, 518; 515 or c//, 527 or c//; or by interview. Supervised experience in the application of guidance and counseling theory and techniques in a school setting. S, F grading.

537 Professional Development in Counseling Psychology 3 NBCC requirements; growth and development, social and cultural foundations, the helping relationship, group dynamics, career, appraisal and research.

541 Clinical and Experimental Hypnosis Seminar 3 Prereq Ph.D. student in counseling, educational, experimental, or clinical psychology. Clinical and experimental hypnosis, emphasizing applied research and clinical methods.

542 Cross-Cultural Research in Counseling and Assessment 3 Cross-cultural research methods, concepts, and findings in counseling and assessment.

551 Doctoral Practicum in Counseling Psychology I 4 (2-6) Prereq CoPsy 512, 513, 515, by interview only. Supervised experiences in the application of counseling psychology theory and techniques. S, F grading.

552 Doctoral Practicum in Counseling Psychology II 4 (2-6) Prereq CoPsy 551, by interview only. Supervised experiences in the application of counseling psychology theory and techniques. S, F grading.

553 Doctoral Practicum in Counseling Psychology III V 2 (1-3) to 4 (2-6) May be repeated for credit; cumulative maximum 12 hours. Prereq CoPsy 552, by interview only. Supervised experiences in the application of counseling psychology theory and techniques. S, F grading.

557 Chicano/Latino Psychology 3 Graduate level counterpart of CAC 457; additional requirements. Credit not granted for both CAC 457 and CoPsy 557.

561 Continuing Counseling ESA Certification V 2-6 May be repeated for credit; cumulative maximum 6 hours. Prereq Initial Counselor Certification; equivalent of 180 full days of school counselor experience. Peer review requirements for continuing level ESA Counselor Certification.

562 Advanced Hypnosis and Therapy 4 Prereq CoPsy 512 or equivalent, or permission of instructor. Advanced training emphasizing mind-body therapies and primary health care including hypnosis, biofeedback, and ego-state therapy.



- 578 Career Services and Programs for Persons with Disabilities 3 Career development concepts, services, and programs for the disabled with an emphasis on interagency collaboration with the public schools. Credit not granted for both CoPsy 478 and 578.
- 590 Seminar in Research in Counseling Psychology 3 By interview only. Recent developments in counseling psychology research and design applied to PhD dissertation proposals. S, F grading.
- 597 Counseling Psychology Internship V 2-4 May be repeated for credit; cumulative maximum 8 hours. Supervised internship experience, individual and group counseling, evaluation, assessment, supervision, and teaching. S, F grading.
- 600 Special Projects or Independent Study Variable credit. S, F grading.
- 700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.
- 702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.
- 800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

### **Educational Administration**

#### **Ed Ad**

- 501 Philosophy of Education 3 Development of American educational philosophy.
- 503 Values and Ethics for Educational Leaders 3 Study of ethical theories, the moral dilemmas of public schooling, and the skills of ethical reasoning; professional code of ethics.
- 506 Social Context of Education 2 The interpretation of social context issues including historical, legal and cultural factors as these influence policies and practice in education.
- 507 Social Foundations of Education 3 Educational adaptations to the economic and social trends and forces.
- 510 Improvement of Instruction 3 Rec teaching experience. Analysis and evaluation of instructional models with emphasis on information processing; implications for changing teaching style.
- 511 Models of Teaching 2 Theoretical models and strategies of teaching in classrooms; relationships between specific models and curriculum priorities.
- 514 Basic Principles of Curriculum Design 2 or 3 Rec teaching experience. The application of theoretical concepts and approaches in the planning and design of curricula.
- 515 Curriculum Implementation 3 Rec teaching experience. Research and practice; innovation and change in curricular organization emphasizing implementation.
- 516 Instructional and Curricular Leadership 2 or 3 Rec teaching experience. Theory, research, and practice of providing instructional and curricular leadership in schools and other educational settings.
- 517 In-Service Programs 3 Research, theory, and practice in staff development in K-12, higher education, and non-school settings. For administrators, teachers, and other staff.
- 518 Educational Technology 3 Rec T & L 445 or 446. Relates research and theory of communication to instructional resources and current educational technology; problems of planning and administering programs.
- 520 Seminar in Curriculum and Instruction 2 or 3 Rec teaching experience. Contemporary issues, analyses, and developments of educational programs.
- 521 Doctoral Dissertation Preparation 3 Seminar to assist graduate students in research proposal writing, dissertation preparation, and scholarly publications.
- 522 Topics in Education V 1-4 May be repeated for credit; cumulative maximum 6 hours. Recent research, developments, issues, and/or applications in selected areas of education.
- 530 Special Topics May be repeated for credit; cumulative maximum 3 hours. Topical issues in education responding to shifting demands and skills needed by parents, teachers, school administrators and community leaders.
- 531 Special Topics 1 May be repeated for credit; cumulative maximum 3 hours. Topical issues in education responding to shifting demands and skills needed by parents, teachers, school adminis-

trators and community leaders.

532 Special Topics 1 May be repeated for credit; cumulative maximum 3 hours. Topical issues in education responding to shifting demands and skills needed by parents, teachers, school administrators and community leaders.

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535 Special Topics 1 May be repeated for credit; cumulative maximum 3 hours. Topical issues in education responding to shifting demands and skills needed by parents, teachers, school administrators and community leaders.

536 Introduction to Qualitative Research in Education 3 Prereq EdPsy 505. Introduction to the theory and methods of qualitative research; field relations, data collections, data analysis, hypothesis development, and theory generation.

537 Advanced Qualitative Research in Education 3 Prereq Ed Ad 536. Advanced theory and methods of qualitative research; theoretical foundations, data collection and analysis, and reporting.

538 Special Topics in Qualitative Research in Education V 1-3 Prereq Ed Ad 536. May be repeated for credit; cumulative maximum 6 hours.

560 Student Personnel Services in Higher Education 2 or 3 Philosophy, structure, functions, and organization of student personnel services.

561 Student Development Theory, Research, and Application 3 Student development theory, related research and the application of theory to practice in student affairs work.

562 Professional Problems in Student Affairs 3 Prereq Ed Ad 560, 561. The organization, programs and professional issues related to selected student affairs programs and units.

563 Models of College Student Social Identity 3 Prereq Ed Ad 561. Critique and understand college social identity models as they relate to teaching, advising, and working with diverse student populations.

564 Seminar in Student Affairs 3 Prereq graduate standing. Contemporary issues, analyses, and development of student affairs programs and institutions.

565 Practicum in Higher Education 3 Prereq graduate student with 15 hours of completed course work in education. Selected supervised experiences in general higher education and student affairs settings provide for the investigation/application of theory/methods gained through formal course work.

566 PhD Practicum in Student Affairs V 1-3 May be repeated for credit; cumulative maximum 3 hours. Prereq must have grad assistantship. Selected supervised experiences in professional affairs settings which provide for the investigation/application of theory/methods gained through formal course work.

567 Organizational leadership of Multicultural Change 3 Prereq graduate standing. Reflection on experience and examination of the theory of practice of organizational leadership in the context of diversity.

568 Finance and Budgeting in Higher Education 3 Prereq undergraduate macro and microeconomics or by permission of instructor, graduate standing. Exposes students to the fundamentals of higher education budgeting and finance.

570 Community and Technical Colleges 3 For teachers and administrators. Development and function of community and technical colleges.

571 Undergraduate and Community Technical College Teaching 3 Rec Ed Ad 570 or 572. Concepts,

principles, issues, and procedures in undergraduate curriculum development; goal oriented educational strategies and delivery systems.

572 The American College and University 3 History, philosophy, objectives, and issues of colleges and universities as social institutions.

573 Issues in Higher Education 3 Selected contemporary issues in higher education.

574 Finance and Budget in Higher Education V 1-3 May be repeated for credit; cumulative maximum 6 hours. Contemporary issues, analyses and developments of higher education programs and institutions.

579 Administration of Higher Education 3 Organization, administration, and leadership of universities, colleges, and community colleges.

580 School Organization and Administration 3 Rec teaching experience. Readings and discussions on the theories and practices of school organization and administration. Cooperative course taught jointly by WSU and UI (Educ 509)

581 Politics in Education 4 Prereq graduate standing. Examining the intrapersonal, organizational politics and political dilemma particularly as they pertain to marginalized groups.

582 Policy Formation and Analysis in Education 3 Political and organizational policy formation processes in educational organizations; policy analysis in education.

583 Community and Communications 3 Social, political, and economic relationships between education and the community; methods of public polling and campaign strategy techniques.

584 Human Resource Management 3 Human relations in education; problems involved and practical solutions considered.

585 Financial Management in Education 3 Economics and financing of education; financial planning, budget development, investment analysis, bonding, cost effectiveness; current trends in educational finance. Cooperative course taught jointly by WSU and UI (EdAd 535).

586 Management of Facility Planning 3 Principles and procedures in the development of educational specifications, conducting needs assessment, forecasting; selecting an architect.

587 Seminar in School Administration V 1-6 May be repeated for credit; cumulative maximum 6 hours. Interdisciplinary seminars; related studies; discussions in several areas by specialists.

588 The Law and Education 3 Fundamental legal principles within which public education functions; applicable school codes of Washington and other states; review important court cases.

589 Leadership Development Seminar 3 Improving knowledge and skills in strategic planning, decision making, leadership issues, conflict, motivation, staff development, productivity, and stress.

590 Internship 3 or 6 May be repeated for credit; cumulative maximum 12 hours. By interview only. Internship in professional positions. S, F grading.

596 Preparing Grant Proposals 3 Identification of funding sources; analysis, evaluation, and production of grant proposals.

600 Special Projects or Independent Study Variable credit. S, F grading.

700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.

702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.

800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

### **Educational Psychology**

501 Scholarly Analysis and Writing for Educators 3 Prereq graduate standing. Develop advanced information literacy to identify information resources; critically analyze education research; analyze and construct oral and written scholarly arguments.

502 Theoretical Foundations of Learning and Instruction 3 Historical and contemporary theories of learning and instruction; application of theory in counseling and teaching settings.

503 Advanced Educational Psychology 2 Theories of learning and development as applied to

education.

504 Classroom-Focused Research Methods 2 Methods, design, implementation, and application of results in classroom context.

505 Research Methods I 3 Research methods; literature review, design, implementation, and interpretation of results.

508 Educational Statistics 3 Prereq

EdPsy 505. Introductory course for graduate students in applied statistics for the behavioral sciences. Cooperative course taught jointly by WSU and UI (EdAd 507).

509 Educational Measurements: Test Development and Assessment 2 or 3 Rec EdPsy 508. Theory and use of standardized educational measurement instruments; intelligence, aptitude, and achievement tests; measurement of outcomes.

511 Large Scale Educational Assessment and Testing 3 Prereq EdPsy 508, 509. Large-scale educational assessment and test development and evaluation; history and policy uses of achievement tests.

510 Assessment of Learning 3 Prereq graduate standing. Assessment of student learning, school and district evaluation; particularly appropriate for school administrators.

519 Practicum in College Instruction 1 (0-3) May be repeated for credit; cumulative maximum 4 hours. By interview only. Supervised experience in college teaching. S, F grading.

521 Topics in Educational Psychology V 1-4 May be repeated for credit; cumulative maximum 6 hours. Recent research, developments, issues, and/or applications in selected areas of educational psychology.

563 Principles of Research 3 Prereq CoPsy 501, EdRes 562 or c//. Same as EdRes 563.

565 Advanced Educational Statistics 3 Prereq EdPsy 508 Applications of inferential statistics in educational research and evaluation.

568 Research Methods II 3 Prereq EdPsy 505, 565. Integration and application of research skills in writing proposals, dissertations, papers for publication; interpreting, critiquing, and synthesizing research studies.

569 Seminar in Quantitative Techniques in Education 2 or 3 May be repeated for credit; cumulative maximum 6 hours. Prereq EdPsy 565. Application of parametric and non-parametric statistics, data processing using computer packages in educational research.

570 Introduction to Program Evaluation 3 Prereq EdPsy 505. Introduction to strategies and techniques for evaluation of educational and social programs.

571 Advanced Program Evaluation 3 Prereq EdPsy 570. Advanced methods and techniques of program evaluation.

597 Educational Psychology Internship V 2-4 May be repeated for credit; cumulative maximum 8 hours. Supervised internship experience in educational psychology, measurement and evaluation. S, F grading.

600 Special Projects or Independent Study Variable credit. S, F grading.

700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.

702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.

800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

## **Department of Teaching and Learning**

### **Teaching and Learning: Language (ESL) and Literacy Education**

<http://education.wsu.edu/graduate>

Degrees offered **Ed.M., M.A., Ph.D.**  
Faculty working with students **5**  
Students **185**  
Students receiving assistantships or scholarships **82%**  
Priority deadline **Fall—January 10**  
Test required **TOEFL or IELTS (international students only)**

### **Admission Requirements**

Applicants must have a degree from an accredited 4-year institution and a 3.0 or higher cumulative grade point average (GPA) on a 4.0 scale. The GPA is based on the last 60 semester hours of graded course work. A writing sample, letter of intent, and three letters of recommendation are required. Students should have a strong background in teaching and/or language or literacy.

### **Program Description**

Faculty in the area of Language and Literacy Education offer specializations in three degrees.

The two master's degrees (Ed.M., M.A.) focus on literacy or English as a Second Language (ESL).

The Ed.M. requires a culminating project. The M.A., a research-focused degree, requires a thesis.

Teaching endorsements are available in reading and in ESL and may be a part of the master's degree coursework.

Washington State's Professional Certification may be a part of the Ed.M.

Faculty in the Language and Literacy PhD specialization have effectively combined the fields of literacy and language learning/ESL.

The Ph.D. specialization includes a common core of six courses in order to establish foundational knowledge and to ensure interaction with faculty in the specialization.

Students gain a strong theoretical background while linking to current issues and practices.

Faculty in the Language and Literacy PhD specialization have effectively combined the fields of literacy and language learning/ESL.

Students join a highly collaborative faculty who are committed to facilitating engaging, interactive, and current programs of study.

Recent graduates are serving as education specialists in P-12 school districts and as faculty in research institutions.

Full-time students are often offered positions as teaching and/or research assistants while pursuing their degrees.

### **Contact Information**

Graduate Coordinator  
Office of Graduate Studies  
Cleveland Hall, Room 252  
PO Box 642114  
Pullman, WA 99164-2114

Telephone: 509-335-9195/335-7016

Fax: 509-335-2097

E-mail: gradstudies@wsu.edu

## **Ph.D. in Education: Emphasis in language and literacy**

### **Core content courses**

#### **T&L 550: Second language learning and literacy**

This course will delve into research on second language teaching and learning as it is applied in literacy education and other educational contexts. The focus of the course will be on English language learners and literacy in U.S. public schools, but course readings will also touch on topics such as adult learners, English as a foreign language, world English and the learning of English not only in public schools but also universities and untutored environments. The assigned readings for this course are found in the required text, *Handbook of Research in Second Language Teaching and Learning*. This volume, edited by Eli Hinkel, features articles by key researchers in the field of second language study that overview current research in applied linguistics, English language teaching, second language acquisition, methods and curriculum for language instruction, assessment, and learner identity, to name only a few.

#### **T&L 567: Social foundations of literacy**

This course is one of five new required courses for students in the language and literacy program. In this course, doctoral students will consider the social, cultural, and political factors that influence literacy. The research and theoretical work linked to these areas provide an important addition to their complete and well-rounded grasp of what literacy and learning to become literate entails. This contributes to a well-rounded understanding of literacy that holders of a Ph.D. in Language and Literacy education should attain. In addition, the exploration of these topics offers fertile ground for identifying and framing further research of importance for the educational community.

#### **T&L 568: Psychological foundations and assessment of literacy**

T&L 568 is one of five required courses for students in the language and literacy education program. The course provides doctoral students with an historical grasp of the various theoretical orientations linked to the psychological components of literacy. Based on these understandings, students will link assessment to them and explore the relationships that exist between psychological premises and assessment options. This combined look at the psychological foundations and assessment of literacy will provide a strong theoretical base for understanding and conducting literacy research.

#### **T&L 569: Critical analysis of children's and young adult literature**

In this course, doctoral students will examine children's and young adult books as cultural products by critically and multiculturally analyzing these texts. Critical (signals the imbalance in social power, manifested in class, race and gender relations) multicultural (acknowledges the diversity in cultural experiences, shaped by historical, social, political, and economic factors) analysis will guide our work together.

## **T&L 570: Theory and research in electronic literacies**

Upon completing the course, the student will be able to identify historical bases for our understandings of what literacy is and how these understandings have evolved. The student will be able to analyze the effects of technology on our understanding of literacy and public policy, particularly as these pertain to diverse learners. The student will demonstrate an understanding of the social, economic, cultural, and political impacts of technology on literacy practices.

## **Teaching and Learning: Mathematics Education**

<http://education.wsu.edu/graduate/specializations>

Degrees offered **PhD**

Faculty working with students **6**

Students **2**

Students receiving assistantships or scholarships **100%**

Priority deadline **Fall—January 10**

Test required **GRE**

### **Admission Requirements**

Entering students must have completed a master's degree from an accredited 4-year institution in a field related to education or math education. The department also requires a 3.0 or higher cumulative grade point average (GPA) on a 4.0 scale. The GPA is based on the last 60 semester hours of graded course work. Submission of Verbal and Quantitative scores from the Graduate Record Examination (GRE), a letter of intent, and three letters of recommendation are also required (GRE scores may not be older than seven years.) In addition to familiarity with public school contexts and a rudimentary awareness of educational research, particularly in the context of mathematics education, incoming students are expected to have a strong foundation in mathematics.

### **Program Description**

The Ph.D. in mathematics education involves a comprehensive course of study that extends the core Ph.D. requirements by focusing on important issues and evidence in the field of mathematics education.

Courses for the theoretical core and the cognate area will be chosen from a menu of courses appropriate for the particular student's background, interest, and specialty.

Typically, students build the math core with emphasis on another area of mathematical study.

The primary goals of the program are to develop mathematics education researchers and/or school-based leaders.

Students will be mentored into the field through exposure to current research projects and core courses that focus on research methodologies, key studies and findings, and norms and individuals central to the field.

The core courses are designed to cover a wide range of issues in mathematics education, addressing a variety of educational issues, mathematical topics, and grade levels.

Students build on these experiences through individualized learning experiences and research projects.

Opportunities exist for multi-campus support and mentoring from WSU mathematics education faculty throughout the state.

### **Contact Information**

Graduate Coordinator  
Office of Graduate Studies  
Cleveland Hall, Room 252  
PO Box 642114  
Pullman, WA 99164-2114  
Telephone: 509-335-9195/335-7016  
Fax: 509-335-2097  
E-mail: gradstudies@wsu.edu

## **Cultural Studies and Social Thought in Education**

[www.educ.wsu.edu/tl/culturalstudy.htm](http://www.educ.wsu.edu/tl/culturalstudy.htm)

Degree offered: **Ph.D. in Education**

Faculty working with graduate students: **7**

Graduate students: **24**

Graduate students receiving assistantships or scholarships: **82%**

Deadline: **Fall—January 10**

**Spring—July 1**

### **Admission Requirements**

Applicants must have a degree from an accredited 4-year institution and a 3.0 or higher cumulative grade point average (GPA) on a 4.0 scale. The GPA is based on the last 60 semester hours of graded course work. A writing sample, letter of intent, and three letters of recommendation are required. Students should have well-developed writing and critical thinking skills. Students should be interested in intellectual research and have a passion for ideas. Students should also maintain a practical orientation remaining grounded in doing good work for their communities.

### **Program Description**

The cultural studies and social thought in education Ph.D. option is a rigorous, flexible, and individually tailored course of study that focuses on the problems of culture and power in the contemporary and historical contexts of education. Cultural studies includes popular culture and media, social justice, environment, ethics, aesthetics, race, ethnicity, gender, and social class, which are applied to a range of educational sub-fields that include literacy, educational leadership, teacher leadership, school reform, curriculum theory, higher education, science, art, special education, and bilingual/ESL (English as a second language). The overall goal of the faculty is to articulate a cohesive and supportive community of educational scholarship and practice. While coursework is important, we work to establish a strong program of mentorship in which doctoral candidates are mentored into the world of research, knowledge generations and dissemination, and pedagogical and social action.



We are committed to the idea that our scholarly endeavors stimulate positive change in schools and the communities and society those schools serve. Education, whether it takes place in the formal settings of schools and museums or the informal contexts of home and the movie theater, is defined by its cultural context. Cultural studies takes these cultural contexts as the essential starting point to build research projects and define teaching practices.

#### **Contact Information**

Graduate Coordinator  
Office of Graduate Studies  
Cleveland Hall, Room 252  
PO Box 642114  
Pullman, WA 99164-2114  
Telephone: 509-335-9195/335-7016  
Fax: 509-335-2097  
E-mail: gradstudies@wsu.edu

#### **Graduate Opportunities**

University faculty in cultural studies, social foundations, or related fields; administrator or researcher in a school district or state/national educational organization or non-profit or non-governmental organization.

#### **Faculty Interests**

**Pam Bettis:** Adolescent girls. *bettis@wsu.edu*

**Susan Finley:** Social barriers to education, issues of education in association with homelessness, and implications of research theory for faculty practice of research methodologies and approaches. *finley@vancouver.wsu.edu*

**David Greenwood:** Conducts research on the relationship between environment, culture, and education; environmental, place-based, and sustainability education; and alternative education. *greenwood@wsu.edu*

**Leslie Hall:** Professional development for technology integration and the socially reproductive and non-reproductive roles technology plays in schooling. *ldhall@wsu.edu*

**Michael Hayes:** Popular culture in education and curriculum theory. *hayesm@mail.wsu.edu*

**Armando Laguardia:** Influence of culture on schooling, school change and underachievement, school/college partnerships, democracy in schools and society. *armando@vancouver.wsu.edu*

**Paula Groves Price:** Social foundations, educational policy, race and culture, critical ethnography, qualitative research. *pgroves@wsu.edu*

**Richard Sawyer:** Teacher change/development, democratic education, and alternative route certification. *sawyerr@vancouver.wsu.edu*

**Dawn Shinew:** Democratic education and research methodologies. *dshinew@wsu.edu*

## **Master in Teaching**

Degree offered **Master in Teaching (M.I.T)**

Faculty working with students **Approximately 40**

Students **Pullman/Spokane, 30; Vancouver,100**

Priority deadline **November 15 - Pullman/Spokane (June enrollment)**

**December 1—Vancouver (June enrollment); March 1- Tri-Cities (August enrollment)**

Campuses **Pullman, Spokane, Vancouver**

Test required **WEST-B, Elementary: WEST-E, Endorsement area tests: Secondary**

### **Admission Requirements**

Students must have a bachelor's degree from an accredited institution and should have a minimum 3.0 cumulative GPA.

In addition, students need to complete and submit an MIT application in accordance with departmental deadlines.

Applicants must demonstrate knowledge in relevant subject areas.

Applicants' transcripts are evaluated to determine if prerequisite courses are needed.

Applicants are required to take the WEST-B examination in reading, writing, and mathematics and obtain a passing score of 240 or higher on each section.

Admission to the program is competitive, and the most highly qualified candidates will be selected.

### **Program Description**

The MIT is intended for those who possess a bachelor's degree in a field other than education and is designed to prepare students to become effective elementary or secondary education teachers. This program of study leads to a master's degree and a State of Washington elementary or secondary education teaching certificate. The MIT degree is available to students on the Pullman, Spokane and Vancouver campuses; however the programs differ slightly from campus to campus.

The programs at the Vancouver campus consist of 15 months of intensive study and internships. The program on the Pullman/Spokane campuses consists of 13 months of intensive study and internships to complete teacher certification with additional time to completed the master's project.

All of the MIT programs are cohort-based, forming a supportive network. The program consists of a wide range of pedagogy courses work. Depending on the student's focus (elementary or secondary education), these courses may include literacy, social studies, science, math, reading, health, fitness, or fine arts methods. Students also study diversity in schools and society, educational technology, the history of education, and research-based effective practices.

When successfully completed, the MIT program results in a master's degree and teacher certification. Therefore all MIT students complete both certification and graduate research courses. All MIT students complete a research project and present the project results at the culmination of their program. The research projects are usually aimed at examining teaching and educational issues, with the focus on understanding the positive impact of education on student learning.

**For more information contact:**

Pullman and Spokane Campuses  
Graduate Coordinator  
Office of Graduate Studies  
Cleveland Hall, Room 252  
PO Box 642114, Pullman, WA 99164-2114  
Telephone: 509-335-9195/335-7016  
Fax: 509-335-2097  
E-mail: gradstudies@wsu.edu

**Vancouver Campus**

MIT Program Coordinator  
WSU Vancouver  
Master in Teaching Elementary Program  
14204 NE Salmon Creek Avenue  
Vancouver WA 98686  
360/546-9673 or millerj@vancouver.wsu.edu.

**Graduate Opportunities**

K-8 teacher

**Positions Held by Recent Graduates**

K-8 teacher

**Faculty Interests**

**Susan Finley:** Engaging students from underrepresented groups, multicultural education, teacher education. *finley@vancouver.wsu.edu*

**Gordon Gates:** Teacher education. *gates@wsu.edu*

**Cheryl Granby:** Teacher education. *granby@vancouver.wsu.edu*

**Deanna Gilmore,** WSU Tri-Cities: Teacher education. *dgilmore@tricity.wsu.edu*

**Leslie Hall:** Professional development for technology integration and the socially reproductive and non-reproductive roles technology plays in schooling. *ldhall@wsu.edu*

**Michael Hayes:** Popular culture in education and curriculum theory. *hayesm@mail.wsu.edu*

**Linda Holloway:** Literacy education, teacher education. *hollowayl@wsu.edu*

**Jerry Jensen:** Teacher education. *jeraldj@wsu.edu*

**Deidre LeFevre:** Teacher education, professional development of educators. *lefevre@vancouver.wsu.edu*

**Amy Roth McDuffie:** Math education, teacher education. *mcduffie@wsu.edu*

**Darcy Miller:** Teacher education, special education, Fetal Alcohol Syndrome. *darcymiller@wsu.edu*

**Judy Morrison:** Science education, assessment/evaluation, teacher education. *jmorrison@tricity.wsu.edu*

**Lynda Paznokas:** Science education, teacher education, informal science education, environmental education. *lpaznokas@wsu.edu*

**Marisol Rodriguez-Price:** Teaching English as a second language (ESL), bilingual education, teacher education. *marisol@tricity.wsu.edu*

**Lenore Schmidt:** Teacher education, arts education *schmidt1@wsu.edu*

**Dawn Shinew:** Culture and schools, engaging students from underrepresented groups, teacher education. *dshinew@wsu.edu*

**David Slavit:** Teacher education, math education, educational technology. *dslavit@wsu.edu*

Jan Spiesman: Teacher education. *spiesman@vancouver.wsu.edu*

**Kay Stern,** WSU Vancouver: Teacher education. *stern@vancouver.wsu.edu*

**Cynthia Thomas:** Teacher education, math education. *csthomas@wsu.edu*

**Guy Westhoff:** Teacher education. *westhoff@wsu.edu*

**Terrell Young:** Literacy education, teaching English as a second language (ESL), teacher education, middle school students. *tyoung@tricity.wsu.edu*

## Teaching and Learning: Special Education

[www.education.wsu.edu/graduate/specializations](http://www.education.wsu.edu/graduate/specializations)

Degrees offered: **Ed.D., M.A., Ed.M.**

Faculty working with graduate students: **6**

Graduate students: **10**

Graduate students receiving assistantships or scholarships: **80%**

Tests required: **GRE; TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

### Admission Requirements

Applicants must have an undergraduate degree from an accredited four year institution.

The Department of Teaching and Learning and the Graduate School require a 3.0 or higher cumulative grade point average on a 4.0 scale. Calculation of the grade point average is based on the most recent 60 semester hours of graded course work.

A letter of intent; three letters of recommendation; writing samples

Acceptance into the doctoral program partially depends on the availability of a faculty member with expertise in the area of the student's primary research interest.

### Program Description

The M.A. is designed for students who will potentially enter a doctoral program or who desire to focus on educational research, as opposed to application of educational strategies.

The Ed.M. allows students to study a variety of education-related areas within structured coursework. A specific set of coursework also can lead to a supporting endorsement in special education.

Although students enroll in research courses and engage in research endeavors, the emphasis in this degree option is on application of educational research strategies in schools settings.

The Doctor of Philosophy (Ph.D.) prepares graduates for academic positions in research and teaching. The program in special education includes the study of response to intervention across the curriculum, diversity issues, social development and school based prevention practices for students with social and behavioral adjustment problems, universal design, and single subject design in

addition to the comprehensive Carnegie core of research courses in quantitative, qualitative and program evaluation research methods.

The faculty support a strong program of mentorship and encourage doctoral students to work closely with faculty of their choosing in investigating the world of research, knowledge generation and dissemination, pedagogical action and advocacy.

### **Contact Information**

Graduate Coordinator  
Office of Graduate Studies  
Cleveland Hall room 252  
PO Box 642114  
Pullman WA 99164-2114  
Telephone: 509-335-9195/335-7016  
Fax: 509-335-2097  
E-mail: gradstudies@wsu.edu

### **Graduate Opportunities**

Master's graduates: teaching, educational specialist, K-12 administration.

Ed.D. graduates: faculty at research university, clinical faculty, central administrator at K-12 school district, administrator at state educational agency.

### **Positions Held by Recent Graduates**

Teacher, faculty members at research universities

### **Faculty Interests**

**Susan Banks:** Native American education, special education, teacher education, assessment/evaluation.  
*sbanks@wsu.edu*

**Michael Dunn:** Referral to special education, reading strategies, literacy definitions and policies, assistive technology.

**Darcy Miller:** Teacher education, special education, Fetal Alcohol Syndrome.  
*darcymiller@wsu.edu*

**Paulette Mills:** Effects of classroom environment factors on language development in young children with disabilities; follow-up of children with disabilities who participated in a longitudinal follow-up curriculum project.  
*pmills@mail.wsu.edu*

### **Teaching and Learning**

501 Practicum in Bilingual Education /ESL 3 May be repeated for credit; cumulative maximum 6 hours. Prereq one course in bilingual/ESL or by interview only. Work with students from diverse linguistic and cultural backgrounds in educational settings.

502 Assessment for Teaching and Learning V 1-3 Designed to provide instruction in sound assessment practices for preservice and in-service graduate students.

503 ESL Methods and Material for Secondary Content Teachers 2 Prereq graduate standing. Application of ESL methods and materials to secondary content area teaching and curriculum development.

504 Advanced Study in Linguistics for Educators 3 Prereq admission to T&L graduate program. Use of linguistics to better understand second language learning and teaching and the physical aspects of acquiring a language.

505 ESL Methods for General Educators 2 For preservice general education K-12 teachers addressing researched-based ESL strategies and methods.

506 Multicultural Classroom Instruction and Management 4 Instructional and management strategies for maximizing students' opportunities to learn in a multicultural setting.

507 Developing Literacy in a Multicultural Setting I 3 Theoretical foundations of language arts in a multicultural setting.

508 Teaching Literacy in a Multicultural Setting II 3 Prereq T & L 507. Applying research-based assumptions to teaching language arts in a multicultural setting.

509 Research in Curriculum and Assessment for Bilingual ESL Education 3 Prereq T & L 510 or 514; graduate standing. Research in curriculum development for and assessment of language minority students.

510 Theoretical Foundations of Bilingual/ESL Education 3 Theoretical foundations related to research and instructional strategies for effective schooling of language minority students. Credit not granted for both T & L 410 and 510.

511 Teaching Poetry to Children and Young People 3 Prereq T & L 303 or 307 or teaching experience. Elements and forms of poetry for children and young people; selection and utilization in the school curriculum.

512 Language and Cultural Factors in Mathematics 3 Prereq T & L 352 or teaching experience. Research and instructional strategies related to linguistic and cultural influences on learning math. Credit not granted for both T & L 412 and 512.

513 Seminar in Middle School Education 3 Prereq teaching experience. Curriculum patterns and recent research regarding instruction and materials in the contemporary middle school.

514 ESL Across Content Areas 3 Research and instructional methods related to English language acquisition across content areas. Credit not granted for both T & L 414 and 514.

515 The Education of Language Minority Students 2 Prereq K-12 teaching experience. Issues in the education of language minority students.

516 Advanced Study in Computer-Assisted Language Learning 3 Prereq T & L 510 or 549 or permission of instructor; graduate standing. Research, theory, and practice in computer-assisted language learning.

518 Integrating Technology Into The Curriculum 3 Examination and articulation of the potential for new technologies to expand learning opportunities.

519 Instructional Media production I 3 Instructional media development, emphasizing the theory and methods of instructional design, digital media production and evaluation.

520 Topics in Special Student Populations V 1-4 May be repeated for credit; cumulative maximum 6 hours. Knowledge of special student populations and guidance in developing appropriate curricula. Cooperative course taught jointly by WSU and UI (EDTE 504).

521 Topics in Education V 1-4 May be repeated for credit; cumulative maximum 6 hours. Recent research, developments, issues, and/or applications in selected areas of education.

522 Topics in Education V 1-3 May be repeated for credit; cumulative maximum 6 hours. Recent research, development, issues, and/or applications in selected areas of education.

523 Topics in Education V 1-3 May be repeated for credit; cumulative maximum 6 hours. Recent research, development, issues, and/or applications in selected areas of education.

524 Topics in Education V 1-3 May be repeated for credit; cumulative maximum 6 hours. Recent research, development, issues, and/or applications in selected areas of education.

525 Classroom Management Seminar 2 or 3 Contemporary issues in management of elementary,

middle school, and secondary classrooms.

526 Research in Multicultural Education 3 Prereq T & L 515 or teaching experience. Research and instructional practices focusing on multicultural education.

527 Seminar in Teacher Education Instruction 1 May be repeated for credit; cumulative maximum 4 hours. Teacher preparation program components and rationale, university teaching strategies, and evaluation methods. S, F grading.

528 Content Area Reading Instruction: Theory and Practice 3 For teachers, supervisors, and administrators in elementary, middle, and secondary schools; influence of research on the design of reading strategies.

529 Place-Based Education 3 Prereq graduate standing. Theory and practice of place-based education with an emphasis on community-based action research and curriculum planning.

530 Innovations in Reading 2 Aspects of teaching reading beyond basic methods course; individual diagnosis; current programs and trends; activities and materials for enrichment. Credit not granted for both T & L 430 and 530.

532 Children's Literature in the Curriculum 2 Prereq T & L 320 or teaching experience. Theory and classroom applications for selecting and using literature and storytelling in content areas; reading, writing, language development, the arts. Credit not granted for both T & L 432/433 and 532.

535 Gender, Power and Education 3 Prereq graduate standing. Interdisciplinary focus on the relationships among gender, power and education.

537 Seminar in Language, Literacy, and Culture 3 Prereq graduate standing. Interrelationships between schools, literacy, and student cultural background.

538 Writing Across the Curriculum 3 Writing for learning at grade levels K-12.

539 Innovations in Language Arts 3 Prereq T & L 303 or 320 or teaching experience. The most recent developments in language arts instruction for pre-service and in-service teachers K-12.

540 Elementary School Social Studies 3 Prereq teaching experience. Elementary structures of various social sciences; research findings related to instruction; classroom applications and materials.

541 Professional Assessment Seminar V 1-3 May be repeated for credit; cumulative maximum 6 hours. Prereq admission to PCP. Focus on knowledge and skills in educational research to assess professional practice.

542 Professional Education Seminar V 1-3 May be repeated for credit; cumulative maximum of 6 hours. Analysis of contemporary and/or classic educational issues.

543 Culminating Seminar for Professional Certification 2 Prereq T & L 541. The first step in ProCert; candidates must have completed T & L 541 and 5 semester credits of learning experiences approved by the Professional Growth Team.

544 Advanced Children's Literature 3 Prereq T & L 307; teaching experience. Trends, issues, and research in children's literature.

546 Teaching Written Expression in Elementary School 3 Prereq teaching experience. Research on children's written language development; application to elementary school classroom.

547 Teaching Folk Literature to Children and Adolescents 3 Prereq T & L 307 or teaching experience. Folk literature as a genre in child and adolescent literature; curriculum applications; reading, language development, social studies, creative expression.

548 Teaching Adolescent Literature 3 Prereq T & L 307 or teaching experience. Evaluating, selecting, and using literature for middle school and teenage students.

549 Communicating in a Multilingual Society 3 Prereq T & L 333, 335 or graduate standing. Study of language in social and educational contexts and its relation to cultural and linguistic diversity.

550 Second Language Learning and Literacy 3 Prereq admission to doctoral program. Research on second language teaching and learning in literacy education with a focus on English language learners in US schools.

551 Psychology of Reading 2 or 3 Prereq T & L 320 or 450/451; teaching experience. Psychological, perceptual, motivational, developmental and physiological aspects of reading.

552 Literacy Development I 3 Review of current research and approaches to instruction in the development of literacy in elementary and middle grades.

553 Diagnosis and Treatment of Reading Disabilities 4(3-3) Prereq T & L 320/321 or 450/451. Remedial techniques for experienced teachers, remedial reading teachers, and reading consultants; causes of disability, testing, diagnosis, and remediation; tutoring.

554 Elementary School Reading 2 Theory and strategies of teaching reading in elementary school.

555 Seminar in Literacy Development 3 May be repeated for credit; cumulative maximum 6 hours. Current and historical research in reading/language arts, infancy through college and adult years; papers presented by faculty, invited speakers, and students.

556 Literacy Development II 3 Review of current research and approaches to instruction in the development of literacy in elementary and middle grades.

557 Research in Reading 3 Prereq EdPsy 505. Exploration of qualitative and quantitative reading research covering topic of current and historical importance.

558 Improving Comprehension Through Literature 3 Prereq teaching experience. Key theoretical concepts and their implications for improved comprehension instruction, using children's literature.

560 Research in Teaching 3 May be repeated for credit; cumulative maximum 6 hrs. Prereq teaching experience. Recent developments in research on teaching; both quantitative and qualitative research methodologies emphasized.

561 Elementary School Mathematics 3 Prereq T & L 352; Math 252; teaching experience. Research on curriculum and instruction issues in elementary school mathematics.

564 Elementary School Mathematics Methods 3 Introduction to research, theory, and methods of teaching K-8 mathematics; emphasis on integrating theory and practice.

565 Introduction to Scholarly Inquiry 1 Prereq graduate standing. Introduction to the Ed.M program including the scholarship and research requirements and the role of students and action research.

567 Social Foundations of Literacy 3 Prereq admission to doctoral program. Social, cultural and political factors which influence the acquisition and use of literacy.

568 Psychological Foundations and Assessment of Literacy 3 Prereq admission to doctoral program. Historical look that blends the assessment of literacy and its psychological components.

571 Elementary School Science 3 Prereq T & L 371; teaching experience. Theories and research underlying science programs with classroom implications.

572 Elementary School Science Methods 3 Theoretical base to design and implement appropriate standards-based elementary science instruction.

573 Children's Literature and Hands-On Science 3 Prereq graduate standing. Students learn how to bring together language arts and science curricula to instill in children a curiosity about the world around them.

574 Science for All: An Individual and Multicultural Perspective 3 Prereq teaching experience. Implications of cultural and individual diversity for understanding western scientific and mathematical thought; an activity-based, educational perspective.

577 The At-Risk Learner 2 Strategies for working with at-risk students.

580 Multicultural Education in a Global Society 3 Examination of multicultural and multilingual education from a global perspective; development of multicultural curriculum. Credit not granted for both T & L 480 and 580.

583 Problem Solving in Elementary and Middle Level Education 3 Prereq admission to MIT program. Integration of knowledge and skills to address complex cases in teaching and learning.

586 Issues in At-Risk Education 2 or 3 School and community resources to assist at-risk students and families.



587 Environment, Culture and Education 3 Prereq graduate standing. Role of education in the social, ecological, and political conflicts between culture and environment.

588 Action Research: Teachers as Researchers 3 Prereq teaching experience. Theoretical concepts, research, issues, models, and strategies for implementation of action research.

589 Race, Identity and Representation in Education 3 Prereq graduate standing. Interdisciplinary research in race, identity and representations in education.

590 Internship V 2-6 May be repeated for credit; cumulative maximum 12 hours. By interview only. Internship in professional positions. S, F grading.

593 Pre-Internship and Seminar 2 (1-3) Instructional practice in diverse classroom settings and reflection on that practice. S, F grading.

594 Art and Music Education 2 Instruction covering the theory and classroom practice of art and music.

595 Internship and Seminar 10 (1-27) Instructional practice in classroom settings and reflection on practice. S, F grading.

596 Topics in In-Service Education V 1-3 (1-3) Prereq graduate standing or permission of instructor. May be repeated for credit; cumulative maximum 12 hours. Advanced study of research, practice, and contemporary issues in education.

597 Topics in In-Service Education V 1-3 May be repeated for credit; cumulative maximum 9 hours. New developments and applications on selected in-service and staff development topics. Credit not granted for both T&L 497 and 597.

600 Special Projects or Independent Study Variable credit. S, F grading.

700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.

702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.

800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

### **Special Education**

501 Teaching Students with Disabilities 3 Prereq c// in Sp Ed 590 for 2 credits. Credit not granted for both Sp Ed 401 and 501. Additional requirements.

502 Assessment and Curriculum for Students with Disabilities 4 Credit not granted for both Sp Ed 402 and 502. Additional requirements.

503 Secondary Education for Students with Disabilities 3 Credit not granted for both Sp Ed 403 and 503. Additional requirements.

504 Professional Skills in Special Education 3 Prereq Sp Ed 301 and certified major or graduate standing. Communication, problem solving, liability, record keeping, professional development, legal issues, and program evaluation. Credit not granted for both Sp Ed 404 and 504.

509 Early Childhood Special Education 3 Assessment, curriculum, and instructional techniques for teaching young children with handicaps and their families in a variety of settings. Credit not granted for both Sp Ed 409 and 509.

520 Teaching in Inclusive Classrooms 3 Credit not granted for both Sp Ed 420 and 520. Additional requirements.

521 Inclusion Strategies for Special Education Teachers 3 Prereq Sp Ed 501. Roles and responsibilities of special education professionals in inclusion programs, including legal aspects and collaboration. Graduate level counterpart of Sp Ed 421; additional requirements. Credit not granted for both Sp Ed 421 and 521.

522 Topics in Special Education V 1-4 May be repeated for credit; cumulative maximum 8 hours. Recent research developments, issues and/or applications in selected areas of special education.

540 Methods in Intensive Educational Supports 3 Credit not granted for both Sp Ed 440 and 540. Additional requirements.

571 Prevention and Remediation of Reading Disabilities 3 Prereq graduate standing. Theoretical

concepts, research, and strategies of reading assessment and instruction for students with disabilities.

578 Career Services and Programs for Persons with Disabilities 3 Same as Copsy 578.

589 Seminar in Disability Studies 3 Prereq graduate standing. Current research, issues, trends in disabilities within the broader context of education, society, history.

590 Practicum in Special Education V 1-4 May be repeated for credit; cumulative maximum 8 hours. Supervised field experiences in the application of theories and practices in special education. S, F grading.

597 Special Education Internship V 2-4 May be repeated for credit; cumulative maximum 6 hours. Supervised internship experience in domestic and international settings. S, F grading.

600 Special Projects or Independent Study Variable credit. S, F grading.

## **School of Electrical Engineering and Computer Science**

[www.eecs.wsu.edu](http://www.eecs.wsu.edu)

Degrees offered: **M.S., Ph.D.**

Faculty working with graduate students: **30**

Graduate students: **100**

Students receiving assistantships or scholarships: **78%**

Degree offered: **Pullman, Tri-Cities (M.S. only), Vancouver**

Tests required: **GRE; TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

### **Requirements**

Students considering graduate study in electrical engineering and computer science should major in computer engineering, electrical engineering, or computer science. Applications should include a statement of purpose giving qualifications, research interests, and goals; official college transcripts; and three letters of recommendation.

### **Program Description**

The School of Electrical Engineering and Computer Science specializes in a wide variety of concentrations, including: artificial intelligence; bioinformatics; distributed computing; power systems engineering; control and signal processing; computer architecture and digital systems; electrophysics; analog microelectronics; software engineering; networks; security; digital VLSI circuit design

### **Graduate Opportunities**

Our graduates are employed in high-tech industries, prestigious government labs, and academia, both in the U.S. and abroad.

### **Positions Held by Recent Graduates**

Postdoctoral research at the University of Washington; professor positions at the University of Montana and Washington State University Vancouver; senior research manager at Pacific Northwest National Laboratory.

## Contact Information

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## Faculty Interests

**Roger T. Alexander:** Software engineering; testing, maintenance, and comprehension of object-oriented and aspect-oriented programs. [rta@eecs.wsu.edu](mailto:rta@eecs.wsu.edu)

**Anneliese K. A. Andrews:** Software engineering: software design, testing, quality, maintenance, and quantitative software analysis methods. [aandrews@eecs.wsu.edu](mailto:aandrews@eecs.wsu.edu)

**David Bakken:** Distributed systems, fault tolerant computing, distributed object middleware, distributed quality of service. [bakken@eecs.wsu.edu](mailto:bakken@eecs.wsu.edu)

**Ben Belzer:** Digital communications: coded modulation for wireless channels; joint source-channel coding; iterative algorithms for reduction of two-dimensional intersymbol interference. [belzer@eecs.wsu.edu](mailto:belzer@eecs.wsu.edu)

**Anjan Bose:** Power systems engineering. [bose@wsu.edu](mailto:bose@wsu.edu)

**Jose Delgado-Frias:** Computer architecture and computer engineering. [jdelgado@eecs.wsu.edu](mailto:jdelgado@eecs.wsu.edu)

**Curtis Dyreson:** Temporal databases and incomplete information in databases; ongoing research in WWW and databases. [cdyreson@eecs.wsu.edu](mailto:cdyreson@eecs.wsu.edu)

**Thomas Fischer:** Data compression of speech, images, and video; source coding and quantization. [fischer@eecs.wsu.edu](mailto:fischer@eecs.wsu.edu)

**Kelly Fitz:** Development and application of robust high fidelity sound modeling techniques to sound morphing, speech modeling, voice conversion, speech synthesis, and prosodic modeling and modification. [kfitz@eecs.wsu.edu](mailto:kfitz@eecs.wsu.edu)

**Carl Hauser:** Concurrent programming models and mechanisms; networking; programming language implementation. [hauser@eecs.wsu.edu](mailto:hauser@eecs.wsu.edu)

**Deuk Heo:** Innovative circuit and system-level solutions for RF and mixed-signal application in advanced communications, in RF/microwave/opto transceivers, wireless sensor applications, and radiation-hard ICs for satellite communications. [dheo@eecs.wsu.edu](mailto:dheo@eecs.wsu.edu)

**Scott Hudson:** Waves and signal processing, three-dimensional shape reconstruction from radar images, acoustic imaging for medicine. [hudson@tricity.wsu.edu](mailto:hudson@tricity.wsu.edu)

**Christopher Hundhausen:** Human-computer interaction, computer-based visualization, end-user programming; building novice programming and algorithm visualization environments and exploring their value as the foundation of a studio-based approach to teaching introductory computer science. [hundhaus@eecs.wsu.edu](mailto:hundhaus@eecs.wsu.edu)

**Min Sik Kim:** Network traffic analysis and network protocol design; construction and maintenance of an efficient network topology through measuring and analyzing network performance. [msk@eecs.wsu.edu](mailto:msk@eecs.wsu.edu)

**George La Rue:** Mixed-signal integrated circuit design; circuits for CMOS low-power high-resolution sensor applications, SiGe high-speed A/D converters, and radiation-hard communication circuits for

space applications. *larue@eecs.wsu.edu*

**Bob Lewis:** Computer graphics and scientific visualization; illumination, molecular graphics, facial animation, and plasma visualization. *bobl@tricity.wsu.edu*

**Murali Medidi:** Parallel computing, wireless networks, mobile computing, simulation and modeling, and data mining algorithms. *mmedidi@eecs.wsu.edu*

**Sirisha Medidi:** Current research includes mobile computing, wireless networks, distributed algorithms, performance evaluation, and discrete event simulation. *smedidi@eecs.wsu.edu*

**John Miller:** WSU Tri-Cities. Applications of bioinformatics and computational biology to the understanding of biological effects of ionizing radiation; using molecular dynamics to simulate the structure and energy of damaged DNA; developing kinetic models of cellular signaling networks. *jhmiller@tricity.wsu.edu*

**Margaret Mortz:** Speech enhancement; signal processing methods merged with perceptual approaches for pre-processing speech to improve intelligibility and quality; special applications of signal processing, with emphasis in bioengineering and metrology. *mmortz@wsu.edu*

**Jabulani Nyathi:** Computer engineering: wave-pipelined, low-power, high-performance VLSI systems; the use of sub-threshold power supply voltages in nano-electronics for ultra-low power battery operated embedded systems. *jabu@eecs.wsu.edu*

**Robert Olsen:** Power system electromagnetic compatibility, particularly the compatibility of systems such as optical fiber cable and communication facilities that share transmission line right-of-ways. *olsen@eecs.wsu.edu*

**Partha P. Pande:** VLSI design methodology, multiprocessor soc platform, network on chip. *pande@eecs.wsu.edu*

**Patrick Pedrow:** Plasma-assisted materials processing; plasma-based thin film deposition and surface modification; deposition and characterization of plasma-polymerized films. *pedrow@eecs.wsu.edu*

**Sandip Roy:** Collaborative research with Ali Saberi on distributed estimation and detection, decentralized control of network dynamics, and complex system and network analysis and design. *sroy@eecs.wsu.edu*

**Ali Saberi:** Collaborative research with Sandip Roy on distributed estimation and detection, decentralized control of network dynamics, and complex system and network analysis and design. *saberi@eecs.wsu.edu*

**John Schneider:** Computational electromagnetics; theory and application of numerical methods to model electromagnetic and acoustic wave propagation. *schneidj@eecs.wsu.edu*

**Behrooz A. Shirazi:** Pervasive computing; distributed real-time systems; parallel and distributed systems. *shirazi@wsu.edu*

**K. Sivakumar:** Data mining, statistical signal processing, issues in data mining concerning the privacy of individual data points. *siva@eecs.wsu.edu*

**Mani V. Venkatasubramanian:** Power system stability and control: nonlinear system theory, algorithms for the analysis and real-time control of large-scale electric power systems. *mani@eecs.wsu.edu*

## Electrical Engineering

EE 501: Linear System Theory. Credit 3. Dynamic systems from the state variable approach; observability, controllability, stability, and sensitivity of differential and nondifferential systems. Prerequisites: EE 489. Cooperative course taught jointly by WSU and UI (EE 572).

EE 502: Linear Multivariable Control. Credit 3. Optimal linear feedback control, optimal stochastic observers, LQG/LTR design methodology, modern Wiener-Hopf design, robust controllers. Prerequisites: EE 501. Cooperative course taught jointly by WSU and UI (EE 574).

EE 503: Structure, Dynamics, and Control of Large-Scale Networks. Credit 3. . Introduction and development of computational and analytical methods required to characterize large-scale networks. Prerequisites: EE 501 and EE 507 or permission of the instructor.

EE 504: Modern Optics. Credit 3. Diffraction theory, Fourier transforming and imaging properties of lenses, spatial filtering, holography, temporal and spatial coherence, imaging through random media. Prerequisites: EE 341, 351, Stat 443.

EE 505: Nonlinear system Theory. Credit 3. Overview of nonlinear phenomena, Lyapunov stability, input-output stability, periodic orbits, singular perturbation, differential perturbation, differential geometric methods, bifurcations and complex behaviors. Prerequisites: EE 501.

EE 507: Random Processes in Engineering. Credit 3. Functions of random variables; random sequences; stochastic processes; mean-square stochastic calculus; ergodicity; spectral density; linear transformations, filtering, dynamic systems. Prerequisites: Stat 443. Cooperative course taught jointly by WSU and UI (EE 570).

EE 508: Estimation Theory for Sginal Processing, Communications, and Control Credit 3. Principles of statistical estimates; LLSE; Kalman filtering; smoothing; predictions; maximum-likelihood and Bayesian estimation. Prerequisites: EE 501, 507.

EE 509: Adaptive Control. Credit 3. Model reference adaptive systems (MRAS), adaptive observers, adaptive control, on-line identification, robustness issues, self-tuning regulators. Prerequisites: EE 501.

EE 510: Solid State Direct Energy Conversion. Credit 3. Analysis of homojunction and heterojunction solar cells. Prerequisites: EE 496 or equivalent.

EE 511: Protection of Power Systems II. Credit 3. Protection of electrical equipment as related to electric power systems with emphasis on digital algorithms. Prerequisites: EE 491 or c//. Cooperative course taught jointly by WSU and UI (EE 526).

EE 512: Active Network Synthesis. Credit 3. Devices and classical network synthesis, two-port network theory, filters, active filters. Prerequisites: EE 341.

EE 514: Optoelectronics Lab I Credit 1 to 3. Experiments with optical systems; imaging interference coherence, information storage/processing, gas and solid state lasers, optical fibers, and communication systems. Same as Physics 514. Prerequisite: Graduate standing.

EE 515: Optoelectronics Lab II Credit 1 to 3. Experiments in optical physics, physical properties of light, laser physics, waveguides, quantum confined semiconductor structures and ultrafast dynamics and nonlinear optics. Same as Physics 515. Prerequisite: Graduate standing.

EE 516: Wave, Propagation and Scattering. Credit 3. Radiative transfer theory; rough surface scattering; scattering in random media; scattering by random discrete scatterers; the T-matrix method; inverse scattering. Prerequisites: EE 351.

EE 517: Numerical Solutions to EM problems. Credit 3. Graduate-level counterpart of EE 417. Credit not granted for both.

EE 518: Advanced Electromagnetic Theory I. Credit 3. Electromagnetic waves, electromagnetic theorems and concepts, solutions to the wave equation in rectangular, cylindrical and spherical coordinates. Cooperative course taught by WSU, open to UI students (EE 530). Prerequisites: EE 351.

EE 519: Advanced Electromagnetic Theory II. Credit 3. Exact solutions to canonical electromagnetic diffraction problems, high and low frequency limits, foundations of numerical solutions to electromagnetic scattering problems. Prerequisites: EE 518.

EE 520: Plasma Engineering. Credit 3. Electromagnetics, kinetic theory, and fluid mechanics of plasmas in space, arcs, plasma processing, coronas, and fusion reactors. Prerequisites: EE 351 or Phys 342.

EE 521: Analysis of Power Systems. Credit 3. Concepts and practices of modern power engineering, including faults, stability, cables, dc transmission and overvoltage phenomena. Prerequisites: EE 491.

EE 522: High Voltage Engineering. Credit 3. High voltage-high power phenomena; design and measurements associated with electrical transmission, current interruption, insulation, transformation, lightning, and corona. Prerequisites: EE 331.

EE 524: Advanced Digital system Architecture. Credit 3. Instruction set architectures, pipelining and super pipelining, instruction level parallelism, superscalar and VLIW processors, cache memory, thread-level parallelism and VLSI. Prerequisites: EE 424.

EE 526: Electromagnetic Compatibility. Credit 3. Graduate-Level counterpart of EE 426. Credit not granted for both. Prerequisite: Graduate standing.

EE 527: Antenna Theory and Design. Credit 3. Antenna fundamentals, analytical techniques, characteristics and design procedures for selected types of wire, broadband, and aperture antennas. Prerequisites: EE 351. (a/y) Cooperative course taught jointly by WSU and UI (EE 533).

EE 528: Advanced Topics in Electromagnetics. Credit 3. May be repeated for credit; cumulative maximum 6 hours. Advanced topics of current interest in wave propagation (electromagnetics, acoustics, or optics). Prerequisites: EE 351.

EE 530: Digital Signal Processing II. Credit 3. Frequency selective digital filtering, least squares filtering, adaptive filtering, multirate signal processing. Prerequisites: EE 341; 464.

EE 531: Energy Management and Planning. Credit 3. Available energy resources; energy issues; economic analysis of energy alternatives; energy future.

EE 534: High Performance Computing. Credit 3. Development, current state and future of high speed computing application of existing commercial supercomputers to engineering problems. Cooperative course taught by UI (EE 504) Prerequisite: EE 324.

EE 538: EM Simulation. Credit 3. Computer simulation of electromagnetics using the finite-difference, time-domain (FDTD) method; theory of finite-difference simulation, techniques for modeling EM propagation in dispersive media, boundary conditions for time-domain simulation. Cooperative course taught by UI (EE 538). Prerequisites: By appointment only.

EE 541: Digital Control Systems II. Credit 3. State space approach, SISO, optimal control, state estimators, stochastic systems, state estimation in the presence of noise. Prerequisites: EE 441.

EE 543: Signal Theory. Credit 3. Theory of signals; signal spaces; basis sets; signal representations; projections theorem; Fourier transform; optimum signal design. Prerequisites: EE 341.

EE 544: Neural Computation. Credit 3. Parallel processing inspired by natural neural systems; neural computer architecture, supervised and unsupervised learning, generalization, implementation, and application; neurophysiology basis. Prerequisites: None.

EE 545: Data Compression. Credit 3. Source coding with a fidelity criterion; quantization theory; predictive, transform and sub band coding; noiseless source codes. Prerequisites: EE 507, 543.

EE 548: Information Theory and Channel Coding Credit 3. Information theory; entropy, mutual information, source and channel coding theorems, channel capacity, Gaussian channels; channel coding; block and convolutional codes. Prerequisites: EE 451 and 507.

EE 551: Data Communication System. Credit 3. Digital communications; multi-amplitude/phase signal constellations; probability of error performance; cutoff rate; Viterbi algorithm; trellis coded modulation. Prerequisites: EE 341, 507.

EE 554: Asynchronous Digital Systems. Credit 3. Analysis and design of high speed asynchronous state machines, timing defect analysis, modular elements, arbiters, programmable sequencers, system level design. Cooperative course taught jointly by WSU and UI (EE 540). Prerequisites: EE 414 or equivalent.

EE 555: Computer Communication Networks. Credit 3. Packet switching networks; multi-access and local-area networks; delay models in data networks; routing and flow control. Prerequisites: Stat 443 or equivalent.

EE 562: Fault Tolerant Computer Systems. Credit 3. Fault tolerance aspects involved in design and evaluation of systems; methods of detection and recovery; modeling, correcting codes and reconfiguration. Same as Cpt S 562. Prerequisites: Cpt S 460, or EE 424 and elementary probability theory.

EE 564: Advanced signal Processing. Credit 3. Signal processing and communication theory aspects of frequency domain analysis of continuous and discrete random signals.. Prerequisites: Stat 443.

EE 574: Optoelectronics. Credit 3. Methods of modulating, generating, and detecting light; display techniques; display devices; fiber optics. Prerequisites: EE 504.

EE 581: Advanced Topics in Power Systems. Credit 3. Prerequisites: EE 521 or equivalent.

EE 582: Advanced Topics. Credit V 1-3. May be repeated for credit.

EE 584: Parallel Processing Systems. Credit 3. Parallel processing, partitioning, allocation and mapping, array processors, hypercubes, parallel routing algorithms, parallel memory access, examples of parallel machines. Prerequisites: EE 524.

EE 586: VLSI Systems Design. Credit 3. VLSI models, layout algorithms, design methodologies, simulation and layout tools, algorithm design for VLSI implementation. Prerequisites: EE 444.

EE 595 Directed Study in Electrical Engineering Credit V 1-3. Current topics in Electrical Engineering. Prerequisites: Graduate Standing.

EE 596: Advanced Analog Integrated circuits. Credit 3. MOS and BiMOS technologies; MOS and BiCMOS operational amplifier; A/D, D/A converters; switched-capacitor filters; current-mode analog circuits, switched-current techniques. Cooperative course taught by WSU open to UI students (EE 515).. Prerequisites: EE 476, 477.

EE 597: RF Mosfet Modeling. Credit 3 Graduate level counterpart of EE 497k Credit not granted for both. Prerequisites: None.

EE 598: High Speed Semiconductor Devices. Credit 3. Transit-time effects, negative resistance devices; ballistic transport in high electric fields; GUNN effect devices; resonant tunneling, IMPATTs HEMTs, and HBTs. Prerequisites: EE 496.

EE 600 Special Projects or Independent Study Variable credit. S, F grading.

EE 700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.

EE 702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.

EE 800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

### **Computer Science**

CptS 560 Operating Systems  
 CptS 561 Computer Architecture  
 CptS 566 Embedded Systems

### **Databases:**

CptS 551 Database Systems

### **Graphics, Animation and Scientific Computation:**

CptS 542 Computer Graphics  
 CptS 530 (Math 554) Numerical Analysis  
 CptS 519 Introduction to Computational Geometry  
 CptS 546 Advanced Animation  
 CptS 548 Advanced Computer Graphics

## **Networks**

CptS 555 Computer Communication Networks  
CptS 556 Secure Wireless Networks  
CptS 557 Advanced Computer Networks  
CptS 559 Mobile Computing in Wireless Networks  
CptS 553 (Math 553) Graph Theory

## **Parallel, Distributed Computing and Fault Tolerant Computing**

Cpt S 550 Parallel Computations  
CptS 562 Fault Tolerant Computer Systems  
CptS 564 Distributed Systems  
CptS 565 Advanced Distributed Systems

## **Security:**

CptS 527 Computer Security

## **Software Engineering**

CptS 522 Software Reuse  
CptS 523 Software Engineering Measurement (University of Idaho)  
CptS 524 Software Specifications and Analysis  
CptS 525 Experimental Software Engineering

## **Theory, Programming Languages and Algorithms:**

CptS 511 Computational Structures  
CptS 516 Algorithmics  
CptS 518 Programming Language Theory

## **Ai, KDD, Bio-informatics and other**

CptS 534 Neural Network Design and Application  
CptS 541 Artificial Intelligence  
CptS 543 Multimedia Systems  
CptS 544 Neural Computation  
CptS 545 Computer Vision  
CptS 547 Statistical Pattern Recognition  
CptS 549 Genetic Algorithms

## **Program in Engineering Management**

[www.engrmgt.wsu.edu](http://www.engrmgt.wsu.edu)

Degree offered: **Master of Engineering and Technology Management**

Faculty working with graduate students: **6**

Graduate students currently enrolled: **130**

Degree offered: **Pullman, Spokane, Tri-Cities, Vancouver, Extended Degree Program, Renton, Everett**



Deadline: **Fall—January 10**

**Spring—July 1**

### **Program Description**

The master of engineering and technology management (MEM) degree provides engineers and other technical contributors with state-of-the-art knowledge, tools, and skills in leading and improving projects, people, organizations, operations, and quality. Mastery of the practical, relevant curriculum often provides immediate on-the-job improvements and has helped graduates move up the corporate ladder. Certificate programs also are available in eight areas of interest to both engineers and other professionals working in technological areas.

Emphases include interdisciplinary teams, customer-oriented approaches, global technology and innovation strategies, quality improvement, performance management in technical organizations, design for manufacturability, management of scarce resources, and a rich offering in the theory of constraints.

The degree can be tailored for non-engineering professionals in technically based industries; it helps all college-educated personnel to be more effective in managing technical people, the technology and constraints of the engineering design and production processes, and their relationships to a technical company's business strategy.

### **Contact Information**

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### **Faculty Interests**

**Rob Crick**, Adjunct Professor, practicing attorney, firm of Winston & Cashatt, Lawyers: Special emphasis on construction and government contract matters; providing counsel to contractors, subcontractors, suppliers, engineers, architects, and project owners.  
*rcrick@winstoncashatt.com*

**William J. Gray**, Adjunct Professor: Manager in the Boeing Future Combat Systems Program system of systems engineering integration. He is manager of the electromagnetic environmental effects, parts, materials, and processes, and environments and constraints organizations. He teaches distance learning classes in Organizational Management, Enterprise Resource Planning, and Systems Engineering Management. Gray is a Senior Member of the Institute for Electrical and Electronics Engineers and Phi Beta Kappa. *william.j.gray2@boeing.com*

**James Holt**, Associate Professor: Specializes in Organizational Behavior, Operations Research, Statistics, Engineering Economics, Simulation, Information Systems, and Constraints Management. He currently serves on the Board of Directors of TOC-ICO, the Theory of Constraints Professional Certification

Organization. [jholt@wsu.edu](mailto:jholt@wsu.edu)

**E. Ray Ladd**, Associate Professor: Specialization in design for manufacturing engineering, quality control and reliability, project management, statistical methods, manufacturing and supply chain management, design of experiments. [ladd@wsu.edu](mailto:ladd@wsu.edu)

**John A. Ringo**, Director; Professor in the School of Electrical Engineering and Computer Science: He is also Director of the National Science Foundation Center for Design of Analog-Digital Integrated Circuits. His research includes specialized instrumentation for measurement in physiological systems, physical properties of semiconductor devices with an emphasis on electric noise, unique circuit application of semiconductor devices in analog circuit design as in modified MOS geometrics for use in linear amplifiers, and bioengineering studies with an emphasis on cardiovascular dynamics including studies of the heart-artery interaction. [ringo@wsu.edu](mailto:ringo@wsu.edu)

**Hal Rumsey**, Associate Professor: He is in charge of the Engineering Management Program in Spokane. His expertise includes Six Sigma Quality Management, High Performance Organizations, Motivation of Engineers and Scientists, Change Management, Strategic Management of Technology and Innovation, and Financial Management for Engineers and Technical Managers. [rumsey@wsu.edu](mailto:rumsey@wsu.edu)

**George Sudikatus**, Adjunct Professor: A retired engineer with more than 35 years of experience in engineering design, construction, and project management. He was employed by successive contractors to the U.S. Department of Energy at the Hanford nuclear reservation. His experience at Hanford included project management, engineering, and construction of nuclear facilities, machine design and fabrication, standards and procedures development, and technical training. His most recent employment was with Fluor Federal Services, where his work included preparing project documents for several overseas projects, such as construction of new U.S. embassies and reconstruction and rehabilitation projects in Iraq and elsewhere. [georgesuds@prodigy.net](mailto:georgesuds@prodigy.net)

## Core courses

### EM 501 Management of Organizations

This course explores issues dealing with individual behavior in work organizations. The major goals of the course are to learn various approaches to motivation, leadership, and team-building, and to illustrate how and when those approaches are appropriately used. A key focus of the course is on team management skills and how to organize groups for maximum effectiveness, motivate group members, and promote and reward team success.

### EM 505 Financial For Technical Systems

Today, it is nearly impossible for an engineer to perform without considering the financial implications of the design, manufacture, construction, sales, and the company strategic plan. Traditional accounting and financial decision making are not always helpful to the engineer who needs to cut through the paper work and get to the bottom line. As a result, engineering and cost accounting are usually at odds with each other. A smart approach to finance, its implications to technical processes, and financial management of the technical firm are needed and are covered in this course.

### EM 508 Legal Concepts for the Engineering and Technical Manager

Provides the career technical or engineering manager with a general understanding and knowledge of business law and the legal environment. The course covers generally the laws of the constitution, contracts, sales, business organizations, agency and employment, property, torts, crimes, government regulation, government contracting, and litigation.

**EM 520 Construction Project Management for Technical Managers**

Construction Project Management for Technical Managers primarily addresses the issues of planning, organizing, and managing projects from start (the proposal) to finish (project closeout), utilizing the latest construction industry practices for project management, for both commercial and government clients.

**EM 522 Supervision and Leadership**

Supervision for engineering and technology managers is a study of the role of the supervisor and the dimensions of effective supervision. Human relations, leadership, counseling, motivation, communication skills, problem solving, and decision making are all covered. The primary goal is to introduce the fundamentals of supervisory management and provide practical advice on how to handle real-life, on-the-job situations. The course will cover terminology necessary for business and professional communication; planning and organizing; staffing, training, motivation theory and practice; appraisal and counseling of trouble employees; and managing a diverse work force.

**EM 526 Constraints Management**

This course introduces the student to the Theory of Constraints. Students learn the formal analysis techniques that find the limiting factor in any system. Students learn to clearly identify the goal and necessary conditions that must be met to achieve success in the system. Students learn to think logically and formulate cause-and-effect relationships that define the system. They learn to differentiate between the many annoying problems that exist in the system to find the core problem or root cause of the many negative effects. Students learn how to find breakthrough injections that open the way for solutions that eliminate the conflict that has always prevented the core problem from being solved. They also learn how to break down the obstacles that prevent near impossible tasks and how to cause change to occur within the system.

**EM 530 Applications of Constraints Management**

Every system can be characterized as a chain of interlocking activities or a network of interlinked events. The operation or productivity of such a linkage is limited by its weakest link. Constraint Management has a broad application for a variety of management problems. The Theory of Constraints provides powerful tools for finding the problem, creating breakthrough solutions, planning the implementation. This course focuses on proven solutions generated from applying the Theory of Constraints to a large number of real world problems. The proven solutions offer innovative, successful solutions superior to previous methods. While EM 526, Constraints Management teaches how to create your own breakthrough solution for your own environment, this course focuses on how to implement previously discovered solutions in your environment.

**EM 540 Operations Research for Managers**

Applying linear, integer, goal programming; network optimization; queuing analysis; dynamic programming; simulation; Markov analysis; and forecasting to engineering management decisions are covered in this course. In the engineering professions, we are intimately familiar with mathematical models of physical systems. The majority of engineering design work is based on the application of these models and extending them to managerial and business systems. The models of operations research represent a collection of mathematically-based models that help the manager make rational decisions. This course introduces a number of models that are effective in solving certain classes of managerial problems. Students will learn how to apply these tools to various representative sample problems. The tools include linear programming, network models, scheduling models, integer and goal programming, dynamic programming, stochastic models, decision theory, queuing models, digital

simulation and inventory systems. The course also discusses how models are integrated into decision support systems, heuristics, and expert systems.

**EM 545 Technical Decision Analysis**

Decision analysis provides engineers a structured discipline for describing, analyzing, and finalizing decisions involving uncertainty. Individuals and organizations make decisions every day. Almost all decisions involve some uncertainty about the outcomes of the decisions and future conditions. Most people handle this uncertainty in intuitive ways. Research has confirmed that intuition is miserably unreliable in assessing the influence of this uncertainty on the outcomes of current decisions. Decision analysis provides a structured discipline for describing, analyzing, and finalizing decisions involving uncertainty.

**E M 555 Enterprise Resource Planning**

This course uses lecture and simulation to focus the flow of quality, timely products and cooperative supply chain operations and planning

**EM 560 Integrated Supply Chain Management (Formerly Manufacturing and Operations Design and Strategy)** Every organization has internal supply chains, and links to external suppliers and customers. Interlinking organizations span the spectrum from raw materials to finished products and services in the hands of the consumer. The supply chain extends even to final disposition of the commodities we consume from concept to grave. The structured dependency of such chains, the uncertainty of forecasts and systemic delays are amplified as individual links in the supply chain try to optimize their performance. Even minor changes in the market can cause wild swings in economic performance. Modern operation theories and information systems hold the promise of stabilizing some of the variability by providing visibility along the whole supply chain. Additional control and operational performance factors are needed to provide a complete solution. This course examines the strategy and tactics of supply chain management to include “how to” techniques to implement, measure and reward the individual links in the supply chain.

**EM 564 Project Management Prerequisite basic statistics**

The use of projects and project management continues to grow in our complex society. Project management differs from more traditional organizational management because most projects are one-time, extremely focused efforts. Time, money, people, and other resources must be managed extremely well to achieve success, yet there is usually only one chance to do it right. This course will examine technical tools, (CPM, PERT, Cost and Schedule Control Systems), behavioral issues, and considerations of organizational structure. The objective of the course is to help students understand the strengths and pitfalls of project management. The ultimate goal is to improve the effectiveness of the students at all levels of project management: from project selection and chartering at the highest managerial levels, to day-to-day skills for the project manager, and meaningful contribution and participation for project team members.

**EM 565 Systems Engineering Management**

The design, manufacture, and operation of complex systems presents a major challenge for today's managers. These systems, encumbered schedule and cost constraints while pushing the state of the art technology, demand new tools for project planning, organizing, controlling. This course is designed to assist students in knowledge essential for the management of new and modified complex system development

**EM 566 Systems Engineering Analysis and Planning**

**EM 570 Quality Management**

Overview of the total field of quality, including strategic quality management programs, quality assurance, quality control, and product design reliability. The purpose of the Quality Management course is to provide the technical manager with an overview of the total field of quality. The subjects addressed throughout the course are: statistics of quality, quality cost, quality improvement, world class quality, design for quality, vendor relations, Japanese manufacturing concepts, process control and capability, measurement systems, customer relations, product safety and liability, quality assurance, product design reliability, and strategic quality management. This is an application-oriented course and interrelationship between the various topics of quality management will be reviewed in case studies, readings and class discussion. Further investigation and a research project will be required of each student.

**EM 575 Performance Management in Technical Organizations**

Management of high technology organizations; planning, measurement, and human factors in improving high technology organizations; productivity, motivation and performance systems. This course addresses the management of high technology engineering process based on the seven key dimensions: effectiveness, efficiency, quality, productivity, quality of work life, innovation, and profitability. The course is tailored to engineers. A critical element of the course is measurement and includes human performance management which is currently of interest in many engineering and high technology organizations. It addresses development of closed-loop measurement and control systems designed to provide information at the source of variation within the system, from an engineering and engineering management perspective. This course is to provide students a current view of philosophies and methods for engineering organizational improvement of high technology processes. Students will understand strategic and tactical planning methods to refine engineering organizational objectives and to measure achievement of the objectives on seven key engineering dimensions.

**EM 580 Quality Control and Reliability Design**

Quality improvement analysis for process and product quality; statistical process control, capability studies; acceptance sampling concepts; reliability models for prediction and testing. This course addresses statistical methods as used in quality analysis; modeling process and product quality. It covers statistical process control; control charts and introduction to process capability studies. Traditional acceptance sampling, process sampling and sampling for quality audit; QC curves, sampling tables are included. The basic concepts of reliability; definitions; failure models, reliability prediction, estimation and apportionment are covered as well as failure data analysis. Product design, development and production; design review, product testing. The final components are maintainability measures and prediction and preventive maintenance scheduling. The objective of this course is to strengthen and improve the ability of engineering managers in detail theory and the design of quality control systems and techniques of quality control and to utilize reliability considerations in engineering design.

**EM 585 Quality Engineering Using Experimental Design**

Design of quality into products and processes using design of experiments including robust/parameter design and tolerance design techniques. Design of experiments is a systematic and efficient method of design optimization for performance, quality and cost in quality engineering. Statistical quality control improves the product and/or process quality for a given design. This course examines the design in order to acquire a better product/process quality. Other names for this include robust design, parameter design, or Taguchi Techniques. This course is to give engineers a current understanding of the techniques and applications of design of experiments in quality engineering design.

**EM 590 Design for Manufacturing**

Various techniques to identify opportunities for improvement and development of a comprehensive product design will be explored. Key issues and competitive product development and design optimization will include topics such as: quality function deployment; design for assembly and product variation; failure modes and effects analysis; reliability/serviceability, concurrent engineering; statistical process control, six sigma process and flexible process selection; tolerances design; rapid prototyping; design and development management issues; reducing part cost with DFM; DFM team building and training.

**EM 591 Strategic Management of Technology and Innovation**

This course focuses on the concepts, techniques, and processes of management with direction and purpose. The perspective we take is that of the manager responsible for the long-term health of the enterprise. The use of technology for competitive advantage, and the interaction of technology with other strategic variables are central themes of the course. The objective of the course is to understand both the formulation of strategic decisions and the management of strategic processes; therefore we will be dealing with analytical, behavioral, and creative aspects of management--frequently simultaneously. This class is to be taken in the final semester(s) of the program.

**STAT 430 Statistical Methods in Engineering**

Engineering and technical managers are often confronted with problems and dealing with CERTAINTY and UNCERTAINTY. Basic analysis and design theory fits the first type of problem when initial design concepts are considered. However, when implementation and use is considered, then the second type of problem emerges. Statistical Methods in engineering deals with this second type of problem and with decision making. The course assumes no background in statistics. Students learn to read and interpret statistical literature and to apply basic statistical methods in evaluating data.

**EM 702 Master's Special Problems, Directed Study and/or Examination 2-4 semester credits [By arrangement only.]** Graduation fee is \$50**Option I. EM 702 Project Guidelines**

This non-thesis written project and oral presentation will showcase student learning and skills. The multidisciplinary nature of engineering management education is significantly addressed as students form teams to research on-the-job solutions. The project allows students to synthesize their knowledge and understanding. To be taken final two semesters. Please note, the final semester for the project option may NOT be taken during summer term.

**Option II. Comprehensive written examination taken the final semester.**

Questions will cover material from core requirements, but responses should reflect an integrated approach. Not to be taken in conjunction with any transfer semester credits.

**Engineering and Architecture**

Degrees Granted **MS in Engineering; PhD Engineering Science**

Faculty working with graduate students **Varied**

Graduate Students **Varied**

Students receiving assistantships or scholarships **Varied**

Priority Deadline **Fall – January 10**

Campuses **Pullman, Tri-Cities**

Test required **TOEFL or IELTS (international students only)**

## **Admission Requirements**

Students entering the program usually will have an undergraduate degree from a recognized program in engineering. Students with a non-engineering undergraduate degree, such as mathematics or the physical or life sciences, may need to complete a central core of undergraduate engineering study focused on their area of interest.

Students wishing to be admitted to the program must satisfy the minimum requirements of the Graduate School and the College of Engineering and Architecture. For admission to the M.S. program, the Graduate School requires:

a minimum grade point average of 3.00 (on a 4.00 scale)

International applicants are also required to have the equivalent of a U.S. Bachelor's degree (normally a minimum of four year of study beyond grade 12), demonstrated proficiency in English (minimum TOEFL of 550 paper or 213 computer or equivalent), and have evidence of financial support.

## **Program Description**

These interdisciplinary programs are administered through the College of Engineering and Architecture's Office of the Associate Dean of Research and Graduate Programs, with students typically advised and funded through one of several departments in the College. The interdisciplinary nature of these degrees provides considerable flexibility in designing programs of study tailored to the specialized needs of each student.

Areas of specialization include (but are not limited to): biological systems engineering, atmospheric research, materials science and engineering, and bioengineering.

These students often work in one of our interdisciplinary centers such as: Bioengineering Research Center (BRC), Center for Environmental, Sediment, and Aquatic Research (CESAR), Center for Environmental Education and Outreach (CEREO), Center for Materials Research (CMR), Engineering Education Research Center (EERC), Laboratory for Atmospheric Research (LAR), and the Wood Materials Research Lab (WMEL).

Thesis and non-theses options are available in the M.S. degree program.

## **Contact Information**

Graduate Student Services  
Office of the Associate Dean of Research and Graduate Programs  
College of Engineering and Architecture  
Washington State University  
Dana Hall 145, PO Box 642714  
Pullman, WA 99164-2714  
Telephone: 509-335-8730  
Fax: 509-335-9608  
E-mail: [dmcgarry@wsu.edu](mailto:dmcgarry@wsu.edu)

## Department of English

<http://libarts.wsu.edu/english>

Degrees offered: **M.A., Ph.D.**

Faculty working with graduate students: **32**

Graduate students: **55-60**

Students receiving assistantships or scholarships: **95%**

Tests required: **GRE; TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

### Requirements

Requirements for admission include official transcripts; official GRE scores; TOEFL or IELTS (international students only); writing sample (approximately 10 pages); three letters of recommendation; statement of purpose (approximately 500 words); undergraduate major in English or other appropriate discipline. <http://libarts.wsu.edu/english/graduate/admissions.html>

### Program Description

The Department of English at Washington State University offers graduate programs leading to the degrees of Master of Arts (M.A.) and doctor of philosophy (Ph.D.). Providing opportunities for diverse course work and extensive pedagogical training, these programs emphasize interpretive and critical thinking, breadth of disciplinary preparation, grounding in current theory and methodology, and respect for the value of multiple perspectives. Students may elect to concentrate either on literary study (British, American, and postcolonial Anglophone literatures) or on rhetoric and composition. The English Department also participates in the University's interdisciplinary American studies program, which offers opportunities for M.A. and Ph.D. students to take specialized seminars in American studies. Our students have opportunities for teaching and research assistantships, can assist the faculty in the editing of academic journals, and may receive funding for travel to conferences and archives.

### Graduate Opportunities

College and university teaching; Professional writing; Academic and professional editing; Tutoring; ESL instruction; Writing program administration

### Positions Held by Recent Graduates

Assistant, associate, and full professorships in the following English departments: College of Charleston (Charleston, SC); Minot State University (Minot, ND); University of Northern Colorado (Greeley, CO); California State University (Hayward, CA); Gonzaga University (Spokane, WA); University of Peradeniya (Sri Lanka); University of Massachusetts (Lowell, MA); University of Wisconsin (Stevens Point, WI); California State University (San Bernardino, CA); Clemson University (Clemson, SC); Emory University (Atlanta, GA); Idaho State University (Pocatello, ID); Director of Education, Intercollegiate Studies Institute, Wilmington, DE; University of Montana (Dillon, MT); North Carolina State University (Raleigh, NC); Southern Illinois University (Edwardsville, IL); University of Hawaii (Hilo, HI).



## Contact Information

William Hamlin, Ph.D.  
Director of Graduate Studies  
Department of English  
PO Box 645020  
Pullman, WA 99164-5020  
Telephone: 509-335-7398  
Fax: 509-335-2582  
E-mail: [whamlin@wsu.edu](mailto:whamlin@wsu.edu)

## Faculty Interests

**Paul Brians:** Interdisciplinary arts and humanities courses; science fiction; the Bible as literature; world civilizations; South Asian literature. [brians@wsu.edu](mailto:brians@wsu.edu)

**Joan Burbick:** American literature and culture (especially late nineteenth and twentieth century); cultural theory; popular culture. [burbick@wsu.edu](mailto:burbick@wsu.edu)

**Todd Butler:** Seventeenth century literature; practical leadership development; political epistemology; marriage of knowledge and power in the Renaissance. [butlert@wsu.edu](mailto:butlert@wsu.edu)

**Donna Campbell:** Nineteenth and twentieth century American literature; naturalism; regionalism and nationalism in American literature. [campbelld@wsu.edu](mailto:campbelld@wsu.edu)

**Peter Chilson:** Writing workshops in fiction and literary nonfiction; form and theory in fiction and literary nonfiction; environmental issues regarding Africa and the American West.  
[pchilson@mail.wsu.edu](mailto:pchilson@mail.wsu.edu)

**Bill Condon:** Writing assessment; composition pedagogy; world civilizations; nineteenth century British literature; computers and writing. [bcondon@wsu.edu](mailto:bcondon@wsu.edu)

**Robert Eddy:** Rhetoric and racism (especially connected to Malcolm X); composition theory and practice; interrelationships of the rhetorics of science, religion, and politics; ideological and identity issues in writing across cultures. [eddyr@wsu.edu](mailto:eddyr@wsu.edu)

**Patricia Ericsson:** Technical and professional writing; multimedia authoring; agency and education; critical technology studies; composition and rhetoric; technical communications.  
[ericsson@wsu.edu](mailto:ericsson@wsu.edu)

**Amanda Espinosa-Aguilar:** Composition and rhetoric; ethnic American literature; linguistics; education (primarily faculty of color in higher education); sociolinguistics.  
[espinosa@wsu.edu](mailto:espinosa@wsu.edu)

**Lynn Gordon:** Linguistics; English grammar; history of English; syntax; syntax and morphology of Native American languages. [gordonl@wsu.edu](mailto:gordonl@wsu.edu)

**William Hamlin:** Shakespeare; English and continental literature, 1500-1700; Renaissance drama; Montaigne; history of early-modern philosophy. [whamlin@wsu.edu](mailto:whamlin@wsu.edu)

**Alexander Hammond:** American literature; humanities; introduction to literature; film and literature; American fiction; class, labor, and gender in American literature; American drama.  
[hammonda@wsu.edu](mailto:hammonda@wsu.edu)

**Michael Hanly:** Medieval literature and culture; Chaucer; humanities; textual editing; paleography; graduate research. [hanly@wsu.edu](mailto:hanly@wsu.edu)

**Jon Heggland:** Twentieth century British literature; film studies; literary theory; postcolonial literature.  
[heggland@wsu.edu](mailto:heggland@wsu.edu)

**Desiree Hellegers:** Seventeenth century literature; ecocriticism.

*helleger@vancouver.wsu.edu*

**Wendy Johnson:** 'Other' rhetorics; history of rhetoric; American literature before 1900; sacred texts and cultures of world religions; women and ethnic studies; poetry. *johnsonw@vancouver.wsu.edu*

**Michelle Kendrick:** Visual literacy; new media; technology and subjectivity; historicizing the technology-literacy relationship; issues of diversity and multiculturalism.

*kendrick@vancouver.wsu.edu*

**George Kennedy:** Technical communication; rhetoric and composition; nineteenth century British fiction; early twentieth century British fiction. *gkennedy@wsu.edu*

**Alex Kuo:** Contemporary poetry; creative writing (all genres); Native American literature; literature of the American West. *alexkuo@wsu.edu*

**Debbie Lee:** Romanticism; Blake; the short story; British romantic literature; science and literature; the history of slavery; imposters and forgers. *deblee@wsu.edu*

**Barbara Monroe:** Writing and literature methods courses; cultural and class differences in rhetoric, learning styles, and interaction patterns. *bjmonroe@wsu.edu*

**Joddy Murray:** Writing and rhetoric; digital technologies and culture; creative writing; language and rhetorical theory; image studies and multimodal, multimedia composition; invention and the affective domain. *jmurray@tricity.wsu.edu*

**Leonard Orr:** Nineteenth and twentieth century British and American literature; critical theory and the history of criticism; modernism; representations of the Holocaust; creative writing (poetry).

*orr@tricity.wsu.edu*

**Aimee Phan:** Creative writing, fiction, Asian American literature. *aphan@wsu.edu*

**T.V. Reed:** Contemporary American literature; literary theory; popular culture; digital diversity; multiethnic contemporary American literature; ecocriticism. *reedtv@wsu.edu*

**Augusta Rohrbach:** 19th Century American Literature and Culture: material approaches to literature, history of the book in the U.S.; African American literature and culture; women's literature and culture. *rohrbach@wsu.edu*

**Camille Roman:** Women writers; poetry; modern American literature; Cold War studies; multicultural American poetics; cultural studies and theory; the politics of language; orientalisms and American cultures. *roman@wsu.edu*

**Carol Siegel:** Poststructuralist literary theory; feminist theory; Shakespeare; Restoration literature; Victorian, modern and postmodernist English literature; Asian-American literature; film; youth cultures; women writers. *siegel@vancouver.wsu.edu*

**Victor Villanueva:** Writing; rhetoric; composition theory; rhetorical theory; literacy; applied linguistics; cultural studies; political economy. *victorv@wsu.edu*

**Albert von Frank:** American literature to 1900; poetry; autobiography; non-fictional prose; literature and religion; bibliography and textual editing. *vonfrank@mail.wsu.edu*

ENGL 501

Seminar in the Teaching of Writing

ENGL 507

Shakespeare and Renaissance Drama

ENGL 512

Introduction to Graduate Studies

ENGL 515  
Contemporary Rhetoric  
ENGL 529  
Beyond the Concord Circle: The American Renaissance  
ENGL 531  
Administering a Writing Program  
ENGL 534  
Theories and Methods of the Teaching of Technical and Professional Writing  
ENGL 443/543  
Phonology  
ENGL 549  
Modernism and Film  
ENGL 550  
Africa: Fact and Fiction

**Spring 2010**

ENGL 502  
Teaching of Writing (WHETS)  
ENGL 511  
What is an American?  
ENGL 525  
Law and Literature in Early Modern England  
ENGL 531  
Administering a Writing Program  
ENGL 546  
An Introduction to ESL Theory and Pedagogy  
ENGL 573  
Post World War II African American Literature  
ENGL 580  
Seminar in Medieval Literature:  
Love in the Western World  
ENGL 595  
The Composed Life: Writing for Publication, Fellowships, and Post-Docs  
ENGL 597.01  
Contact Zone Rhetorics  
ENGL 597.02  
Rhetoric of Science and Technology (WHETS)  
516 Rhetorical Theory 3 Same as Com 525.  
521 Seminar in British Romantic Literature 3 May be repeated for credit; cumulative maximum 6 hours.  
522 Seminar in Victorian Literature 3 May be repeated for credit; cumulative maximum 6 hours.  
525 Seminar in English Literature of the 17th Century 3 May be repeated for credit; cumulative maximum 6 hours.  
527 Seminar in English Literature of the Restoration and 18th Century 3 May be repeated for credit; cumulative maximum 6 hours.  
529 Seminar in 19th-Century American Literature 3 May be repeated for credit; cumulative maximum 6 hours.  
531 Administering A Writing Lab 3 Prereq Engl 501 or 502, or consent of writing lab director.

Combining theory and practice in writing lab supervision and management. Interns will work under direct faculty supervision.

532 Teaching Writing to Nontraditional Students 3 Prereq Engl 501. Theory and practice of the teaching of basic writers.

534 Theories and Methods of the Teaching of Technical and Professional Writing 3 Historical and theoretical bases for production of scientific discourse; training in its practical applications.

537 Seminar in English Literature 3 May be repeated for credit; cumulative maximum 12 hours. Major topics and figures.

543 Problems in English Linguistics: Syntax and Phonology 3 May be repeated for credit; cumulative maximum 6 hours. Credit not granted for both Engl 443 and 543.

547 Literary Criticism 3 Theories of literature from Plato and Aristotle to the present.

548 Seminar in Literary Theory 3 May be repeated for credit; cumulative maximum 6 hours. Problems in the theory and practice of literary criticism.

549 Seminar in 20th-Century British Literature 3 May be repeated for credit; cumulative maximum 6 hours.

550 Seminar in Poetry or Non-Fiction Prose 3 May be repeated for credit; cumulative maximum 6 hours. Historical and generic studies in poetry and non-fiction prose.

554 History of the English Language 3

555 Seminar in Middle English Literature 3 May be repeated for credit; cumulative maximum 6 hours.

567 Seminar in Prose Fiction 3 May be repeated for credit; cumulative maximum 6 hours. Historical and generic studies of prose fiction.

573 Seminar in American Literature 3 May be repeated for credit; cumulative maximum 12 hours. Major topics and figures.

580 Seminar in Medieval Literature 3 May be repeated for credit; cumulative maximum 6 hours. The literature of western Europe from 450 to 1500.

590 Research in English Studies 1 May be repeated for credit; cumulative maximum 3 hours. Prereq graduate standing. Directed reading and interpretive problems in English studies.

591 The Teaching of Literature 3 Prereq two semesters full-time graduate enrollment or consent of adviser. The theory and practice of designing and teaching courses in literature. Cooperative course taught jointly by WSU and UI (ED 558).

592 Language Arts: Methods of Composition 3 Methods of composition and relevant research in language arts.

595 Topics in English 3 May be repeated for credit; cumulative maximum 6 hours. Language, English pedagogy, or literature of special or current interest; reading theories, teaching of writing, current literary theories.

596 Topics in American Studies 3 May be repeated for credit; cumulative maximum 9 hours. American Studies Summer Institute. Credit not granted for both Engl 496 and 596.

597 Topics in Composition and Rhetoric 3 May be repeated for credit; cumulative maximum 6 hours. Rhetoric and composition theory and praxis.

598 Teaching Apprenticeship 1 May be repeated for credit. S, F grading.

600 Special Projects or Independent Study Variable credit. S, F grading.

700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.

702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.

800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

## Department of Entomology

<http://entomology.wsu.edu>

Degrees offered: **M.S., Ph.D.**

Faculty working with graduate students: **32**

Graduate students: **20**

Students receiving assistantships or scholarships: **80%**

Tests required: **GRE; TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

### Admission Requirements

Applicants should have completed an undergraduate major in one of the biological or physical sciences, forestry, agriculture, or a closely related field. Students with majors in other disciplines are considered on an individual basis. Background work should include courses in biological and physical sciences, genetics, ecology, entomology, and plant or animal sciences.

To apply, submit a letter of application stating personal goals and professional objectives; official GRE scores (advanced biology subject test is recommended); official copies of all college or university transcripts; three letters of recommendation; and official TOEFL or IELTS scores (international students only). Please visit the departmental Web site for further information.

### Program Description

Entomology at Washington State University is active, robust, and dynamic. The curriculum provides the opportunity to study the basic and applied aspects of the science. Facilities and training are available for graduate study in major areas of entomology, including (but not limited to) apiculture; behavior; integrated biological control and sustainable pest management; ecology; forest entomology; insect/plant interactions; medical/veterinary entomology; population genetics; physiology; systematic; biological diversity and environmental toxicology

Departmental faculty, adjunct faculty, and affiliate faculty may all serve as student advisors. Faculty are housed both on campus and at research stations throughout the state; the ability to significantly interact with both on- and off-campus advisors and mentors offers students opportunities and perspectives not available in most programs.

We maintain strong cooperative interactions with the USDA ARS lab in Yakima, Washington, and students are encouraged to explore this avenue for advisors and funding opportunities. The department has a long and excellent record of student placement both nationally and internationally.

### Graduate Opportunities

University staff and faculty; research, technical, and service positions; federal, state, and private agricultural and biological laboratories; public health, environmental, and natural science positions.

### Positions Held by Recent Graduates

Postdoctoral positions, university and college faculty, federal and state agencies (e.g. USDA, FDA, and Washington State Department of Agriculture), private industry and entrepreneurial endeavors, pesticide education programs, state forensics laboratory.

### Contact Information

Doris Lohrey-Birch, Academic Coord.  
Richard S. Zack, Chair  
Department of Entomology  
PO Box 646382  
Pullman, WA 99164-6382  
Telephone: 509-335-5422  
Fax: 509-335-1009  
E-mail: entom@wsu.edu

### Graduate Opportunities

University staff and faculty; research, technical, and service positions; federal, state, and private agricultural and biological laboratories; public health, environmental, and natural science positions.

### Positions Held by Recent Graduates

Postdoctoral positions, university and college faculty, federal and state agencies (e.g. USDA, FDA, and Washington State Department of Agriculture), private industry and entrepreneurial endeavors, pesticide education programs, state forensics laboratory.

### Faculty Interests

**John J. Brown:** Insect physiology, toxicology. Insect growth regulators to control pest insects; synthetic sex pheromones, developmental hormone analogs, and feeding stimulants. *brownjj@mail.wsu.edu*

**Laura Corley:** Insect development and evolution. Genetic mechanisms underlying adaptive trait evolution in insects. *corley@wsu.edu*

**Gary L. Piper:** Invasive plant management. Insect-plant associations and the implementation of biological control programs for aquatic and terrestrial weeds; non-indigenous bioagent introduction, establishment, redistribution, and impact evaluations.  
*glpiper@wsunix.wsu.edu*

**Carol A. Ramsay:** Urban IPM and Pesticide Safety Education. Integrated pest management, personal safety and environmental protection. *ramsay@mail.wsu.edu*

**Carol Sheppard:** Insect physiology, history of biology/entomology, pedagogy. Lepidopteran immunosuppression due to polydnavirus infection transmitted by ichneumonid wasp.  
*sheppc@mail.wsu.edu*

**W. Steven Sheppard:** Apiculture, population genetics, and evolutionary biology. Diversity of honey bees of the genus *Apis*; the population genetic consequences of *Apis mellifera* subspecies introductions and hybridization. *shepp@wsu.edu*

**William Snyder:** Community ecology and sustainable agriculture; the relationship between on-farm biodiversity and the success of biological control. *wesnyder@wsu.edu*

**William J. Turner:** Insect taxonomy and systematics; biosystematics, natural history, and evolutionary studies of true flies. *turnerwj@wsu.edu*

**Richard S. Zack:** Biological diversity and systematics. Ecosystematics and the faunal composition of native and changing environments. *zack@wsu.edu*

### Off Campus faculty

**Art Antonelli:** Extension entomology in crops and urban entomology. *antonell@wsu.edu*

**Elizabeth Beers:** Secondary pests of apple. *ebeers@wsu.edu*

**Jay Brunner:** Pest management of pome fruit cropping systems with emphasis on pheromone- or

behavior-based tactics, biological control and selective insecticides. *jfb@wsu.edu*

**John Dunley:** Development of biorational pest management techniques, focusing on pears. *dunleyj@wsu.edu*

**Allan Felsot:** Environmental chemistry and toxicology. *afelsot@wsu.edu*

**Vince Hebert:** Chemical ecology, pesticide fate and transport in the environment. *vhebert@tricity.wsu.edu*

**David James:** Development of biologically-based insect and mite management in irrigated crops. *david\_james@wsu.edu*

**Vincent P. Jones:** Population biology to improve IPM programs in deciduous fruits. *vpjones@wsu.edu*

**Keith Pike:** Develop long-term biological controls in concert with other sound management strategies. *kpike@wsu.edu*

**John Stark:** Ecotoxicology. Non-target effects of pesticides and other chemicals; population modeling of toxicant effects. *starkj@wsu.edu*

**Lynell K. Tanigoshi:** Integrated pest management of small fruits. *tanigosh@wsu.edu*

**Douglas Walsh:** Environmental manipulation to promote better pest management. *dwalsh@wsu.edu*

#### **Adjunct Faculty**

**Steve Clement:** Pullman USDA office. Host plant resistance, insect-plant interactions, weed biological control. *slclement@wsu.edu*

**James D. Hansen,** Post-harvest entomology and wetland insects. *jimbob@yarl.ars.usda.gov*

**Laurel Hansen:** Urban entomology. Biology and management of carpenter ants. *laurelh@spokanefalls.edu*

**David Horton:** Integrated pest management and biological control in tree fruit and vegetable systems. *horton@yarl.ars.usda.gov*

**Andrew Jensen:** Insect systematics, row crop pest management. *ajensen@televar.com*

**Peter J. Landolt:** Chemical ecology, how chemicals mediate interactions among insects and between insects and plants; discovering and developing chemical attractants. *landolt@yarl.ars.usda.gov*

**Bethany Johnston Marshall:** School of Biological Sciences. Biological and ecological evidence, for resolution of crimes. *bethany\_marshall@wsu.edu*

**Joseph E. Munyaneza:** Integrated pest management of insect pests of potatoes. *nunyaneza@yarl.ars.usda.gov*

**Merrill Peterson:** Western Washington University. Ecology and evolutionary biology of herbivorous insects. *peterson@biol.wvu.edu*

**Dan Suomi,** Washington State Department of Agriculture: Wood destroying organisms. *dsuomi@agr.wa.gov*

**Tom Unruh:** Biological control of tree-fruit and potato pest insects and genetics of pest and beneficial species. *unruh@yarl.ars.usda.gov*

## Entomology

- 526 Population Analysis 1 Same as NATRS 526.
- 529 Principles of Population Dynamics 1 Same as NATRS 529.
- 539 Taxonomic Entomology 2 or 4 (2-6) Identification of insect orders and families. Insect collection required. Graduate level counterpart of Entom 439; additional requirements. Credit not granted for both Entom 439 and 539.
- 540 Taxonomy of Immature Insects 2 or 4 (2-6) Graduate level counterpart of Entom 440; additional requirements. Credit not granted for both Entom 440 and 540.
- 541 Advanced Insect Ecology 3 (2-3) Prereq Entom 343; general ecology course. Graduate-level counterpart of Entom 441; additional requirements. Credit not allowed for both Entom 441 and 541. Field trips required. Cooperative course taught by UI (Ent 541), open to WSU students.
- 542 Insect Behavior 3 Prereq one year biology or entomology. Principles of the behavior of insects. Cooperative course taught by WSU, open to UI students.
- 543 Predator-Prey Dynamics 1 Prereq calculus; general ecology; statistics. Dynamical consequences of interactions between predators and their prey at the population community and ecosystem level.
- 545 Insect-Plant Interactions: Mechanisms of Resistance to Arthropods 3 (2-3) Graduate-level counterpart of Entom 445; additional requirements. Credit not granted for both Entom 445 and 545. Cooperative course taught by UI (Ent 549), open to WSU students.
- 546 Host Plant Resistance 3 Prereq graduate standing. Principles and methods of screening and developing crop cultivars resistant to arthropods. Graduate level counterpart of Entom 446; additional requirements. Credit not granted for both Entom 446 and 546. Cooperative course taught by UI (Ent 546), open to WSU students.
- 547 Introduction to Biological Control 3 (2-3) Graduate level counterpart of Entom 447; additional requirements. Credit not granted for both Entom 447 and 547.
- 550 Insect Physiology 3 Prereq Chem 240, Zool 352; Zool 322, or Entom 340 or 343. General principles of insect physiology; the mechanisms of vital processes in insects; organ, cellular, subcellular, chemical and physical levels. Cooperative course taught by WSU, open to UI students (Ent 550).
- 551 Biological Control of Weeds 1 Prereq general ecology. Principles, methodologies, and implementation of biological control of weeds in noncropland environments. Cooperative course taught by WSU, open to UI students (Ent 451/J551).
- 555 Applied Design and Analysis of Ecological Field Experiments 2 Prereq Biol 372 or Stat 212; graduate standing. Overview of the application of experimental design and advance statistical analysis in ecological systems.
- 556 Insecticides: Toxicology and Mode of Action 1 Prereq biochemistry, organic chemistry, physiology, plant or animal physiology. Insecticides in terms of historical perspective, classification, synthesis, toxicity, mode of action, and metabolism.
- 557 Herbicides: Toxicology and Mode of Action 1 Prereq biochemistry, organic chemistry,, physiology, plant or animal physiology. Herbicides in terms of historical perspective, classification, synthesis, toxicity, mode of action, and metabolism.
- 558 Pesticide Topics 1 Prereq biochemistry, organic chemistry, physiology, plant or animal physiology. Current issues concerning pesticides in terms of toxicity, mode of action, and metabolism.
- 562 Systems in Integrated Crop Management 3 (2-3) Prereq one semester calculus. Evaluate and use computer models to make decisions for managing pests, diseases, and crop productivity. Credit not granted for both Entom 462 and 562.
- 565 Integrated Biological Control 3 Prereq Entom 340 or 343. Study of importance of incorporating



biological control into integrated pest management problems in agricultural and urban ecosystems.

572 Aquatic Entomology 3 (2-3) Graduate-level counterpart of Entom 472; additional requirements. Credit not granted for both Entom 472 and 572. Cooperative course taught by UI (Ent 572), open to WSU students.

583 Physiological Interactions in Predator-Prey Relationships 1 Prereq Bio S 102. Rec general ecology. Intricate physiological and behavioral adaptations that have evolved in predator/prey relationships.

590 Special Topics in Entomology V 1-4 May be repeated for credit: cum max 10 hours. Current areas of special interest within entomology. Credit not granted for both 490 and 590. Cooperative course taught by WSU, open to UI students (Ent 490/590).

593 Seminar 1 Prereq 20 hrs biology. May be repeated for credit. Reporting and discussing problems and research in entomology.

595 Noncropland Weed Biological Control Internship V 1-3 May be repeated for credit, cumulative maximum 6 hours. Prereq graduate standing, by interview only. Supervised individual practicum in noncropland weed biological control; professionally related field interaction. Cooperative course taught by WSU, open to UI students (Ent 595). S, F grading.

600 Special Projects or Independent Study Variable credit. S, F grading.

700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.

702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.

800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

### **Integrated Pest Management**

#### **IPM**

552 Pesticides and the Environment 2 Intermediate and prolonged effects of pesticides on man and other animals; legal and moral repercussions of pesticide use. Graduate level counterpart of IPM 452; additional requirements. Credit not granted for both IPM 452 and 552.

562 Systems of Integrated Pest Management 3 (2-3) Utilization of the systems approach in agricultural pest management; design, implementation, and analysis of IPM programs for selected crops.

### **Environmental Science and Regional Planning**

[www.sees.wsu.edu/GraduateStudies/index.html](http://www.sees.wsu.edu/GraduateStudies/index.html)

Degree offered **M.S., Ph.D.**

Faculty working with students **Any faculty member on any campus can work with students in the program**

Students **65**

Students receiving assistantships or scholarships **70% (Pullman campus)**

Priority deadline **Fall - January 10 (to be considered for TA positions)**

Campuses **Pullman, Tri-Cities, Vancouver**

International test **TOEFL or IELTS**

#### **Admission Requirements**

Minimum undergraduate course requirements (semester hours) for admission to the program are: sociology or cultural anthropology (3); basic course in environmental science (3); biological sciences (3); general chemistry or general physics (6); calculus or statistics (3); and general ecology (4).

Students admitted with deficiencies in prerequisites can remove them after admittance by taking suitable courses without receiving graduate credit.

Before applying for admission to the master's program, a student should have completed an

undergraduate curriculum that included examination of a physical, biological, or social system in sufficient depth to serve as background for advanced investigation of one or more of these systems in an ecological context, and a minimum GPA of 3.0. Previous course work also is required in sociology or cultural anthropology, environmental science overview, biological science, chemistry or physics, and calculus or statistics.

Three letters of recommendation, transcripts from colleges attended, and a statement of goals are required in addition to the application for graduate school. Applications for Teaching and Research Assistantships and Fellowships are available upon request. A TOEFL score of at least 580 is required for students whose first language is not English.

General requirements for the degree of Master of Science in Environmental Science include upper division or graduate level courses in physical, biological, social, or applied science; ecology; mathematics, statistics, or computer sciences; environmental impact assessment; graduate seminar and advanced topics in Environmental Science; an option with a minimum of 10 credit hours of courses; and a thesis or special project. A minimum of 32 hours of graduate credit is required. The Program has been successful in placing master's graduates in a variety of positions with federal, state, and local agencies, industry and academia, as environmental and resource management specialists.

### **Program Description**

Environmental science is a multidisciplinary inquiry that deals primarily with the variety of environmental problems caused by humans as they live their lives, satisfying their needs and wants, processing materials; and releasing unwanted products into the environment. A student's program of study therefore includes subject matter from a wide range of disciplines.

Graduates of environmental sciences and regional planning (ESRP) have earned a degree that has a solid background in the natural sciences as well as a strong foundation in the social sciences.

Environmental science is also an applied field. The field emerged as a response to environmental problems, such as air and water pollution, and today includes the issues of biodiversity, global climate change, hazardous waste, and ozone depletion. Environmental scientists usually work to solve or remedy specific problems, including an increasingly important effort to prevent them.

In ESRP we provide a number of courses that give our students the tools they need to work in this applied context. These include environmental impact assessment, environmental modeling, geographic information systems, environmental conflict resolution, and environmental planning.

### **Faculty**

*Professor and Chair, W. Budd; Professors, F. Ford, W. Hendrix; Associate Professor, E. Franz; Assistant Professor, R. Gill; Program Coordinator at WSU Tri-Cities and Associate Professor, R. Schreckhise; Program Coordinator at WSU Vancouver and Associate Professor, B. Tissot; Academic Coordinator for General Science at WSU Tri-Cities, E. Moore, Jr; Senior Research Scientist, A. Brooks; Professors Emerti, G. Hinman, G. Young.*

The Program in Environmental Science and Regional Planning offers courses of study leading to the degrees of Master of Science in Environmental Science, and PhD in Environmental and Natural Resource Sciences (PhD offered jointly with Department of Natural Resource Sciences).

The Program is closely associated with the Environmental Research Center, the Laboratory for Atmospheric Research, the Water Research Center, the International Program Development Office and other University research units.

Course work and research collaboration with leading scholars on the ES/RP Graduate Faculties ensure that options and specializations continually shift emphasis to reflect current advances in environmental science and regional planning. Recent developments, for example, have included an emphasis on ecosystem management and geographic information systems. The opportunity to develop such emphases in response to new developments is a distinguishing feature of the Program.

The PhD degree in Environmental and Natural Resource Sciences, sponsored jointly by the Program in Environmental Science and Regional Planning and the Department of Natural Resource Sciences, emphasizes coursework and research relevant to understanding and managing environmental and natural resource science issues. General requirements for completing the PhD degree include advanced courses in the areas of ecosystems, statistics, modeling, issues and ethics, and the specialized subject area of the dissertation. A minimum of 72 credits, including an acceptable dissertation, is required. Prerequisites for admission include the general requirements of the Graduate School, ten semester credits in basic biological and/or physical sciences, and acceptance of the student by a faculty advisor. Deadlines for initial consideration for admission to the PhD degree program are February 15 for fall semester and October 15 for spring semester.

### **Environmental Science and Regional Planning**

502 Human Health and the Environment 3 Graduate-level counterpart of ES/RP 402; additional requirements. Credit not granted for both ES/RP 402 and 502.

503 Natural Resource Planning 3 Same as NATRS 503.

504 Ecosystem Management 3 Analysis of ecosystem processes; dual emphasis on ecological principles and development of methods and concepts to evaluate policies for management.

509 Applied Radiological Physics 3 (2-3) Prereq calculus course; Phys course; Rec ES/RP 406. Production, interactions and measurement of radiation, with application to radiological health protection concerns. Credit not granted for both ES/RP 409 and 509.

510 Applied Radiation Dosimetry 3 (2-3) Prereq ES/RP 409/509 or course in radiological physics. Determination of exposure and doses from external and internal sources of radiation, with applications to environmental, occupational and medical protection.

511 Legal Process 3 Rec ES/RP 444. Legal process in general and role of the judiciary in natural resource management. Cooperative course taught jointly by WSU and UI (Law 511).

513 Environmental Epidemiology 3 Prereq Stat 412; Rec Micro 420, Stat 422. Environmental epidemiologic methods to investigate environmental problems and familiarity with relevant scientific literature.

514 Environmental Biophysics 2 Graduate level counterpart of ES/RP 414; additional requirements. Physical environment of living organisms (temperature, humidity, radiation, wind); heat and mass exchange and balance in plant and animal systems. Credit not granted for both ES/RP 414 and 514. Cooperative course taught by WSU, open to UI students (Bot 532).

516 Radiation Biology 4 (3-3) Prereq introductory radiological physics, or one course each in biology, and radiological physics; Rec ES/RP 406. Effects of ionizing radiation at the molecular, cellular, organ and organism level. Credit not granted for both ES/RP 416 and 516.

517 Fate and Effects of Environmental Contaminants 3 Prereq graduate standing. Rec biochemistry, organic chemistry. Rationale perspective on the environmental behavior and biological, effects of contaminants.

519 International Development and Human Resources 3 Same as Anth 519.

524 Environmental Health Assessment 2 Prereq one course each in biology, calculus, chemistry, general ecology and physics. Rec ES/RP 406. Environmental transport, fate and effects of radioactive and hazardous materials. Credit not granted for both ES/RP 424 and 524.

526 Population Analysis 1 Same as NATRS 526. Credit not granted for both ES/RP 426 and 526.

527 Environmental Chemistry 2 Natural water chemistry, organic processes, kinetics, thermodynamics, modeling in lake, river and sea water. Graduate level counterpart of ES/RP 427; additional requirements. Credit not granted for both ES/RP 427 and 527.

528 Environmental Management Systems 3 (2-3) Introduction to EMS standards; procedures and requirements for EMS certification; creations and auditing of an EMS.

529 Population Theory 1 Development of the theory of population dynamics from Malthus to the

present. Graduate level counterpart of ES/RP 429; additional requirements. Credit not granted for both ES/RP 429 and 529.

530 Fundamentals of Industrial Safety 2 Prereq graduate standing or by interview only. Fundamentals for recognizing and controlling hazards and losses to protect the safety and health of workers.

531 Fundamentals of Environmental Toxicology 3 Prereq BC/BP 364, Chem 240, Zool 353.

Fundamentals of toxicology; environmental fate and biological deposition and effects of natural products, drugs, food chemicals, and pollutants.

532 Applied Environmental Toxicology 3 Prereq ES/RP 531 or P/T 505. Overview of the field of environmental toxicology; interactions of xenobiotics with natural systems.

534 Industrial Ecology: Theory and Practice 3 Complex relationships and interactions among industrial activities, the environment, and society and the need for a sustainable system.

535 Resolving Environmental Conflicts 4 (3-3) Same as R S 535. Graduate-level counterpart of ES/RP 435; additional requirements. Credit not granted for both ES/RP 435 and 535.

544 Environmental Assessment 4 Rec Bio S 372. Analysis of environmental impact statements and their legal framework; methods of environmental assessment and team development of an impact statement. Credit not granted for both Env S 444 and 544. Cooperative course taught by WSU, open to UI students (Geog 544).

545 Hazardous Waste Management 3 Graduate level counterpart of ES/RP 445. Environmental, technical, and political aspects of hazardous waste management; evaluative methods, risk assessment, and current management requirements. Credit not granted for both ES/RP 445 and 545. Cooperative course taught by WSU, open to UI students (EnvS 545).

548 Environmental Law 3 By interview only. Environmental planning and protection, regulation of air and water pollution, waste disposal, use of pesticides and other toxic chemicals, and remedies for environmental injury. Cooperative course taught by UI (Law 947), open to WSU students.

549 Public Land Law 3 History of public lands, special problems arising from ownership of land by government, legal issues incident various uses of public land including land sales, mineral extraction, livestock grazing, timber harvest, recreation, wildlife protection and preservation. Cooperative course taught by UI (Law 948), open to WSU students.

550 System Dynamics Models of Environmental Systems 3 Prereq graduate standing. Analysis of environmental system dynamics; development and use of simulation models using the Stella software on Macintosh. Cooperative course taught by WSU, open to UI students (EnvS 550).

551 Energy Production and the Environment 2 Prereq biology course; ecology course; Rec ES/RP 406. Evaluation of the impacts of nuclear and other forms of energy production on humans and the environment. Credit not granted for both ES/RP 451 and 551.

552 Environmental Microbiology 3 Same as Micro 552. Credit not granted for both ES/RP 452 and 552.

555 Environmental Planning 3 State, local and federal approaches to environmental planning and their interactions in private and public land use and development decisions. Cooperative course taught jointly by WSU and U of I (ENVS 555).

556 Insecticides: Toxicology and Mode of Action 1 Same as Entom 556.

557 Herbicides: Toxicology and Mode of Action 1 Same as Entom 557.

558 Pesticide Topics 1 Same as Entom 558.

565 Biogeochemistry and Global Change 4 (3-1) Survey of how life affects the chemistry of the surface of earth. Same as GEOL 565.

560 Watershed Management 3 Same as NATRS 560.

567 Advanced Applications in GIS 4 (1-6) Advanced applications in GIS will provide an opportunity to develop understanding of GIS concepts using ARC/INFO geographic information systems.

569 (565) Ecosystem Ecology and Global Change 3 Prereq Biol 372; Chem 106. Historic and current

factors controlling the function of ecosystems and their response to natural and human-caused global change. Credit not granted for both ES/RP 469 and 569.

571 Meteorology 3 Same as C E 571. Credit not granted for both ES/RP 471 and 571.

573 Engineering Risk Assessment for Hazardous Waste Evaluations 3 Graduate level counterpart of ES/RP 473; additional requirements. Quantitative and qualitative approaches to assessing risks to public health and environment from chemical contaminants; toxicology, exposure assessment, risk characterization and environmental modeling; critical reviews of specific toxins and actual waste site studies. Credit not granted for both ES/RP 473 and 573. Cooperative course taught by UI (ChE 580), open to WSU students.

575 Geographic Information Systems 3 Prereq ES/RP 385. Computerized management of data organized on regional geographic bases; preparation overlays, coding, and manipulation of data for regional planners and land managers. Cooperative course taught by UI (Geog 475), open to WSU students.

584 Engineering Aspects of Aquatic Biology 4 (3-3) Same as C E 584.

585 Aquatic System Restoration 3 (2-3) Same as C E 585.

586 Introduction to Geographic Information Systems 4 (2-6) Rec DOS knowledge. Geographic information systems technology. Graduate level counterpart of ES/RP 486; additional requirements. Credit not granted for both ES/RP 486 and 586.

590 Special Topics 2 May be repeated for credit; cumulative maximum 6 hours. Cooperative course taught by WSU, open to UI students (Geog 590).

591 Special Topics 2 May be repeated for credit; cumulative maximum 4 hours.

592 Special Topics V 1-4 May be repeated for credit; cumulative maximum 4 hours.

593 Seminar in Environmental Science and Regional Planning 1 May be repeated for credit; cumulative maximum 8 hours. Seminar with student, faculty and outside speakers

594 Environmental and Natural Resources Issues and Ethics 2 or 3 Same as NATRS 594

595 Graduate Internship V 2-5 By interview only. Practical work experience in appropriate agencies; for graduate career students. S, F grading.

597 Technical and Public Communications in Environmental Science 2 Prereq technical writing course; Rec public speaking course. Development of written and oral communication skills for practical application in the field of environmental science.

600 Special Projects or Independent Study Variable credit. S, F grading.

700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.

702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.

800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

## Department of Fine Arts

[www.wsu.edu/~finearts/](http://www.wsu.edu/~finearts/)

Degree offered: **Master of Fine Arts**

Faculty working with graduate students: **10**

Graduate students: **14**

Students receiving assistantships or scholarships: **90%**

Tests required: **TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

## **Admission Requirements**

Applicants should possess an undergraduate degree (B.A. or B.F.A.) in fine arts with 40 or more semester hours in art. In addition to the Graduate School application materials, the Department of Fine Arts requires:

A statement of intent indicating your area(s) of focus, the subject of your work, the concepts and issues you are exploring, and how you foresee your work evolving within the program.

A portfolio of no more than 15 images on CD/DVD. Digital files must be readable on Mac computers. Include a printed, hard copy inventory list of the works in your portfolio. It is preferable that images are sent in .JPG or .TIFF format and not in a presentation format such as Power point, etc. Time-based works must be limited to 10 minutes total. Since they will be viewed at 1024×768 resolution on a large projection screen, your formatted images should be as close as possible to that resolution while maintaining presentable image quality. Ensure that your name is clearly printed on the disk and the sleeve or case. Please avoid adhesive disc labels. If you would like your disks returned, please include a prepaid return mailer. CDs will be considered disposable unless otherwise indicated.

An inventory list with the title, medium, size and approximate date of completion for each work included in the CD/DVD portfolio.

Those applying for a Teaching Assistantship must furnish three letters of recommendation to the Graduate School indicating in which areas they are qualified to assist and teach.

## **Program Description**

The department offers an interdisciplinary program where students may focus in, but are not limited to, ceramics, drawing, digital media, painting, photography, printmaking, and sculpture. Emphasis is placed on personal and conceptual artistic development in light of contemporary art practices. Graduates meet with faculty for one-on-one studio discussions. First year students have an exhibition in the departmental gallery and the second year program culminates in a thesis exhibition held in the Museum of Art. A final oral examination is also required.

## **Contact Information**

Department of Fine Arts  
Washington State University  
PO Box 647450  
Pullman, WA 99164-7450  
Telephone: 509-335-8686  
Fax: 509-335-7742  
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## **Graduate Opportunities**

University and community college faculty, gallery director, museum curator, public commissions, residencies, professional artist, exhibitions, collaborative printmaking and publishing, cooperative arts studio manager or director.

### **Positions Held by Recent Graduates**

Director of Center for Plateau Cultural Studies, Northwest Museum of Arts and Culture; archivist/librarian of art, Loyola University; assistant director of education, San Francisco Museum of Art; Assistant professor/Renshaw Gallery director, Linfield College; Assistant professor, West Virginia Wesleyan College; Assistant professor of art, University of Montana; Assistant professor, Johnson C. Smith University; recruiter for the Art Institute of Chicago.

### **Faculty Interests**

#### **Ann Christenson**

Professor: Ceramics  
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#### **Maria DePrano**

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Graduate Coordinator  
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#### **Michelle Forsyth**

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Graduate Coordinator  
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#### **Douglas Gast**

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**Harrison Higgs**

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**Carol Ivory**

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**Nickolus Meisel**

Assistant Professor: Sculpture, Installation  
Undergraduate Coordinator  
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**Io Palmer**

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**Gene Rosa**

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**Reza Safavi**

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**Chris Watts**

Interim Department Chair  
Professor: Painting and Drawing  
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**Adjunct Faculty****Mark Anderson**

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**Tamara Helm**

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**Rick Hines**

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**David Huyck**

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**Casey Shiprek**

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**Heather Losey McGeachy**

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Tobias Walther  
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[www.tobiaswalther.com](http://www.tobiaswalther.com)  
Office: 7073

## **Emeritus Faculty**

### **Ross Coates**

Drawing, Sculpture  
E: r@rosscoates.info

### **Jack Dollhausen**

Professor: Sculpture  
Francis Ho  
Photography  
E: franho@mail.wsu.edu

### **Patrick Siler**

Drawing  
E: Siler.Patrick@gmail.com

## **Art History**

500 Graduate Art History 2 May be repeated for credit; cumulative maximum 6 hours. Prereq 9 hrs undergraduate art history.

## **Drawing F A**

- 510 Graduate Drawing 3 (0-6) May be repeated for credit; cumulative maximum 9 hours.
- 511 Graduate Drawing 3 (0-6) May be repeated for credit; cumulative maximum 9 hours.
- 512 Graduate Drawing 3 (0-6) May be repeated for credit; cumulative maximum 9 hours

## **Painting F A**

- 520 Graduate Painting 3(0-6) May be repeated for credit; cumulative maximum 9 hours.
- 521 Graduate Painting 3 (0-6) May be repeated for credit; cumulative maximum 9 hours.
- 522 Graduate Painting 3 (0-6) May be repeated for credit; cumulative maximum 9 hours.

## **Electronic Imaging F A**

- 530 Graduate Digital Media 3 (0-6) May be repeated for credit; cumulative maximum 9 hours.
- 531 Graduate Digital Media 3 (0-6) May be repeated for credit; cumulative maximum 9 hours.
- 532 Graduate Digital Media 3 (0-6) May be repeated for credit; cumulative maximum 9 hours.

## **Ceramics F A**

- 540 Graduate Ceramics 3 (0-6) May be repeated for credit; cumulative maximum 9 hours.
- 541 Graduate Ceramics 3 (0-6) May be repeated for credit; cumulative maximum 9 hours.
- 542 Graduate Ceramics 3 (0-6) May be repeated for credit; cumulative maximum 9 hours.

## **Sculpture F A**

- 550 Graduate Sculpture 3 (0-6) May be repeated for credit; cumulative maximum 9 hours.
- 551 Graduate Sculpture 3(0-6) May be repeated for credit; cumulative maximum 9 hours.
- 552 Graduate Sculpture 3(0-6) May be repeated for credit; cumulative maximum 9 hours.

## **Printmaking F A**

- 570 Graduate Printmaking 3 (0-6) May be repeated for credit; cumulative maximum 9 hours.
- 571 Graduate Printmaking 3 (0-6) May be repeated for credit; cumulative maximum 9 hours.
- 572 Graduate Printmaking 3 (0-6) May be repeated for credit; cumulative maximum 9 hours.

## **Photography F A**

- 580 Graduate Photography 3 (0-6) May be repeated for credit; cumulative maximum 9 hours.

- 581 Graduate Photography 3 (0-6) May be repeated for credit; cumulative maximum 9 hours.  
582 Graduate Photography 3 (0-6) May be repeated for credit; cumulative maximum 9 hours.

### **Special Topics, Seminars and Thesis F A**

- 598 Graduate Seminar 2 May be repeated for credit; cumulative maximum 6 hours. Topics in contemporary issues theory and criticism.  
600 Special Projects or Independent Study Variable credit. S, F grading.  
700 Master's Research, Thesis and/or Examination Variable credit. S, F grading.

## **Department of Food Science and Human Nutrition**

<http://fshn.wsu.edu>

Degrees offered: **M.S., Ph.D.**

Faculty working with graduate students: **22**

Graduate students: **33**

Campuses: **Pullman**

Graduate students receiving assistantships or scholarships: **95%**

Tests required: **GRE; TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

### **Admission Requirements**

Apply to the Graduate School, and submit all official transcripts, letter of interest, resume, GRE and TOEFL scores (minimum 213-computer test and 80-Internet test), and the names of three references. Applications that meet the minimum requirements and are complete by the deadline will be reviewed. Teaching or research assistantships may be available on a competitive basis.

A PhD requires a MS degree that demonstrates the ability to conduct and report research. Exceptional students may by-pass the MS degree.

### **Program Description**

Washington State University and University of Idaho merged faculty and programs to become the School of Food Science. This is the first program in the nation to share teaching, research, extension programs, faculty and resources between two states and two universities.

Food Science is a multidisciplinary science that applies biology, chemistry, physics, engineering, nutrition, and other sciences to improve the safety and quality of food products; develop new food products; and design new, safer, and more energy efficient food preservation methods.

Curriculum emphasizes courses in food processing, food chemistry, food microbiology, sensory evaluation, and other specialized areas such as the processing and manufacturing of cereal, dairy, fruit, and vegetable products, as well as cheeses and wines.

Students gain practical processing and leadership skills at the WSU Food Science research facilities housed in a modern complex that includes: research level chemistry, microbiology, and engineering laboratories; the WSU Creamery where on-going research on ice cream and cheese occurs, including the world renowned 'Cougar Gold' cheese; a contemporary sensory evaluation facility where aroma, flavor and taste panels are conducted, and a processing pilot plant where small-scale equipment allows for applied research. Off campus facilities include the Irrigated Agriculture Research and

Extension Center in Prosser, WA. Fruit and vegetable processing research are located at this center, in the heart of Washington's expanding wine and food processing industries.

Food science graduates begin careers in food quality assurance, food safety microbiology, technical sales, production management, product extension or development, regulatory affairs, or research in the food/allied industries or federal/state regulatory agencies.

### **Contact information**

Jodi Anderson  
Academic Coordinator  
School of Food Science  
Washington State University  
FSHN #106  
PO Box 646376  
Pullman, WA 99164-6376  
Phone: 509-335-4763  
Fax: 509-335-4815  
Email: [janderson@wsu.edu](mailto:janderson@wsu.edu)

### **Graduate Opportunities**

Food product development, food processing, quality assurance, sensory evaluation, marketing, and creative/technical writing.

### **Positions Held by Recent Graduates**

Production supervisor, research and development specialist, technical sales manager. University faculty, postdoctoral research associates, director of research, development, and technical support for large companies.

### **Faculty Interests**

**Charles G. Edwards:** Microbiology and chemistry of wines. Malolactic fermentation of wine, the influence of cellar practices on fermentation microbiology and wine quality, and the relationship between the use of different strains of microorganisms and production of volatile compounds important for sensory characteristics. [edwards@wsu.edu](mailto:edwards@wsu.edu)

**James F. Harbertson,** WSU Prosser Irrigated Agriculture Research and Extension Center: Wine chemistry. Phenolic compounds found in grapes and wine and their biochemical and chemical changes during grape ripening, winemaking, and aging; understanding the variability of tannin found in red wine cultivars and the ultimate relationship between tannin, polymeric pigments, and astringency; work with wineries to solve simple and difficult problems.  
[jfharbertson@wsu.edu](mailto:jfharbertson@wsu.edu)

**Dong-Hyun Kang:** Food safety, particularly the recovery of injured microorganisms, control of food-borne pathogens, and the application of HACCP plans; developing new methods and media to be used in the industry to detect and monitor food-borne pathogens or spoilage microorganisms in food products. [dhkang@wsu.edu](mailto:dhkang@wsu.edu)

**Joseph R. Powers:** Enzymes and proteins of food products, primarily fruits and vegetables; enzymes responsible for off-flavor development in frozen vegetables; the enzymology of polysaccharide synthesis in plants, specifically starch in potatoes and cell wall components in fruits and vegetables.  
[powersjr@wsu.edu](mailto:powersjr@wsu.edu)

**Barbara A. Rasco:** Process and product development in fisheries technology and aquaculture, including studies on the chemical and nutritional properties of food; development of spectroscopic analytical and biomarker methods for process control and microbial detection in foods; food safety and food security, including products liability, environmental issues, and regulatory reform.  
*rasco@wsu.edu*

**Carolyn Ross:** Sensory evaluation of foods and wine. Sensory analysis combined with analytical chemistry techniques to identify and describe changes in flavor and odor profiles; evaluation of aroma and flavor compounds and precursors in grapes and wine, and the changes in these compounds due to viticultural and enological practices; changes in sensory profiles of foods as a result of advanced processing techniques; the interaction of flavors and aromas with packaging material. *cfross@wsu.edu*

**Barry G. Swanson:** Legume protein digestibility and storage quality; synthesis of sucrose fatty acid polyester fat substitutes and alternative fat replacers; methods to improve the quality of reduced-fat cheeses; fundamental research on microbial inactivation and quality of foods treated with high intensity pulsed electric fields and ultra high hydrostatic pressures; the implementation of ultra high pressures to improve cheese yield, attenuate adjunct cultures to accelerate aging and improve the flavor of Cheddar cheeses, and improve the hydrophobic functional properties of whey proteins.  
*swansonb@wsu.edu*

**Byung-Kee Baik, Ph.D.**  
Associate Professor; Scientist  
*bbaik@wsu.edu*  
509.335.8230

**Boon Chew, Ph.D.**  
Professor; Scientist  
*boonchew@wsu.edu*  
509.335.1427

**Richard H. Dougherty, Ph.D**  
Professor; Extension Food Science Specialist  
*dougherty@wsu.edu*  
509.335.0972

**Thomas Henick-Kling**  
Professor of Enology;  
Director of Viticulture & Enology  
*thk@wsu.edu*  
509.372.7292

**Karen Killinger, Ph.D.**  
Assistant Professor  
*karen\_killinger@wsu.edu*  
509.335.2970

**Kerry Ringer, Ph.D.**  
Assistant Professor, Prosser, WA  
*kringer@wsu.edu*  
509.786.9324

### Emeritus Faculty

Lloyd Luedecke, Ph.D.

Faculty Advisor to WSU Creamery

luedecke@pullman.com

509.595.7658

Alan McCurdy, Ph.D.

Professor

mccurdy@wsu.edu

509.335.4289

### Food Science and Human Nutrition

FS 501 Topics in Food Science WSU (arrange) varies (1-3) Sum/Fall/Spr

May be repeated for credit; cumulative maximum 6 hours. Selected topics in Food Science.

FS 506 Evaluation of Dairy Products I WSU TBA 1 spr

1 Graduate-level counterpart of FSHN 406; additional requirements. Credit not granted for both FS 406 and 506. Cooperative course taught jointly by WSU and UI.

FS 507 Evaluation of Dairy Products II WSU TBA 1 (0-3) Fall

Graduate-level counterpart of FS 407; additional requirements. Credit not granted for both FS 407 and 507. Cooperative course taught jointly by WSU and UI.

FS 510 Functional Foods and Health WSU B. Chew 3 Spr (a/y)

Prereq MBioS 303 and one year of biology. Benefits of foods beyond basic nutrition; bioactive compounds in functional foods and nutraceuticals relating to disease prevention and health promotion.

FS 511 Food Lipids WSU B. Swanson 3 Spr (a/y)

Rec biochemistry, food chemistry. Occurrence, structure, chemical and physical properties; functions of lipids in foods. Cooperative course taught jointly by WSU and UI.

FS 512 Food Proteins & Enzymes WSU J. Powers 2 Fall

Prereq biochemistry, food chemistry. Chemistry/biochemistry of proteins/enzymes applied to food research and industry; protein functionality/enzyme technology application to food industry. Cooperative course taught jointly by WSU and UI.

FS 513 Food Carbohydrates UI K. Huber 3 Spr (a/y)

Structure function relationships of polysaccharides within food systems as a function of their respective molecular structures and physical characteristics.

Cooperative course taught jointly by WSU and UI.

FS 516 Food Laws WSU B. Rasco 2 Fall (a/y)

Prereq senior or graduate standing. Government statues/regulations that contribute to safe, nutritious and wholesome food supply; US legal system relevant to regulation of manufacture and sale of food and supplements. Cooperative course taught jointly by WSU and UI.

FS 517 Seminar Written various 2 Fall

May be repeated for credit. May be repeated for credit. Planning, writing, reporting, reviewing and evaluating current food-related research.

FS 518 Seminar Oral various 1 Fall/Spr

May be repeated for credit. Development of skills and communication tools and techniques for oral presentations of current food science research.

FS 522 Sensory Evaluation of

Food and Wine WSU C. Ross 43 spr

Prereq Stat 212. Graduate-level counterpart of FS 422; additional requirements. Credit not granted for

both FS 422 and 522. Cooperative course taught jointly by WSU and UI.

FS 529 Dairy Products WSU TBA 3 Fall

Prereq MBioS 101 or 301; Chem 345; MBioS 303. Graduate-level counterpart of FS 429; additional requirements. Credit not granted for both FS 429 and 529. Cooperative course taught jointly by WSU and UI.

FS 530 Dairy Products Lab WSU TBA 1 (1-3) Fall

Prereq c// FS 529. Graduate-level counterpart of FS 430; additional requirements. Credit not granted for both FS 430 and 530. Cooperative course taught jointly by WSU and UI.

FS 564 Food Toxicology UI G. Moller 3 Fall

Prereq MBioS 303. Graduate-level counterpart of FS 464; additional requirements. Credit not granted for both FS 464 and 564. Cooperative course taught jointly by WSU and UI.

FS 565 Wine Microbiology and Processing WSU C. Edwards 3 fall

Prereq graduate standing. Graduate-level counterpart of FS 465; additional requirements. Credit not granted for both FS 465 and 565. Cooperative course taught jointly by WSU and UI.

FS 570 Advanced Food Technology WSU B. Rasco 3 spr

Prereq FS 416, 433 or c//. Graduate-level counterpart of FS 470; additional requirements. Credit not granted for both FS 470 and 570. Cooperative course taught jointly by WSU and UI.

FS 583 Advances in Cereal Science

and Technology WSU B. Baik 2 Fall (a/y)

Prereq food chemistry, biochemistry or organic chemistry. Chemistry and functionality of cereal grains as related to their processing and product quality. Cooperative course taught jointly by WSU and UI.

FS 700 MS Research Thesis / Exam WSU (arrange) varies Fall/Spr/Sum

May be repeated for credit S, F grading.

FS 800 Doctoral Research, Dissertation, Exam WSU (arrange) varies

all/Spr/Sum May be repeated for credit S, F grading. 500 Topics in Food Science 1 May be repeated for credit; cumulative maximum 6 hours. Cooperative course taught jointly by WSU and UI (FST 504).

501 Topics in Food Science and Human Nutrition V 1-3 May be repeated for credit; cumulative maximum 6 hours. Graduate-level counterpart of FSHN 401; additional requirements. Credit not granted for both FSHN 401 and 501.

502 Topics in Food Science 1 May be repeated for credit; cumulative maximum 6 hours. Cooperative course taught jointly by WSU and UI (FST 504).

503 Topics in Food Science 1 May be repeated for credit; cumulative maximum 6 hours. Cooperative course taught jointly by WSU and UI (FST 504).

504 Advanced Human Nutrition 4 Prereq graduate standing. Scientific basis of human nutrient requirements, dietary allowances and assessment techniques. Cooperative course taught by WSU, open to UI students (FCS 514).

505 Eating Disorders 2 Prereq by permission only. Web-based class that examines anorexia nervosa, bulimia nervosa, compulsive eating, obesity, and weight preoccupation; cultural and nutritional factors, family issues, and psychological consequences; preventative and therapeutic interventions. Cooperative course taught by UI (FCS 504), open to WSU students.

506 Evaluation of Dairy Products I 1 Graduate-level counterpart of FSHN 406; additional requirements. Cooperative course taught by WSU, open to UI students (FST 506). Credit not granted for both FSHN 406 and 506. Cooperative course taught by WSU, open to UI students (FST 506).

507 Evaluation of Dairy Products II 1 (0-3) Graduate-level counterpart of FSHN 407; additional requirements. Credit not granted for both FSHN 407 and 507. Cooperative course taught by WSU, open to UI students (FST 507).

508 Seminar—Written 2 May be repeated for credit. Planning, writing, reporting, reviewing and evaluating current food related research.

509 Seminar—Oral 1 May be repeated for credit. Development of skills and communication tools and techniques for oral presentations of current food science and human nutrition research.

510 Advanced Food Chemistry 3 Rec biochemistry, food chemistry. Chemical, physical, and toxicological properties of water, vitamins, pigments, synthetic colors, minerals, miscellaneous food additives, and natural toxicants. Cooperative course taught by WSU, open to UI students (FST 510).

511 Food Carbohydrates, and Lipids 3 Rec biochemistry, food chemistry. Occurrence structure, chemical and physical properties, and functions of carbohydrates and lipids, in foods. Cooperative course taught by WSU, open to UI students (FST 512).

512 Food Proteins and Enzymes 2 Rec biochemistry, food chemistry (FSHN 460). Chemistry/biochemistry of proteins/enzymes applied to food research and industry; protein functionality/enzyme technology application to industry. Cooperative course taught by WSU, open to UI students (FST 513).

513 Mineral and Vitamin Metabolism 4 Same as A S 513.

520 Research Methods in Human Nutrition 3 Prereq FSHN 130 or 233; Rec FSHN 426 or 436; statistics course. The application of behavioral theories and qualitative/quantitative methods of data collection to behavioral nutrition research. Cooperative course taught by WSU, open to UI students (FCS 520).

521 Research Techniques in Human Nutrition 3 (1-6) Rec 6 hrs upper-division nutrition. Methods of conducting field, applied and metabolic studies in human nutrition.

526 Advanced Community Nutrition 3 Prereq 300-400 level nutrition course; by interview only. Components of community nutrition programs-needs assessment, planning, intervention, evaluation; application of concepts to case studies. Cooperative course taught by WSU, open to UI students (FCS 526).

530 Prenatal, Infant and Child Nutrition 2 Prereq graduate standing. Nutrition of the mother and fetus during pregnancy and of the child from infancy through childhood.

531 Advanced Lifecycle Nutrition 2 Rec 300-400-level lifecycle nutrition course; c// FSHN 436. Critically evaluate published literature concerning nutritional considerations during periods of growth, development, pregnancy, lactation, and aging.

533 Pathophysiology of Human Nutrition 3 Prereq BC/BP 364; FSHN 435. Protein, fat, carbohydrate and other nutrient pathophysiology in the development and treatment of major human diseases.

538 Readings in Foods and Nutrition 2 Prereq FSHN 480 or c//. Reports, discussions and reviews of recent scientific literature and development in foods and food systems management. Credit not granted for both FSHN 438 and 538.

540 Advanced Clinical Practice 3 (0-9) Prereq FSHN 435, 437; instructor's permission. Application of diet therapy principles to development of nutrition interventions and care plans in a clinical practice setting.

561 Sports Nutrition 3 By interview only. Macronutrient and selected micronutrient utilization during exercise and restoration after feeding, dietary surveys of athletes, dietary ergogenic aids and discussion of the origins of dietary recommendations for athletes. Cooperative course taught by UI (FCS 561), open to WSU students.

570 Advanced Food Technology 3 Prereq FS 416,433 or c//. Physical principles of food preservation and recent advances in food technology. Credit not granted for both FSHN 470 and 570. Cooperative course taught by WSU, open to UI students (FST 570).

575 Supervised Practice V 2-18 May be repeated for credit; cumulative maximum 18 hours. Rec by interview only. Professional supervised experience in administrative, clinical, and community dietetics; meets American Dietetic Association requirements for registration eligibility. S, F grading.

582 Food Process Engineering Design 3 Same as BSysE 582.

583 Advances in Cereal Science and Technology 2 Prereq FSHN 460. Chemistry and functionality of cereal grains as related to their processing and product quality. Cooperative course taught by WSU,



open to UI students (FST 583).

600 Special Projects or Independent Study Variable credit. S, F grading.

700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.

800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

## **Foreign Languages and Cultures**

[www.forlang.wsu.edu](http://www.forlang.wsu.edu)

Degree offered: **M.A.**

Faculty working with graduate students: **7**

Graduate students: **12**

Students receiving assistantships and scholarships: **100%**

Tests required: **TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

### **Admission Requirements**

Applicants should have majors in related areas, such as literature, linguistics, and pedagogy, but applicants from other humanities and social sciences disciplines will be considered. Submit the following materials to the Graduate School:

an electronic application for admission to the Graduate School with a list of three references for letters of recommendation;

three current letters of recommendation;

original transcripts sent directly from ALL institutions that you have indicated on your application form, including an official English translation; a TOEFL Exam Score (required only if English is not your native language);

two writing samples, one in English and one in Spanish. They may be copies of a term paper or a narrative on any topic, and should be at least two pages in length

### **Submit the following materials to the department:**

letter of application stating qualifications and personal goals;

brief (3-5 min.) tape recordings of two informal dialogues between yourself and a native speaker, one in Spanish and one in English.

### **Program Description**

The program has an emphasis in Spanish. Students have the option of pursuing a thesis or a non-thesis program. We offer Spanish and Spanish American literature courses, from the Middle Ages up to the latest in contemporary production, as well as seminars on literary criticism, research methodology, foreign language pedagogy, teaching with technology, and applied linguistics.

Most of our students receive financial assistance for their first year of study in the form of a teaching assistantship that provides for full tuition waiver and a bi-monthly stipend. This assistantship can be

extended for a second year based on satisfactory academic and teaching performance. Admittance into the program does not necessarily mean the student has or will be awarded an assistantship.

The program is designed to allow students to complete their M.A. in two years. We encourage student participation in professional and scholarly activities beyond the program. Travel grants, scholarships, and internships are available for selected students.

### **Contact Information**

Ana M. Rodríguez-Vivaldi, Ph.D.  
Foreign Languages and Cultures  
PO Box 642610  
Pullman, WA 99164-2610  
Telephone: 509-335-6173  
Fax: 509-335-3708  
E-mail: amrodriguez@wsu.edu

### **Graduate Opportunities**

Our alumni have gone on to pursue doctoral degrees in several prestigious universities, including Yale, Stanford, UC Berkeley, and Johns Hopkins, or pursue careers in secondary and higher education/administration, academic publishing, international marketing, state-level social services, and various federal government units.

### **Positions Held by Recent Graduates**

Chair of the department at Ashland University  
Chair of the department at Bowling Green University  
Foreign languages department lead at Columbia Basin College  
Senior Spanish teacher, Moscow High School  
High school equivalency program instructor  
International programs coordinator  
Immigration officer  
Stockbroker in Europe

### **Faculty Interests**

**Bond, Robin** Honors 130 5-4505 rsbond@wsu.edu Greek  
**Bonzo, Joshua** Thomp124G 5-6649 jbonzo@wsu.edu German  
**Borges, Olga** VMMC 202P 6-9488 oborges@vancouver.wsu.edu Spanish  
**Brecher, William Puck** Thomp 101G 5-6628 wbrecher@wsu.edu Japanese  
**Cao, Weiguo** Thomp 101E 5-6626 weiguoc@wsu.edu Chinese  
**Davis, Sabine** Thomp 124E 5-2751 davisj@wsu.edu French

### **Foreign Language**

540 (Methods of Teaching Foreign Languages 3 Prereq two years foreign language. Survey of current methodology with emphasis on practical application in the classroom. Credit not granted for both For L 440 and 540.

541 Research Methods of Technology Enhanced Foreign Language Learning 3 Research and methods of the use of technology and computers to enhance foreign language instructions and second language acquisition. Credit not granted for both For L 441 and 541.

542 Research and Methods of Teaching Foreign Culture 3 Current research and theory-based methods for teaching culture in the foreign language classroom.

560 (597) Seminar in Scholarly Methodology 2 Bibliography and formal aspects of scholarly writing; general introduction to literary criticism.

600 Special Projects or Independent Study Variable credit. S, F grading.

### **Spanish**

550 (520) Medieval Literature 3 Prereq graduate standing or permission of instructor. Selected works. Taught in Spanish.

551 (522) Seminar in Golden Age Literature 3 Prereq graduate standing or permission of instructor. Reading and discussion of representative works of the Spanish Golden Age. Taught in Spanish.

552 (524) Topics in Nineteenth-Century Spanish Literature 3 May be repeated for credit; cumulative maximum 6 hours. Prereq graduate standing or permission of instructor. Selected works and topics. Taught in Spanish.

553 (525) Topics in Twentieth-Century Spanish Literature 3 May be repeated for credit; cumulative maximum 6 hours Prereq graduate standing or permission of instructor. Selected works and topics. Taught in Spanish.

554 (527) Seminar in Spanish Literature and/or Culture V 1-3 May be repeated for credit.

555 (533) Seminar in Colonial Spanish American Literature 3 May be repeated for credit; cumulative maximum 6 hours. Prereq graduate standing. Seminar on conquest and colonial literature in Hispanic America.

556 (534) Seminar in Nineteenth-Century Spanish American Literature 3 May be repeated for credit; cumulative maximum 6 hours. Prereq graduate standing. Study of nineteenth-century Spanish American Literature.

557 (535) Seminar in Twentieth-Century Spanish American Literature 3 May be repeated for credit; cumulative maximum 6 hours. Prereq graduate standing. Study of twentieth-century Spanish American literature and culture.

558 (536) Seminar in Spanish American Literature and/or Culture V 1-3 May be repeated for credit; cumulative maximum 6 hours. Graduate standing or permission of instructor.

559 (547) Special Topics in Hispanic Studies/ or Linguistics V 1-3 May be repeated for credit; cumulative maximum 6 hours. Prereq graduate standing. Special interdisciplinary topics in Hispanic studies and/or Linguistics.

560 (540) Beginning Instructional Practicum 2 Prereq graduate standing. An introduction to foreign language instruction for beginning teaching assistants

561 (542) Advanced Instructional Practicum 1 May be repeated for credit; cumulative maximum 4 hours. Supervised practical experience in foreign language teaching. S, F grading.

597 Graduate Internship V 1-6 Prereq graduate standing; Span 560; For L 540; minimum GPA of 3.50; one semester of language teaching experience. Supervised internship experience relating to career objectives; portfolio assignment required.

600 Special Projects or Independent Study Variable credit. S, F grading.

702 Master's Special Problems, Directed Study and/or Examination Variable credit. S, F grading.

### **Forestry and Range Management**

(See Natural Resource Sciences)

### **Genetics and Cell Biology**

(See Molecular Biosciences)

## Department of Geology

[www.wsu.edu/~geology](http://www.wsu.edu/~geology)

Degrees offered: **M.S., Ph.D.**

Faculty working with graduate students: **9**

Graduate students: **27**

Graduate students receiving assistantships or scholarships: **98%**

Tests required: **GRE; TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

### Admission Requirements

Undergraduates considering graduate study in geology should have a strong background in math, physics, and chemistry. To apply to the geology graduate program in the School of Earth and Environmental Sciences, submit a letter of application stating qualification, personal goals, and objectives of graduate study; official GRE scores; official copies of college transcripts; and three letters of recommendation from academic advisors and/or faculty you have taken classes from. International students must also provide a minimum TOEFL score of 560.

### Program Description

Geology is the study of the earth, its materials, and the ongoing processes that shape its surface and interior. Our Geology graduate program within the School of Earth and Environmental Sciences offers M.S. and Ph.D. degrees with specialization in disciplines in Earth surface processes (sedimentation, hydrology), the solid Earth (tectonics, volcanology), geochemistry and geophysics.

Within the School, strong synergies exist with degree programs in Environmental Science in the area of Earth surface processes. Our internationally-known analytical laboratory facilities are extensive and modern, and are available to graduate students for their research. The School cooperates with the Department of Geological Sciences at the nearby University of Idaho in providing graduate instruction and research collaboration.

### Graduate Opportunities

Geology is the study of the earth, its materials, and the ongoing processes that shape its surface and interior. Our Geology graduate program within the School of Earth and Environmental Sciences offers M.S. and Ph.D. degrees with specialization in disciplines in Earth surface processes (sedimentation, hydrology), the solid Earth (tectonics, volcanology), geochemistry and geophysics.

Within the School, strong synergies exist with degree programs in Environmental Science in the area of Earth surface processes. Our internationally-known analytical laboratory facilities are extensive and modern, and are available to graduate students for their research. The School cooperates with the Department of Geological Sciences at the nearby University of Idaho in providing graduate instruction and research collaboration.

### Contact Information

School of Earth and Environmental Sciences  
Webster Physical Science Bldg. #1228

PO Box 642812  
Washington State University  
Pullman, WA 99164-2812  
Telephone: 509-335-3009  
Fax: 509-335-7816  
E-mail: sees@wsu.edu

### Faculty Interests

**Franklin F. Foit, Jr.:** Mineralogy, crystallography. Currently focused in two areas: 1) tephra chemistry, distribution, and stratigraphy in the Pacific Northwest; and 2) crystal chemistry.  
*foit@mail.wsu.edu*

**David R. Gaylord:** Sedimentary petrology. Research concentrated in three areas: 1) Quaternary sedimentology and paleoclimatic studies in the western interior of the U.S.; 2) modern and ancient sedimentary volcanic research near Mount St. Helens, northern Washington, southern British Columbia, Taranaki, New Zealand, and Vanuatu; and 3) hazardous waste-related sedimentology and stratigraphy research at and near the Hanford Site, Washington and Borden Site, Canada.  
*gaylordd@wsu.edu*

**Peter R. Hooper,** Professor Emeritus: Igneous petrology. *prhooper@mail.wsu.edu*

**C. Kent Keller:** Hydrogeology. Understanding the relationships between physical processes and biogeochemical environments in vadose (unsaturated) zones. *ckkeller@wsu.edu*

**Peter B. Larson,** Chair: Stable isotopes, economic geology. Investigation of the processes of water/rock interaction in hydrothermal environments, and the sources of continental granites and ocean island magmas. *plarson@wsu.edu*

**Michael C. Pope:** Sedimentology, stratigraphy. Carbonate sequence stratigraphy and the record of carbonate deformation fabrics in meteorite or cryptoexplosive structures.  
*mcpope@wsu.edu*

**Phillip E. Rosenberg,** Professor Emeritus: HT geochemistry. *rosenberg@wsu.edu*

**Dirk Schulze-Makuch:** Eco-hydrogeology. A broad interdisciplinary approach, with research areas including the transport of pathogens and microbes in the subsurface, the use of reactive barriers to protect drinking water wells microbial interactions with the natural environment, and the suitability of planetary environments to microbial colonization. *driksm@wsu.edu*

**Jeffrey D. Vervoort:** Isotope geochemistry. Radiogenic isotope geochemistry with a concentration in two categories: using natural isotopic variations of elements such as Hf, Nd, Sr, and Pb to understand the origin and chemical evolution of the earth; and using radiogenic isotopes to determine the ages of rocks and geological events. *vervoort@wsu.edu*

**A. John Watkinson:** Structural geology. The mechanics of the physical process of how rocks fold and fracture, and how mountain belts evolve. *watkinso@mail.wsu.edu*

**Gary D. Webster,** Professor Emeritus: Paleontology. *webster@wsu.edu*

**John A. Wolff,** Graduate Coordinator: Igneous petrology. The behavior of magma in and on the Earth's crust, as deduced from physical and chemical analysis of volcanic rocks and minerals.  
*jawolff@mail.wsu.edu*

### Sedimentology-Stratigraphy Requirements

Graduate study in sedimentology and stratigraphy requires a fundamental knowledge of the principles of each of these areas. For the graduate program, the student will select a research project in one of,

or any combination of, the general areas of sedimentology or stratigraphy for the thesis or dissertation topic.

Geology M.S. candidates are required to include 521, 523, 525 and one additional core course within their program.

Geology Ph.D. candidates are required to include four of the five core courses within their program.

Geol 511	(3)	Advanced Topics in Paleontology
Geol 520	(3)	Advanced Topics in Sedimentary Rocks
Geol 521	(3)	Clastic Depositional Systems
Geol 523	(3)	Advanced Topics in Stratigraphy
Geol 525	(3)	Carbonate Depositional Systems

Additional Courses:

Geol 428	(3)	Geostatistics
Geol 508	(3)	Advanced Field Methods
Geol 515	(3)	Paleoecology
Geol 528	(3)	Petrology of Carbonate Rocks
Geol 529	(3)	Geologic Development of North America
Geol 540	(3)	Tectonics
Geol 541	(3)	Structural Analysis
Geol 552	(3)	X-ray Analysis in Geology
Geol 571	(3)	Geochemistry of Hydrothermal Ore Deposits
Geol 577	(3)	Advanced Groundwater Hydraulics
Geol 591	(3)	Remote Sensing and Geologic Applications

Structural Geology-Tectonics Requirements

Because structural geology and tectonics are frequently related to most other branches of geology, the additional courses in your program will be selected according to your interests.

Structural Geology-Tectonics program is a COOPERATIVE program with Department of Geological Sciences at University of Idaho.

Required Courses, M.S. and Ph.D:

Geol 540	(3)	Tectonics
Geol 541	(3)	Structural Analysis
Geol 559	(3)	Geodynamics
Geol 592	(V)	Advanced Topics in Structural Geology

Additional Courses:

Further mathematics, statistics, GIS, computer courses are strongly recommended as electives. Other courses strongly recommended in the Structural Geology-Tectonics area include:

Geol 542	(3)	Geomechanics
Geol 546	(3)	Fault Mechanics
Geol 444	(3)	Seismic Hazards

Finally, the student can tie in with the other programs within the department, such as economic geology, hydrogeology, igneous petrology, volcanology, and more to create a joint program.

### **Mineralogy-Petrology-Geochemistry**

#### **Requirements**

Students pursuing an advanced degree with specialization in the Mineralogy-Petrology-Geochemistry program should have completed an undergraduate program comparable to that of Washington State

University. The Ph.D program will include at least 18 hours of core courses; the M.S. program at least 9 hours of core courses. The remainder of the program will consist of courses selected from the list below and/or departmental or interdepartmental graduate-credit courses. Individual programs will be designed to provide the background and proficiency appropriate to the area of specialization and degree sought.

Core Courses, M.S.:

- Geol 550 (3) Advanced Mineralogy
- Geol 560 (3) Advanced Igneous Petrology
- Geol 582 (3) Petrologic Phase Equilibria (Additional chemistry may be required.)

Core Courses, Ph.D.: Geol 552 (3) X-ray Analysis in Geology

- Geol 563 (3) Igneous Petrogenesis
- Geol 584 (3) Principles of Isotope Geochemistry

Additional Recommended Courses:

- Geol 362 (2) Metamorphic Petrology
- Geol 470 (4) Introduction to Economic Geology
- Geol 480 (3) Introductory Geochemistry
- Geol 540 (3) Tectonics
- Geol 551 (3) Ore Microscopy and Fluid Inclusion Analysis
- Geol 552 (3) X-ray Analysis in Geology
- Geol 554 (3) Physical Petrology (UI)
- Geol 561 (3) Advanced Mineral Deposits (UI)
- Geol 563 (3) Igneous Petrogenesis
- Geol 567 (3) Volcanology
- Geol 571 (3) Geochemistry of Hydrothermal Ore Deposits
- Geol 573 (2) Advanced Topics in Economic Geology
- Geol 584 (3) Principles of Isotope Geochemistry
- Geol 588 (4) Radioactive Isotope Geology
- Chem 331 (3) Physical Chemistry I
- Chem 332 (3) Physical Chemistry II

**Hydrogeology Requirements**

Students pursuing an advanced degree with specialization in hydrology should have completed an undergraduate program comparable to that of Washington State University. Originally, this will require the student to have completed, or to take without graduate credit, course work having content analogous to that in

- Geol 206 (3) Field Petrology
- Geol 340 (4) Geologic Structures
- Geol 350 (4) Mineralogy & Crystallography
- Geol 308 (3) Geology Field Camp
- Geol 320 (3) Sedimentary Petrology & Sedimentation
- Geol 475 (3) Groundwater
- CE 315 (3) Mechanics of Fluid
- Math 315 (3) Differential Equations

Required Courses, M.S.:

- Geol 569 (2) Field Methods in Hydrogeology
- Geol 577 (3) Advanced Groundwater Hydraulics
- Geol 579 (V) Groundwater Geochemistry

Two of the following:

- Geol 428 (3) Geostatistics
- Geol 521 (3) Clastic Depositional Systems
- Geol 570 (V) Advanced Topics in Hydrogeology (Organic Contaminants)
- Geol 584 (3) Principles of Isotope Geochemistry
- CE 576 (3) Dynamics of Groundwater Contamination

Required Courses, Ph.D.:

Students pursuing the Ph.D. degree should have completed all of the courses listed under the requirements of the M.S. program and, in addition, are expected to take:

- CE 550 (3) Intermediate Fluid

### **Mechanics**

Additional Courses:

Depending upon the individual student's major interest within the ground-water discipline, additional studies will be selected from the following list:

- Geol 480 (3) Introductory Geochemistry
- Geol 505 (4) Geophysics
- Geol 520 (3) Advanced Topics in Sedimentary Rocks
- Geol 523 (3) Advanced Topics in Stratigraphy
- Geol 525 (3) Carbonate Depositional Systems
- Geol 540 (3) Tectonics
- Geol 541 (3) Structural Analysis
- Geol 552 (3) X-ray Analysis in Geology
- CE 515 (3) Environmental Measurements
- CE 540 (3) Instrumental Analysis of Environmental Contaminants
- CE 560 (3) Advanced Hydrology
- CE 576 (3) Dynamics of Groundwater Contamination
- CE 584 (2) Engineering Aspects of Aquatic Biology
- Chem 527 (2) Environmental Chemistry
- Math 441 (3) Applied Math II
- Math 448 (3) Numerical Analysis
- SoilS 513 (2) Advanced Soil Physics
- SoilS 521 (3) Advanced Soil Chemistry
- SoilS 537 (3) Soil Biochemistry
- SoilS 551 (3) Advanced Pedology 600Special Projects or Independent Study Variable credit.

S, F grading.

700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.

702 Master's Special Problems, Directed Study and/or Examination Variable credit. S, F grading.

800 Doctoral Research, Dissertation, and/or Examination Variable Credit. S, F grading.

## **Department of Health Policy and Administration**

[www.hpa.spokane.wsu.edu](http://www.hpa.spokane.wsu.edu)

Degree offered: **Master of Health Policy and Administration (M.H.P.A.)**

Faculty working with students: **5**

Graduate students: **55**

Graduate students receiving assistantships or scholarships: **7%**

Program offered: **Spokane**

Tests required: **GRE or GMAT; TOEFL or IELTS (international students only)**



Deadline: **Fall—January 10**

**Spring—July 1**

### **Admission Requirements**

To apply, submit a WSU Graduate School application, official copies of all college transcripts, letter of intent and introduction, three letters of recommendation, official GRE or GMAT scores, and official TOEFL or IELTS scores (international students only). GRE and GMAT scores are required except for applicants holding a professional doctoral degree from a United States accredited school. Significant weight is given to GRE aptitude scores of at least 1000 (verbal and quantitative combined), or a GMAT score of at least 500.

### **Program Description**

The program is accredited by the Commission on Accreditation of Healthcare Management Education and has particular strengths in health care finance and health law. The mission of the program is

To prepare students for a variety of professional health services management positions.

To contribute to community health services enhancement and community health policy development through education, applied research and service.

Located in Spokane, a regional medical center with thirteen hospitals and medical centers, the program provides students with opportunities to work with faculty who are leaders in the field, and to contribute to community health services and health policy through research and internships. Students work with faculty who receive funding for research in local, state, national, and international community health services management and policy enhancement.

### **Contact Information**

Winsor Schmidt, J.D., LL.M.: Chair  
De Martin, M.S.: Academic Coord.  
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### **Faculty Interests**

**Melissa Ahern:** Managed care efficiency and effectiveness; impact of communities on health. Courses taught: Health Care Policy and Politics, Health Care Economics, Health Quality Management. [ahernm@wsu.edu](mailto:ahernm@wsu.edu)

**Fevzi Akinci:** Access to care; utilization and cost-effectiveness of preventive health services; health related quality of life; disease management and health outcomes. Courses taught: Introduction to the Health Care System, Research and Evaluation Methods, Health Care Information Systems, Health Quality Management. [akinci@wsu.edu](mailto:akinci@wsu.edu)

**Joseph Coyne:** International health system comparative analysis; decision science; risk analysis; health care finance and accounting. Courses taught: Health Care Cost Accounting, Health Care Finance,

Health Management Decision Science, Comparative International Health Care. *joecoyne@wsu.edu*

**Jae Kennedy:** Disability and aging services; health, rehabilitation, and long term care policy; program evaluation. Courses taught: Introduction to the Health Care System, Health Care Management, Disability and Aging Policy, Strategic Management and Marketing. *jjkennedy@wsu.edu*

**Winsor C. Schmidt:** Health and mental health law and policy; guardianship and adult protective services; patient safety. Courses taught: Law and Ethics of Health Management, Government Regulation of Health Services, Mental Health Policy and Law. *schmidtw@wsu.edu*

**David Sclar:** Pharmaceutical economics, pharmaceutical marketing, epidemiology, health policy. Courses taught: Biostatistics and Epidemiology for the health sciences. *sclar@mail.wsu.edu*

**Tracy Skaer:** Pediatrics, internal medicine, psychiatry, women's health, pharmaceutical economics. *skaer@mail.wsu.edu*

### **Health Policy and Administration**

500 Introduction to the Health Care System 3 Orientation to history and organization of the health care system.

501 Health Care Policy and Politics 3 History, methods, results and evaluation of health-care-related policy and politics.

502 Law and Ethics of Health Management 3 Private health law and ethics, including professional liability, relationship of physician and patient, malpractice reform, health institutions, and health access.

503 Government Regulation of Health Services 3 Prereq graduate standing. Public law regulation: health care quality, personhood and individual autonomy, life/death decisions, antitrust, health care financing and cost control.

506 Basin Analysis 3 Characteristics of sedimentary basins and methods for studying them. Field trip required. Cooperative course taught by UI, open to WSU students (GEOL 506).

509 Health Care Economics 3 Prereq microeconomics. The economics of allocating, financing and delivering medical care services.

510 Health Care Cost Accounting 3 Prereq basic financial accounting; graduate standing. Basic cost-accounting concepts, principles, and applications in the health care setting.

511 Health Care Finance 3 Prereq HPA

512. Aspects of health care financial management fundamentals and managerial accounting for strategic financial management.

512 Health Management Decision Science 3 Prereq HPA 510. Application of decision science technology to risk-analysis problems in healthcare for both investor-owned and non-profit entities.

515 Health Care Management 3 Introduction to the knowledge, skills, health and values associated with the practice of health management.

516 Health Quality Management 3 Overview of the total field of health quality, including strategic quality management programs, quality assurance, quality control, and design.

519 Biostatistics and Epidemiology for the Health Sciences 3 Prereq graduate standing. Application of quantitative methods to problems in the health sciences; statistical analysis software.

520 Research and Evaluation Methods 3 Prereq statistics or HPA 519. Basic research and evaluation methods for health care professionals

530 Health Care Information Systems 3 Key attributes of health care information systems and their evolution in health care environment.

570 Marketing for Health Care Organizations 3 Prereq graduate standing. Basic marketing concepts, principles, and issues related to marketing public and private health care.

571 Managed Care/Integrated Delivery Systems 3 Prereq HPA 500, 511. Business, regulatory and liability issues in field of managed care.

- 572 Health Care Ethics 3 Ethical issues affecting health care institutions, professionals and consumers.
- 573 Comparative International Health Care 3 Analysis of key attributes of health care in selected countries and comparisons with the US health care system.
- 574 Rural Health Care in America 3 The unique characteristics, professional opportunities, problems and reform alternatives in rural health care.
- 575 Aging and Long-term Care Administration 3 Introduction to issues in population aging and requirements for administration of aging and long-term care programs.
- 576 Managing Change for Healthier Communities 3 Prereq graduate standing. Prepares health leaders for managing change to create healthier communities through understanding determinants of health and implications of collaborative approaches.
- 577 Women's Health: Social, Psychological, and Physiological Issues 2 Contemporary issues in women's health focusing on physiological, social and psychological aspects.
- 578 Innovative Leadership and Management 3, 4 (3-3), or 5 (3-6). Same as Nurs 513.
- 579 Mental Health Policy and Law 3 Professions regulation, negligence, consent, privacy; civil commitment, treatment rights, guardianship, trial competency, insanity defense, sex offenders, execution capacity, entitlements, discrimination.
- 580 Disability and Aging Policy 3 Prereq graduate standing. Policy aspects of disability, aging and chronic illness; including work disability, health and long term care, rationing, gender and class.
- 590 Strategic Management and Marketing 3 Prereq HPA 511, 515. Key components and processes in strategic planning.
- 596 Seminar in Health Policy V 1-3 May be repeated for credit; cumulative maximum 9 hours. Major problems and research issues in health policy through dialogue among students and experts.
- 597 Internship V 1-5 May be repeated for credit; cumulative maximum 5 hours. Prereq HPA 500. Student experience in professional work settings. S, F grading.
- 599 Special Topics in Health Policy and Administration V 1-3 May be repeated for credit; cumulative max. 9 hrs.
- 600 Special Projects or Independent Study Variable credit. S, F grading
- 700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.
- 702 Master's Special Problems, Directed Study and/or Examination Variable credit. S, F grading.

## Exercise Science

**[Not accepting applications at this time]**

[www.spokane.wsu.edu/academic/health\\_sciences](http://www.spokane.wsu.edu/academic/health_sciences)

Degree offered: **M.S.**

Faculty working with graduate students:

Students receiving assistantships or scholarships:

Degree offered: **Spokane**

Tests required: **GRE (recommended); TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

## Requirements

Applicants should have a bachelor's degree in exercise science or in a related field with a GPA of 3.00 or better during the last half of undergraduate work and all prerequisite course work. Prerequisites include the following: 400-level exercise physiology with laboratory; 400-level exercise prescription;

300- or 400-level exercise techniques/assessment with laboratory; one semester each of undergraduate human anatomy and physiology with laboratories; one year of undergraduate inorganic chemistry with laboratories; one semester of undergraduate organic chemistry with laboratory; one semester of undergraduate physics with laboratory; one semester undergraduate of biochemistry with laboratory (preferred, not required); 300- or 400-level biomechanics with laboratory (preferred, not required). The exercise physiology, exercise prescription, and exercise techniques/assessment prerequisites can be satisfied by enrolling in these courses at WSU Spokane. All the above courses must be completed with a "B" grade or higher.

### **Program Description**

Exercise science at WSU Spokane is a research-based graduate program that focuses on clinical and experimental exercise physiology with an emphasis on cellular and molecular mechanisms. The curriculum provides a foundation in the study of the cellular mechanisms that regulate physiological responses to exercise and the molecular mechanisms that govern these cellular responses. Courses in research methods and statistics provide vital grounding in research design and analysis, preparing students for thesis work and for future professional projects and research. Students choose a thesis or non-thesis option. The thesis option provides research training in exercise physiology with an emphasis in either cellular or clinical physiology; it also serves as preparation for students who plan to continue their education in a doctoral program. The non-thesis option includes an internship and courses that prepare students for testing, exercise prescription, and certification in clinical exercise physiology by the American College of Sports Medicine.

### **Graduate Opportunities**

Clinical exercise physiologist, clinical research technician, sport medicine exercise specialist, academic research technician, corporate research technician, preparation to enter doctoral program.

### **Positions Held by Recent Graduates**

Officer in the US Air Force, air base safety office as a human performance consultant and physiology trainer; Director, Pro Sports Club, Bellevue, Washington; Ph.D. student in neuroscience graduate studies program at The Ohio State University, Columbus, Ohio; Postdoctoral position, protein dynamics, Japan; M.S. food science and human nutrition, University of Florida; nursing program, Washington State University.

### **Contact information**

Sally E. Blank, Ph.D., Director  
Program in Health Sciences  
Washington State University Spokane  
PO Box 1495  
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E-mail: [seblank@wsu.edu](mailto:seblank@wsu.edu)

### **Faculty Interests**

**Janet Beary**, Ph.D., RD, CHES: Human nutrition; weight management, eating disorders, and diet's effect on bladder symptoms.

*[beary@wsu.edu](mailto:beary@wsu.edu)*

**Sally Blank**, Ph.D., FACSM, Director of the program in health sciences: Exercise physiology: stress-related effects of exercise and its impact on immune function; integrative biobehavioral interventions

for cancer survivors.  
*seblank@wsu.edu*

**Maddy Houghton**, Ph.D., RD, University of Idaho: Human nutrition: breast feeding, world food supply, infant feeding practices, sports nutrition, eating disorders, hunger, Native Americans, international issues, and comparative cultures. *dellwo@wsu.edu*

**E. Carolyn Johnson**, Ph.D., FACSM: Exercise physiology: cells from small blood vessels in the body and the damaging effects of conditions associated with diabetes, high protein intake, and atherosclerosis, as well as the protective effect of ethanol on processes underlying atherosclerosis in these cells.  
*ecarolj@mail.wsu.edu*

**Susan Kynast-Gales**, Ph.D., RD: Human nutrition; nutrition education for the Action to Control Cardiovascular Risk in Diabetes (ACCORD) Trial; research on effects of stress and circadian rhythms, diabetes, kidney stones, caffeine and blood pressure. *kynasts@wsu.edu*

**Linda Massey**, Ph.D., RD: Human nutrition: mineral metabolism; calcium, sodium, and magnesium nutrition as related to development and treatment of chronic diseases of aging such as kidney stones, osteoporosis, and hypertension. *massey@wsu.edu*

### **Exercise Science**

501 Special Topics 3 Prereq admission to Clinical and Experimental Exercise Science graduate program. Special topics in exercise physiology and metabolism.

563 Exercise and Immune Response 3 Rec Kin 463. Influence of physical exercise on immune response and consequent impact on host susceptibility to disease and infection.

565 Muscle Physiology and Exercise Bioenergetics 3 Rec Kin 463. Bioenergetic, striated muscle metabolic, and neuroendocrine responses to exercise and training.

567 Cardiopulmonary Exercise Physiology 3 Rec Kin 463. Pulmonary, circulatory, thermoregulatory, fluid balance, and physiological system integration responses to exercise and training.

568 Clinical Assessment and Prescription 3 (2-2) Prereq Kin 463. Development of skills in testing analysis, and prescription for health-related fitness. Cooperative course taught by UI (PE 593), open to WSU students.

589 Research Techniques 2 (1-3) or 3 (2-3) Application and use of research techniques and tools in physiology of exercise.

590 Internship V 2-12 May be repeated for credit; cumulative maximum 12 hours. By interview only. Internship in educational, industrial, municipal or private sports or recreational setting; direct participation in tasks, research and reporting activities. S, F grading.

596 Seminar 1 or 2 May be repeated for credit.

600 Special Projects or Independent Study Variable credit. S, F grading.

700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.

702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.

### **Department of History**

<http://libarts.wsu.edu/history>

Degrees offered: **M.A., Ph.D.**

Faculty working with graduate students: **25**

Graduate students: **50**

Students receiving assistantships or scholarships: **72%**

Degree offered: **Pullman, Vancouver (M.A. only) campuses**

Tests required: **GRE; TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

### **Admission Requirements**

Materials required for admission include: the Graduate School Application form; official transcripts from all universities attended; GRE scores; TOEFL or IELTS scores (international students only); three letters of recommendation addressing the applicant's academic qualifications for graduate work in history; a statement of purpose; a writing sample, preferably in the field of history; Preferred Fields of Study form; and the Language Background form available at <http://libarts.wsu.edu/history/graduate-studies/admissions.asp>

### **Program Description**

The Department of History at Washington State University offers graduate study leading to the Master of Arts (thesis and non-thesis options) and doctor of philosophy degrees. Specialized areas of study within the history department include U.S., early and modern European, modern East Asian, Latin American, world, women's, public, and environmental history. The department also cooperates with the Department of English to offer a research field in American studies. In recent years the department has succeeded in placing almost all of its graduate students in academic or public history positions.

### **Graduate Opportunities**

Faculty positions doing research and teaching at universities and colleges; teaching positions at secondary and private schools; governmental service as historians, archivists, or information specialists; positions in departments of agriculture, the interior, intelligence, and national security agencies (FBI, CIA, National Security Agency); State Police; and careers in the private sector (business, law).

### **Positions Held by Recent Graduates**

Tenure-track position at Weber State University in Utah; tenure-track position at Idaho State University in Pocatello; university archivist and adjunct professor at Eastern Washington University; professor at California State University at Stanislaus; tenured associate professor at the University of San Diego; tenure-track position at Cuyamaca Community College in El Cajon, California, and chair of the social sciences department; tenure-track assistant professor at California State University at Stanislaus; tenure-track faculty position in history and director of women's studies at Idaho State University.

### **Contact Information**

David Pietz, Ph.D.  
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Fax: 509-335-4171  
E-mail: [pietz@wsu.edu](mailto:pietz@wsu.edu)

### **Faculty Interests**

**Sue Armitage**, Director, Center for Columbia River History and Claudius O. and Mary Johnson Distinguished Professor of History. Teaches U.S. women's history, graduate courses in American historiography, social history, U.S. women's history, and western history.  
*armitage@wsu.edu*

**LeRoy Ashby**, Claudius O. and Mary Johnson Distinguished Professor of History. Teaches popular culture and twentieth century American history. *ashby@wsu.edu*

**Robert Bauman**: Teaches American history and public history, including the civil rights movement, immigration, migration and ethnic identity, and the cold war. Research interests in the areas of race and ethnicity in the American west and poverty and public policy.  
*rbauman@tricity.wsu.edu*

**David L. Coon**: Teaches agricultural history, early America, and the American Revolution.  
*coond@wsu.edu*

**Brigit Farley**: Teaches Russian and East European history, World Wars I and II and the cold war, and the city in history. Current interests center on the return of history in former Soviet bloc nations, particularly Russia and Hungary. *bfarley@tricity.wsu.edu*

**Edwin P. Garretson**: Teaches world and modern European history. *epgjr@wsu.edu*

**Luz Maria Gordillo**: Teaches Chicana/o history, the history of sexuality in the U.S. 19th and 20th century, immigration and citizenship in the global economy, Latin American cultural history, Modern Mexico, and the history of women in U.S. sports. *ordillo@vancouver.wsu.edu*

**Candice L. Goucher**: Teaches courses in African history and Caribbean studies.  
*goucher@vancouver.wsu.edu*

**Jerry B. Gough**: Teaches the history of science and technology and early Britain. *gough@wsu.edu*

**Richard L. Hume**: Teaches Civil War and the Reconstruction era, United States, and the Jeffersonian and Jacksonian eras. *rhume@wsu.edu*

**Steven D. Kale**: Teaches classes in 19th century Europe, Europe since 1945, and modern France; developing undergraduate courses in comparative revolutions and Christianity in the modern west for general education. Research focuses on modern French history, addressing the politics and social life of 19th century elites.

**Noriko Kawamura**: Teaches American diplomatic history and Japanese history.  
*nkawamura@wsu.edu*

**John E. Kicza**: Teaches Latin American history. *jekicza@wsu.edu*

**Robert McCoy**: Teaches public history with a specialization in historic preservation and U.S. history with special interest in memory and the creation of historical narratives.  
*rmccoy@wsu.edu*

**Laurie Mercier**: Teaches the history of the United States, the American west, the Pacific Northwest, immigration and migration, and American labor. *mercier@vancouver.wsu.edu*

**Sue Peabody**: Teaches early modern European society and culture, concentrating on France and England; and modern European colonialism 1450-1800. *peabody@vancouver.wsu.edu*

**Jacqueline Peterson**: Teaches Native American, North American, and public history. Recently curated and directed a 7,000 square foot traveling museum exhibition funded by NEH titled *Sacred Encounters: The Society of Jesus and the Indians of the Northwest*.  
*peterson@vancouver.wsu.edu*

**David Pietz**: Teaches China and East Asia history. His current research focuses on twentieth century Chinese economic and environmental history. *pietz@wsu.edu*

**Roger Schlesinger:** Teaches renaissance and reformation history. *schlesin@wsu.edu*

**Heather Streets:** Teaches modern British history, the history of imperialism and colonialism since 1800, European women's history, modern European history, historical geography, and world history. *streetsh@mail.wsu.edu*

**Raymond Sun:** Teaches European history and the history of modern Germany. *sunray@wsu.edu*

**Orlan Svingen:** Teaches public history and U.S. history, with a special interest in Native American history. *svingen@wsu.edu*

**Marina Tolmacheva:** Teaches Islamic civilization and Middle East history. *tolmache@wsu.edu*

**Ian C. Wendt:** Teaches South Asia history. *iwendt@wsu.edu*

**Richard S. Williams:** Teaches the history of ancient Greece, Rome, and medieval Europe. *sarek@wsu.edu*

## History

510 Field Course in American History 3 May be repeated for credit. Readings and interpretive problems of American history.

511 American Diplomatic History 1776-1914 3 Policies and principles characteristic of American diplomacy from 1776 to 1914. Graduate level counterpart of Hist 411; additional requirements. Credit not granted for both Hist 411 and 511.

512 American Diplomatic History in the 20th Century 3 Graduate level counterpart of Hist 412; additional requirements. Credit not granted for both Hist 412 and 512.

513 Theory and Method in American Studies 3 May be repeated for credit. Same as Engl 513.

515 Jeffersonian-Jacksonian America 3 Social and political history of the United States from 1789 to 1845; Jeffersonian, and Jacksonian eras. Graduate level counterpart of Hist 415; additional requirements. Credit not granted for both Hist 415 and 515.

516 Civil War and Reconstruction 3 The Civil War as a problem in historical causation and the social, political, and economic impact of the war. Graduate level counterpart of Hist 416; additional requirements. Credit not granted for both Hist 416 and 516.

517 Rise of Modern America 3 Response to industrialism in the Gilded Age and the reform movements of Populism and Progressivism. Graduate level counterpart of Hist 417; additional requirements. Credit not granted for both Hist 417 and 517.

518 United States 1914-1945 3 America through World War I, cultural tensions of the Twenties, and the crises of Depression and World War II. Graduate level counterpart of Hist 418; additional requirements. Credit not granted for both Hist 418 and 518.

519 United States 1945-Present 3 International and domestic impact of Cold War, era of McCarthyism, American aspirations, tensions, and conflicts in the post-industrial era. Graduate level counterpart of Hist 419; additional requirements. Credit not granted for both Hist 419 and 519.

520 American Constitutional History 3 Prereq Hist 110 or Pol S 101. Graduate level counterpart of Hist 420; additional requirements. Credit not granted for both Hist 420 and 520.

521 The American West 3 Multicultural exploration of the frontier experience and western America; environment, economic development, gender, class and race emphasized. Graduate level counterpart of Hist 421; additional requirements. Credit not granted for both Hist 421 and 521.

522 History of the Pacific Northwest 3 Political, social economic and environmental history of the Pacific Northwest. Fulfills the teaching certification requirement in state history and government in Washington and other Pacific Northwest states. Graduate level counterpart of Hist 422; additional requirements. Credit not granted for both Hist 422 and 522.

523 Radicals, Reformers, and Romantics: The Impact Graduate level counterpart of Hist 423;



additional requirements. Credit not granted for both Hist 423 and 523.

525 Seminar in American History 3 May be repeated for credit.

527 Public History: Theory and Methodology 3 An introduction to the broad range of non-traditional careers in history. Graduate level counterpart of Hist 427; additional requirements. Credit not granted for both Hist 427 and 527.

528 Seminar in Public History 3 May be repeated for credit; cumulative maximum 6 hours. The development of skills at the graduate level to be used in non-traditional careers for historians.

529 Interpreting History through Material Culture 3 May be repeated for credit; cumulative maximum 6 hours. Historical interpretation to work on major historic preservation and museum projects.

530 History of Mexico 3 War of independence, 19th century Mexico and the liberal conservative struggle; modern Mexico since the Revolution of 1910. Graduate level counterpart of Hist 430; additional requirements. Credit not granted for both Hist 430 and 530.

532 20th Century Latin America 3 Contemporary developments, policies and trends in the Latin American states. Graduate level counterpart of Hist 432; additional requirements. Credit not granted for both Hist 432 and 532.

533 History of Cuba and the Caribbean 3 Historical development of the Caribbean, with emphasis on Cuba, from the Spanish arrival to Castro's revolution. Graduate level counterpart of Hist 433; additional requirements. Credit not granted for both Hist 433 and 533.

534 Revolution in Latin America 3 Social and political development in Central America; reasons for dictatorships and radical social changes. Graduate level counterpart of History 434; additional requirements. Credit not granted for both Hist 434 and 534.

535 Field Course in Latin American History 3 May be repeated for credit; cumulative maximum 9 hours. Readings and interpretive problems in Latin American history.

539 Slavery, Abolition and Emancipation in World History 3 Graduate-level counterpart of Hist 439; additional requirements. Credit not granted for both Hist 439 and 539.

540 Seminar in European History 3 May be repeated for credit.

547 Europe in the French Revolutionary and Napoleonic Era, 1789-1815 3 Graduate level counterpart of Hist 447; additional requirements. Credit not granted for both Hist 447 and 547.

549 Europe and Two World Wars, 1914-1945 3 Political, intellectual, economic, and international aspects of European life during and between two world wars. Graduate level counterpart of Hist 449; additional requirements. Credit not granted for both Hist 449 and 549.

550 Europe Since 1945 3 Europe from the end of World War II to the present; the Cold War, European integration, social and intellectual life. Graduate level counterpart of Hist 450; additional requirements. Credit not granted for both Hist 450 and 550.

553 Conservatism, Liberalism, and Socialism: Europe, 1815-1870 3 The consolidation of industrial society and the nation-state in 19th century Europe. Graduate level counterpart of Hist 453; additional requirements. Credit not granted for both Hist 453 and 553.

554 Nationalism and National Conflict: Europe 1870-1914 3 The rise of Europe to world predominance and the crises of the European order. Graduate level counterpart of Hist 454; additional requirements. Credit not granted for both Hist 454 and 554.

555 From the Tudor Revolution to the Glorious Revolution 3 England in the age of the Protestant Reformation. Graduate level counterpart of Hist 455; additional requirements. Credit not granted for both Hist 455 and 555.

559 Modern Britain 3 Britain and the Empire from the Napoleonic wars to the present. Graduate level counterpart of Hist 459; additional requirements. Credit not granted for both Hist 459 and 559.

560 Field Course in Early European History 3 May be repeated for credit; cumulative maximum 9 hours. Readings and issues in early European history.

562 History of Imperial Russia 3 History and culture of Imperial Russia from Peter the Great to the 1905 revolution. Graduate level counterpart of Hist 462; additional requirements. Credit not granted for both Hist 462 and 562.

563 History of the Soviet Union 3 The Russian revolutions and the Soviet regime; 1905 to the present. Graduate level counterpart of Hist 463; additional requirements. Credit not granted for both Hist 463 and 563.

564 Comparative Genocide 3 Graduate-level counterpart of Hist 464; additional requirements. Credit not granted for both Hist 464 and 564.

565 East-Central Europe 3 History, government, and culture of the countries between Germany and the Soviet Union; emphasis on the 20th century. Graduate level counterpart of Hist 465; additional requirements. Credit not granted for both Hist 465 and 565.

567 Modern France 3 The history of France from the revolution of 1789 to the present. Graduate level counterpart of Hist 467; additional requirements. Credit not granted for both Hist 467 and 567.

568 Hitler and Nazi Germany 3 Origins and rise of Nazism; state, society and culture in the Third Reich; Nazi racial ideology; world war; the Holocaust. Graduate level counterpart of Hist; additional requirements. Graduate level counterpart of Hist 468; additional requirements. Credit not granted for both Hist 468 and 568.

569 Field Course in Modern European History 3 May be repeated for credit; cumulative maximum 9 hours. Readings and interpretive problems in modern European history.

570 World History Theory and Methods 3 May be repeated for credit; cumulative maximum 9 hours. Historiographic overview of the field of world history.

571 Topics in World History 3 May be repeated for credit; cumulative maximum 6 hours. Readings in themes, theories, methods and literature of a global approach to history.

572 Middle East Since World War I 3 Developments in the Middle East since World War I; including nationalism, fundamentalism, and revolution. Graduate level counterpart of Hist 472; additional requirements. Credit not granted for both Hist 472 and 572.

574 Caste, Religion and Ecology in Modern South Asia 3 Graduate-level counterpart of Hist 474; additional requirements. Credit not granted for both Hist 474 and 574.

575 Field Course in Women's History 3 May be repeated for credit; cumulative maximum 6 hours. Prereq graduate standing. Readings and interpretive problems in women's history.

576 Revolutionary China, 1800 to Present 3 Nature and effects of revolution on China from 1800 to present. Graduate level counterpart of Hist 476; additional requirements. Credit not granted for both Hist 476 and 576.

577 Modern Japanese History 3 The development of state and society in Japan from 1800 to present. Graduate level counterpart of Hist 477; additional requirements. Credit not granted for both Hist 477 and 577.

578 Field Course in Asian History 3 May be repeated for credit; cumulative maximum 9 hours. Readings and interpretive problems in Asian history.

580 Historiography 3

581 American Historiography 3

590 Politics of Developing Nations 3 Same as Pol S 435. Graduate level counterpart of Hist 490; additional requirements. Credit not granted for both Hist 490 and 590.

595 The Teaching of History in College V 1 or 2 May be repeated for credit; cumulative maximum 5 hours. Theory, problems, and methods of teaching history at the college level.

596 Topics in American Studies 3 May be repeated for credit; cumulative maximum 9 hours. Same as Engl 596. Graduate level counterpart of Hist 496; additional requirements. Credit not granted for both Hist 496 and 596.

- 597 Seminar in History 2 or 3 May be repeated for credit.
- 598 History Internship V 1-12 May be repeated for credit; cumulative maximum 12 hours. Graduate level counterpart of Hist 498; additional requirements. Credit not granted for both Hist 498 and 598.
- 599 History Colloquium 1 Weekly discussions and presentations on historical topics or current faculty and graduate student research. S, F grading.
- 599 History Colloquium 1 Weekly discussions and presentations on historical topics or current faculty and graduate student research. S, F grading.
- 600 Special Projects or Independent Study Variable credit. S, F grading.
- 700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.
- 702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.
- 800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

## Department of Horticulture and Landscape Architecture

### Horticulture

[www.hortla.wsu.edu](http://www.hortla.wsu.edu)

Degrees offered: **M.S., Ph.D. in Horticulture**

Faculty working with graduate students: **27**

Graduate students: **36**

Graduate students receiving assistantships or scholarships: **95%**

Tests required: **GRE; TOEFL (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

### Admission Requirements

Undergraduate degree in plant sciences, horticulture, crop science, botany, environmental science, or closely related field.

Letter of application stating qualifications, personal goals, and objectives of graduate study.

Official copies of all college transcripts.

Three letters of recommendation and departmental questionnaire.

### Program Description

Graduates from the program are employed in careers ranging from applied crop production to teaching and research in the molecular mechanisms controlling plant growth and development. Graduate work can be basic or applied, and students acquire experience in both teaching and research.

Students generally focus their research on solving a production or postharvest quality issue for a particular commodity (vegetable crop, tree fruits, small fruits, viticulture and enology, ornamentals), or on the more basic areas of plant physiology, biochemistry, and molecular genetics. Interdisciplinary areas such as plant pathology, soils, entomology, biological systems engineering, environmental science, foods and nutrition, and the social sciences are often included. Research projects may address problems or situations related to the growth, production, or utilization of any horticultural commodity.

Thesis projects, course requirements, and teaching experiences are individualized to the specific interests and goals of the student. After completion of course work students may have the

opportunity to conduct research at one of several field stations located throughout the state. Graduates are placed in highly regarded laboratories; in respected research, teaching, and extension programs at universities; and with industry

### **Contact Information**

Judy Hobart  
Academic Coordinator  
Department of Horticulture and Landscape Architecture  
Johnson Hall 149  
PO Box 646414  
Pullman, WA 99164-6414  
Telephone: 509-335-9504  
Fax: 509-335-8690  
e-mail: hobart@wsu.edu

### **Graduate Opportunities**

University faculty positions; Federal and state agricultural laboratories; Extension specialists; Management positions in allied and agricultural industries; Technical positions; Postdoctoral positions

### **Positions Held by Recent Graduates**

Assistant professor/assistant landscape specialist, University of Hawaii; Assistant professor, Penn State University; Product specialist, Thermo Electron Corporation, San Jose, CA; Extension educator, Cooperative Extension, Adams/Grant County, WA; Director of new market development, AgroFresh, Inc., Springhouse, PA; Research plant physiologist, Eastern Regional Research Laboratory, USDA/ARS, Philadelphia, PA

### **Related Programs**

Landscape architecture; Food science; Human nutrition; Molecular plant sciences; Agricultural and resource economics; Biological systems engineering; Natural resource sciences; School of Biological Sciences; School of Molecular Biosciences

### **Faculty Interests**

**Preston K. Andrews:** Fruit biology/sustainability; reproductive biology and sustainability of fruit crops, with emphasis on environmental stresses and sustainable production practices, including photo-oxidative stress, fruit quality, antioxidants and phytonutrients, and organic farming.  
*andrewsp@wsu.edu*

**John H. Bassman:** Tree physiology, environmental physiology, photosynthesis, carbon partitioning, functional genomics. *bassman@wsu.edu*

**Bhaskar Bondada:** Anatomy and morphology of grapevine and berry; foliar applications of nutrients; water and nutrient transport into berry; berry growth and development; hydraulic architecture of vine and berry; ampelography; effect of management practices on fruit quality. *bbondada@wsu.edu*

**Charles R. Brown:** Genetics, plant breeding, potatoes, gene transfer technology.  
*cbrown@tri-cities.wsu.edu*

**Linda Chalker-Scott:** Responses of woody plants to environmental stress (including cold, UVB, drought, salinity, compaction); management strategies for sustainable landscapes in human-altered environments. *lindasc@wsu.edu*

**Carter Clary:** Harvesting and processing of fruits and vegetables; mechanical harvesting of asparagus

and other specialty crops; dehydration of fruits and vegetables using new technologies.  
*cclary@wsu.edu*

**Clarice Coyne:** Plant breeding and genetics; genomic approaches to plant germplasm characterization and germplasm utilization, using food legumes as model systems.  
*coynec@wsu.edu*

**Donald Elfving:** Bioregular effects on fruit tree physiology. *delving@wsu.edu*

**John K. Fellman:** Post-harvest plant physiology and biochemistry of perishable commodities and their products (wine grapes, apples, onions, raspberries, cranberries, asparagus, cassava); studies of perishable shelf life extension; fundamental investigations of how signaling molecules potentially interact with active oxygen species in controlling plant responses to the environment.  
*fellman@wsu.edu*

**Richard D. Hannan:** Germplasm maintenance, physiology of seed aging.  
*rhannan@wsu.edu*

**William G. Hendrix:** Professor and chair, Department of Horticulture and Landscape Architecture; director, viticulture and enology program. *hendrix@wsu.edu*

**Larry Hiller:** Olericulture/potato physiology, mineral nutrition, water relations, tuber quality, vegetable seed crops. *hillerl@wsu.edu*

**Rita Hummel:** Water and cold stress physiology of landscape plants; landscape plant production and management with emphasis on water, nutrients, and recycled organic materials; developing stress-tolerant, small-statured trees for urban landscapes. *hummelrl@wsu.edu*

**Markus Keller:** Viticulture; influence of environmental factors and management practices on crop physiology of wine and juice grapes; reproductive development; fruit ripening; scion-rootstock interactions; irrigation management. *mkeller@wsu.edu*

**N. Richard Knowles:** Factors affecting the productivity of seed potatoes and the storability and quality of processing potatoes; role of oxidative metabolism in wound-healing; development of novel sprout inhibitors; potato variety development; physiology and biochemistry of aging in seed potatoes.  
*rknowles@wsu.edu*

**G.N. Mohan Kumar:** Biochemical, physiological, and molecular aspects of aging; differential gene expression during aging in relation to decline in productivity, loss of apical dominance, and wound-healing ability in potatoes. *gnmkumar@wsu.edu*

**Virginia I. Lohr:** Ornamental horticulture, environmental horticulture, plant-people interactions, water-conserving landscapes. *lohr@wsu.edu*

**Dorrie Main:** Bioinformatics; plant comparative genomics using the tools of bioinformatics; development of a comparative mapping database for rosaceous crops; synteny conservation of resistance genes in Rosaceae; global analysis of functional units in plant chromosomes; development of plant bioinformatics analysis tools. *dorrie@wsu.edu*

**Patrick P. Moore:** Strawberry and raspberry plant breeding and genetics with emphasis on fruit characteristics, disease resistance, and use of germplasm in breeding.  
*moorepp@wsu.edu*

**M. Kent Mullinix:** Sustainable, biologically based perennial cropping systems; living and non-living organic mulches; agro ecosystem diversification; legume orchard insecticide elimination; bio-control of apple arthropod pests; compost utilization.  
*mullinix@wsu.edu*

**Mercy Olmstead:** Viticulture; providing up-to-date information through viticulture extension program; sustainable viticulture production; cover crop and insect dynamics; two-year certificate programs.

*molmstead@wsu.edu*

**Mark Pavek:** Aiding Washington potato growers in profitable and sustainable production through applied research; cultural management, including fertility, plant spacing and depth, irrigation, crop protection chemicals, varieties, etc. *mjpavek@wsu.edu*

**B.W. (Joe) Poovaiah:** Calcium/calmodulin-mediated signaling in plants, particularly the functional significance of genes involved in this signal network. *poovaiah@wsu.edu*

**Julie M. Tarara:** Viticulture, particularly production practices for juice and wine grapes; micro-meteorology (the interactions between vines or vineyards and their physical environment). *jtara@wsu.edu*

**Thomas W. Walters:** Small fruit horticulture; berry crop production and physiology; irrigation practices and their effects on soil-borne disease and nutrient leaching. *twwalters@wsu.edu*

**Matthew D. Whiting:** Stone fruit physiology and production systems. *mdwhiting@wsu.edu*

**Kathleen M. Willemsen:** Small fruit and grape physiology; grape production and management systems; plant bioregulators. *willemsen@wsu.edu*

### **Horticulture**

503 Advanced Topics in Horticulture V 1-4 May be repeated for credit; cumulative maximum 8 hours. Prereq Biol 320. Current topics and research techniques in horticulture.

509 Seminar 1 May be repeated for credit; cumulative maximum 4 hours. Continuous enrollment required for regularly enrolled graduate students in Hort. Recent developments in horticulture. S, F grading.

510 Graduate Seminar 1 May be repeated for credit; cumulative maximum 4 hours. Literature reviews and research progress reports.

512 Advanced Pomology 3 Modern concepts, research, and problems of the fruit industry reflected in current literature; practice in critical review of scientific literature.

513 Advanced Viticulture 3 Graduate-level counterpart of Hort 413; additional requirements. Credit not granted for both Hort 413 and 513.

515 Seminar in Molecular Plant Sciences 1 Same as MPS 515.

516 Advanced Horticultural Crop Physiology 3 Physiological processes related to growth, development, and productivity of horticultural crops; advances in recombinant DNA technologies; the impact on horticultural practices. Graduate level counterpart of Hort 416; additional requirements. Credit not granted for both Hort 416 and 516.

518 Post-Harvest Biology and Technology 3 (2-3) Prereq graduate standing. Physical and physiological basis for handling and storage practices; perishable organ ontogeny and physiological disorders; post-harvest environment requirements. Graduate level counterpart of Hort 418; additional requirements. Credit not granted for both Hort 418 and 518. Cooperative course taught by WSU. Open to UI students (PISc 518).

521 Fruit Crops Management 3 Graduate level counterpart of Hort 421; additional requirements. Woody horticultural crop production, a plant physiology course. Management strategies for optimizing the productivity and resource utilization efficiency of horticultural fruit crops. Credit not granted for both 421 and 521.

533 Plant Tissue, Cell, and Organ Culture 3 (1-6) Prereq senior standing. By interview only. Current plant tissue techniques used in research and industry to solve problems. Cooperative course taught jointly by WSU and UI (PISc 533).

535 Chemistry and Biochemistry of Fruit and Wine 3 Graduate-level counterpart of Hort 435; additional requirements. Credit not granted for both Hort 435 and 535.

- 539 Ornamental Plant Production II 3 (2-3) Production requirements for spring greenhouse and nursery crops; garden center management considerations. Field trip required. Graduate level counterpart of Hort 439; additional requirements. Credit not granted for both Hort 439 and 539. Cooperative course taught by WSU, open to UI students (PISc 531).
- 570 Plant Molecular Genetics 3 Same as MBioS 530.
- 590 Potato Science 3 History, botanical characteristics, seed physiology and production, plant population, physiology of growth, and pest management; factors influencing maturation, harvest, yield, grade, bruise control, storage, and quality maintenance; economics of production and research on a global basis. Graduate level counterpart of Hort 490; additional requirements. Credit not granted for both Hort 490 and 590. Cooperative course taught by UI (PISc 590), open to WSU students.
- 600 Special Projects or Independent Study Variable credit. S, F grading.
- 700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.
- 702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.
- 800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

## Landscape Architecture

<http://hortla.wsu.edu>

Degree offered: **Master of Science in Landscape Architecture (MSLA)**

Faculty working with graduate students: **6**

Graduate students: **15**

Students receiving assistantships or scholarships: **40%**

Program Offered: **Pullman, Spokane**

Tests required: **TOEFL or IELTS (international students only)**

Deadlines: **Fall—April 1 (March 1 international)**

**Spring—August 1 (July 1 international)**

### Requirements

A bachelor's degree from an accredited program in landscape architecture, or related design discipline is preferred; applicants without a degree in landscape architecture may be admitted to the program but will be required to gain basic skills and knowledge in landscape architecture. Students should submit: a statement of research interest or focus area; official transcripts; three letters of recommendation written by college professors or advisors, or professional references; and a portfolio of design work or other evidence of creative/scholarly ability. International students must take the TOEFL (Minimum score of 550 paper test, 213 computer test) or IELTS.

### Program Description

The degree is offered at WSU Pullman and the Interdisciplinary Design Institute at WSU Spokane. Both programs serve graduate-level landscape architecture and landscape planning needs for the Pacific Northwest and the Northern Rocky Mountain Bioregion.

The regions in which the program resides encompass portions of Washington, Idaho, Montana, Wyoming, and southern British Columbia. The region is rich in forests, agriculture, and public lands. Careful attention to bioregional investigation, design, and planning of the natural, rural, and urban landscapes is crucial to the curriculum.

### Contact Information

MSLA Program Coordinator

Department of Horticulture and Landscape Architecture

Washington State University  
PO Box 646414  
Pullman, WA 99164-6414  
Telephone: 509-335-9504  
Fax: 509-335-8690  
E-mail: hortla@wsu.edu

### **Opportunities for our graduates:**

The MSLA has two primary educational goals. The first is to serve the advanced study needs of those possessing a professional degree in landscape architecture. The MSLA offers the opportunity for currently practicing professionals to enhance knowledge and skills in a particular area of landscape architectural and land planning practice; allows students to acquire a strong interdisciplinary knowledge and practical background in support of their research topics; and the opportunity to contribute to the body of design knowledge and the innovative application of cognitive and technical skills. The second MSLA educational goal is to serve applicants with degrees in disciplines other than landscape architecture. The MSLA offers the opportunity to pursue research and advanced specialization in landscape architecture that complements their current knowledge and skills.

### **Positions held by recent graduates**

GIS specialist for the Environmental Protection Agency; Indus Corporation; David Evans, Spokane, WA; Land Expressions, Spokane, WA; LandConcern, California.

### **Faculty Interests**

**Bill Hendrix**, Chair: Ecological planning, applications of geographic information systems.  
*whendrix@wsu.edu*

**Kerry Brooks**, Director, GIS and Simulation Laboratory: Geographic information systems, visualization, land use and environmental planning; image processing and remote sensing; planning research methods and applications. *kerrybrooks@wsu.edu*

**Jolie Kaytes**: Writing and design; science gardens; landscape representation; meaning of experimentation in design and science; design education. *jolie@wsu.edu*

**Sean Michael**: Human response to the environment; crime prevention through environmental design (CPTED); design stewardship; recreation (urban and wild land); distance education; online practice.  
*o2design@wsu.edu*

**Keith Diaz Moore**, NCARB: Aging and the environment; health care design; progressive practice; design education and pedagogy. *keithdm@wsu.edu*

**Bob Scarfo**: Spatial implications of successful aging; social basis of design; neighborhood and small town planning and design as related to health. *scarfo@wsu.edu*

**Ken Struckmeyer**: Design teaching, student advising, international education. *kast@wsu.edu*

**Phil Waite**: Sustainable design and development; sustainable agriculture; farming on the urban fringe; issues on the urban/suburban rural interface. *pswaite@wsu.edu*

### **Landscape Architecture**

510 Philosophy and Theory in Landscape Architecture 3 Prereq graduate standing. Natural and cultural processes that characterize the interaction between humans and the landscape.

511 Methodology and Communication in Landscape Architecture 3 Prereq graduate standing. Methods of investigation and analysis of tools used for communication in landscape architecture research.



- 520 The Northern Rocky Mountain Regional Landscape 4 (2-4) Prereq graduate standing. Biophysical characteristics of the Northern Rocky Mountain regional landscape.
- 521 Cultural Interpretation of the Regional Landscape 4 (2-4) Prereq graduate standing. Cultural characteristics of the Northern Rocky Mountain regional landscape.
- 525 Landscape Modeling 3 (1-6) Prereq L A 477 or equivalent. Visual and cartographic landscape modeling through application of GIS and visualization technologies to landscape changes.
- 530 Philosophies and Theories of the Built Environment 3 Same as Arch 530.
- 540 Research Methods 3 Same as Arch 540.
- 550 Design Applications 2 Same as Arch 550.
- 560 Interdisciplinary Seminar 3 Same as Arch 560.
- 561 Interdisciplinary Seminar II 3 Same as Arch 561.
- 600 Special projects of Independent Study Variable credit. S, F grading.
- 700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.

## Hospitality Business Management

(See Business Administration)

## Department of Human Development

hd.wsu.edu/grad

Degree offered: **M.A.**

Faculty working with graduate students: **11**

Graduate students: **12**

Students receiving assistantships or scholarships: **83%**

Tests required: **GRE; TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

### Admission Requirements

Applicants should have a bachelor's degree in human development or a related field (e.g., psychology, sociology). To apply, submit an application form; a written statement specifying qualifications, educational goals, and career objectives; official GRE scores; official TOEFL or IELTS scores (international applicants only); official copies of all college transcripts; and three letters of reference.

### Program Description

The program is a prevention-based graduate program that promotes the well-being of children, youth, and families. Through their coursework, research, and practical experiences, students receive an integrated education in developmental and family theories, research, and application.

Using a prevention science approach, the master's program provides students with valuable skills such as needs assessment, program development, and program evaluation that prepare them for careers in educational and social service settings; the strong research emphasis and thesis experience prepare interested students for doctoral programs and careers in research and teaching.

Numerous departmental resources support the integrative mission of the program, including the Child Development Laboratory, a department-run, on-campus early childhood program, and university extension programs for youth and families throughout the state.

Graduates of the program are highly desired by employers in human service agencies, early childhood education, school-age child care programs, Head Start, programs for adolescents, and community college teaching.

### **Contact Information**

Thomas Power, Chair  
Department of Human Development  
PO Box 644852  
Pullman, WA 99164-4852  
Telephone: 509-335-9540  
Fax: 509-335-2456  
E-mail: [tompson@wsu.edu](mailto:tompson@wsu.edu)

### **Graduate Opportunities**

Human services administration (e.g., director of a community action center); Primary service (e.g., parent educator, family case worker, probation counselor); Policy development (e.g., state agencies, advocacy work); University cooperative extension (e.g., 4-H, family living faculty); Prevention positions (e.g., school district or health department positions); Community college teaching

### **Positions Held by Recent Graduates**

Case worker, Stepping Stones, Moscow, ID; Counselor, worker retraining program, Lake Washington Technical College; Relocation program manager, army base, Stuttgart, Germany;  
Employment training specialist, Community Action Center, Pullman; Client service coordinator, Multiple Sclerosis Foundation, Seattle; Distance degree instructor, WSU;  
Veterans' counselor, Omak, WA; Counselor, Catholic and Family Services, Yakima, WA;  
Health educator, Health Department, Bend, OR; Contact Information Thomas Power, Chair

### **Faculty Interests**

**Chris Blodgett**, WSU Spokane, Director of the Child and Family Research Unit: Conducts research programs at the national and state level addressing child care needs assessment, domestic violence prevention, and child neglect and abuse. [blodgett@wsu.edu](mailto:blodgett@wsu.edu)

**Brenda Boyd**, Director of the Child Development Laboratory: Child care staff retention and turnover, outcomes assessment in early childhood education. [boydb@mail.wsu.edu](mailto:boydb@mail.wsu.edu)

**Matthew Bumpus**: Work and family, especially link between work-related stress and family processes: mother-child and father-child relationships; and parental monitoring and knowledge. [mbumpus@wsu.edu](mailto:mbumpus@wsu.edu)

**Debbie Handy**, State Administrator of the Washington Family, Career, and Community Leaders of America: Student learning and engagement, the role of technology in learning, and adolescent prevention programming. [handy@wsu.edu](mailto:handy@wsu.edu)

**Laura Hill**: Motivation and social cognition in relation to adjustment in middle childhood and adolescence; implementation and dissemination of prevention programming for children and families. [laurahill@wsu.edu](mailto:laurahill@wsu.edu)

**Jared Lisonbee**: Social relationships (teacher and peer) and physiological and cognitive functioning in early childhood education settings; selection factors (e.g., family influences) on children's early social and academic competence. Thomas Power: Parent-child relationships, with an emphasis on how parents influence children's coping with stress; early childhood assessment and children's play. [tompson@wsu.edu](mailto:tompson@wsu.edu)

**Kathleen Boyce Rodgers**: How individual, family, and non-family environments influence positive

youth development and the reduction of risk behaviors; focus on youth asset mapping and faith-based mentoring of adolescent mothers. *rodgersk@wsu.edu*

**Mary Wandschneider**, Human Development Internship Coordinator: Research on the professional development of child care providers and on the careers of Human Development graduates.  
*wandsch@wsu.edu*

**Nicole Werner**: Peer influences on problem behavior, family-peer linkages, gender differences in adjustment, prevention and treatment of relational aggression. *nwerner@wsu.edu*

**Margaret Young**: The psychological adjustment of grandparents who are primary caregivers to their grandchildren, young adults' death anxiety, attitudes toward aging, and attitudes toward corporal punishment. *youngm@mail.wsu.edu*

### **Human Development**

510 Proseminar in Human Development 1 Introduction to human development profession, departmental faculty and their research, WSU resources, conducting research, writing thesis; preparation for field placement.

511 Theory and Substance of Human Development I 3 Prereq graduate standing. Human development theories; application to life span development, cultural variations, resources, problem solving, interaction of families and individuals with other systems.

512 Theory and Substance of Human Development II 3 Prereq H D 511. Continuation of 511; theory and application to concepts and issues in human development.

513 Research Methods in Human Development I 3 Prereq graduate standing. Introduction to process of research and methods in human development; techniques of research, data collection, and data analysis procedures. Cooperative course taught by WSU, open to UI students (FCS 521).

514 Research Methods in Human Development II 3 Prereq H D 513. Integration of formal decision making into the social science research process; procedures appropriate for experimental, quasi-experimental and field research. Cooperative course taught by WSU, open to UI students (FCS 522).

515 Seminar 2 Prereq H D 510, 512, 514, 598 or c//. Application of knowledge in professional settings, analysis and integration of internship experience with theoretical and substantive expertise.

520 Adolescence 3 Prereq graduate standing. In-depth examination of theories and research, developmental issues and prevention and intervention programs for school-aged child and adolescents.

523 Fundamentals of Participatory Research 3 Principles/methods of involving community/interest group members in knowledge generation to understand local issues while building local capacity.

535 Program Development in Child and Family Studies 3 Prereq graduate standing. Analysis and development of program delivery systems, curricula and evaluation models. Cooperative course taught jointly by WSU and UI (FCS 554).

540 Effective Intervention Programs 3 Prereq H D 530. Innovative effective prevention and intervention programs from theoretical, applied, and outcome evaluation perspectives.

550 Seminar on Family Relationships 3 Prereq graduate standing. Survey of family studies topics and issues examined from a research point of view.

558 Parent-Child Relationships 3 The reciprocal interactions among family members will be examined; theoretical perspectives and empirical findings will be explored in terms of implications for education and practice.

560 Seminar in Child Development 3 Prereq graduate standing. Survey of literature on selected areas in child development; discussion of research and application related to current issues and trends.

561 Advanced Curriculum for Early Childhood Programs 3 Opportunity to explore curriculum practices

in early childhood education; discussion, evaluation and adaptation of curricula based on current research.

562 Administration and Leadership in Programs 3 Examining early childhood administrator role; analysis and application of research to administration, developing concrete skills necessary for successful administration.

580 Families, Community and Public Policy 3 Prereq H D 513, 514 or approved graduate research methods course. Analysis of family policy research; role of family policy research in public policy and knowledge building processes. Cooperative course taught by WSU, open to UI students (FCS 580).

586 Special Topics in Human Development V 1-3 May be repeated for credit; cumulative maximum 6 hours. Prereq graduate standing. Assessment and evaluation of families and children.

595 Instructional Practicum V 1-4 May be repeated for credit; cumulative maximum 8 hours. Prereq senior standing. Supervised instructional practicum for departmental majors. S, F grading.

598 Professional Internship 3 Prereq H D 510. Supervised individual experiences with related organizations, businesses, or government agencies; opportunities for interaction with professionals in related fields. S, F grading.

600 Special Projects or Independent Study Variable credit. S, F grading.

700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.

## Individual Interdisciplinary Doctoral Program

<http://www.gradsch.wsu.edu/iidp.htm>

Degree offered: **Ph.D.**

Graduate students: **15**

Tests required: **TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

### Admission Requirements

Applicants must have a cumulative GPA of at least 3.5 in all graduate coursework and have received a master's degree from an accredited institution. The following materials must be submitted to the IIDP at the Graduate School in addition to the application required by the Graduate School available online (which includes the requirement of 3 letters of recommendation):

A brief description of the research area and a proposed program of study (no more than 3 pages).

A letter from a WSU faculty member willing to serve as advisor commenting on the student's potential for success and the proposed program sent directly to the IIDP Graduate Coordinator.

Emails from at least four permanent tenure-track WSU faculty members indicating their willingness to serve as committee members sent directly to the IIDP Graduate Coordinator.

A summary statement by the student of faculty interests and disciplines that has led the applicant to believe the IIDP is the program needed to best pursue the degree.

### Program Description

The individual interdisciplinary doctoral program is designed to meet the professional interests and research endeavors of each student. Although the program maintains a high degree of flexibility, it is a rigorous program and requires the involvement of the Graduate School as well as several academic

units on campus. The degree offers a unique opportunity for students seeking a breadth of knowledge not available within one particular discipline.

Each student works with an advisor and four additional members of the WSU faculty from at least three academic units. This committee oversees the development of the individual doctoral degree and works closely with the student to ensure a high quality doctoral education. The individual doctoral program must meet the following criteria: it will be of doctoral significance, no single recognized graduate degree-granting unit will be able to meet the student's needs, and the academic resources to complete the proposed program will be available at WSU.

### **Contact Information**

Dr. Lori Wiest  
Graduate School  
Washington State University  
PO Box 641030  
Pullman, WA 99164-1030  
Telephone: 509-335-6424  
Fax: 509-335-1949  
E-mail: lwiest@wsu.edu

### **Positions Held by Recent Graduates**

Since 1983, approximately 68 individual interdisciplinary doctorates have been earned at WSU. Graduates of the program now work as university and college faculty as well as educational consultants.

### **Example Dissertation Titles**

The Public Broadcasting Service: A Survey of Organizational Structure, Quality Programming, and Organizational Goals  
Managing for Improved Health Outcomes, Reduced Costs and Reduced Utilization in Type 2 Diabetic Patients  
Sex Abstinence Only or Sex Abstinence Plus Programs in the Schools: An Analysis of Effectiveness  
Visualization and Systematic Desensitization: Interventions for Habituating and Sensitizing Patterns of Public Speaking Anxiety  
Information Dissemination: The Case of Delayed Decision Making and the Diffusion of Innovations  
The Jefferson Peace Medal: A Cultural Phenomenon Passed Down from Chief to Chief In Walla Walla Culture, Circa 1805-1986  
Eye Movement Desensitization and Reprocessing (Emdr): Impacting Communication Apprehension  
Eye Candy: A Study of Experimental Design Communities and the Dialectical Surface of the Experimental Website  
The Effects of Psychological Characteristics, and Group Dynamics on Performance Enhancement  
Affective and Cognitive Responses to Minority TV Portrayals: Effects of Television News on Mexican American Perceptions of Own Group Members  
Dropping Out among Mexican-American Students: A Multicultural Perspective  
Socio-Cultural Metamorphosis in Istanbul After the 1980s: Spatial Analysis of Public Spaces  
Integrated Decision Making: The Case of Snake River Salmon Recovery

### **University**

590 Preparation for College Teaching 2 Prereq graduate student/TA appointment. Cross-discipline instructional development for graduate teaching assistants; course development teaching techniques,

university policies and procedures. S, F grading.

591 Interdisciplinary Studies 1 May be repeated for credit. Contemporary issues in interdisciplinary education and research. Open to all interested students.

597 Preparing the Future Professorate 2 Prereq doctoral student status. Course provides students with understanding and contextual knowledge of the professorate and issues facing higher education.

598 Seminar in Interdisciplinary Studies 1 May be repeated for credit; cumulative maximum 3 hours. Prereq Univ 591. Seminar on theory and practice of advanced interdisciplinary doctoral study.

800 Doctoral Research, Dissertation, and/or Examination Variable credit. (For Interdisciplinary PhD only) S, F grading.

## **Integrated Pest Management**

(See Entomology)

## **Program in Interdisciplinary Design**

[www.idi.spokane.wsu.edu](http://www.idi.spokane.wsu.edu)

Degree offered: **Doctor of Design (D.Des.)**

Faculty working with graduate students: **2**

Graduate students: **5**

Students receiving assistantships or scholarships: **100%**

Tests required: **GRE; TOEFL or IELTS (international only).**

Program offered: **Spokane, Pullman (students can enroll in Pullman, must take core courses in Spokane).**

**Deadline: Fall—January 10**

**Spring—July 1**

### **Admission Requirements**

a completed Graduate School application;

official transcripts from all colleges and universities from which credit has been received;

curriculum vita or resume;

statement of purpose (not to exceed 1500 words);

documentation of two faculty members whose research expertise matches your interest area;

three letters of recommendation from educational and/or professional references who can speak to the applicant's research and academic potential and ability to succeed in a doctoral program;

GRE scores; for international students, TOEFL (minimum score of 600 paper test, 250 computer test), or IELTS;

and an exhibit of work illustrating the applicant's interests and abilities in areas related to the design disciplines at Washington State University. The work may be presented via hard copy reprints, web accessibility, CD, DVD, or combined media as appropriate. (Materials will be returned to the applicant

after admission decisions have been made in mid-February. Please include a stamped, self-addressed envelope for the return of these materials).

### **Program Description**

The Doctor of Design (D. Des) is offered through the Interdisciplinary Program at the Interdisciplinary Design Institute, Washington State University Spokane. The D. Des is a unique doctoral degree, on the same level of intellectual rigor as the PhD, but designed expressly for integrating cross-disciplinary research towards design applications.

The D. Des addresses a demonstrated void in design education by specifically bridging education, research, and practice within a philosophical and pedagogical framework of interdisciplinary inquiry and critical synthesis. For the purposes of this degree, “design” is broadly defined as the creative integration of disparate components of knowledge, resources, and experience towards an applied outcome that contributes to socio-cultural well-being.

Concurrent to the interdisciplinary focus of the program is the development of specific disciplinary goals designed to deepen knowledge and investigative methodologies inherent in and supportive of each of the design professional fields. Each candidate will apply the appropriate philosophical, technical and/or synthetic focus to their study and will develop critical content to their research contributing in innovative and original ways.

### **Contact Information**

Nancy Blossom, MA, FIDEC, IIDA  
Interdisciplinary Design Institute  
Washington State University Spokane  
PO Box 1495  
Spokane, WA 99210-1495  
Telephone: 509-358-7920  
E-mail: blossom@wsu.edu

### **Department of Interior Design**

[www.idi.spokane.wsu.edu](http://www.idi.spokane.wsu.edu)

Degree offered: **M.A.**

Faculty working with graduate students: **8**

Graduate students: **17**

Students receiving assistantships or scholarships: **25%**

Degree offered: **Spokane**

Tests required: **TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

### **Requirements**

Bachelor’s degree from an accredited program in interior design or related degree (applicants without design backgrounds will be considered for the 3-year program).

3.0 minimum GPA.

Official transcripts.

Personal statement addressing the applicant's interest in pursuing the Master of Arts in Interior Design, anticipated career path, and specific areas of research interest.

Three letters of recommendation written by college level professors or advisors, or professional references that address the applicant's ability for intellectual engagement, creative thinking, attitude, and motivation.

Written essay or visual evidence that demonstrates creativity.

All other requirements as outlined by the WSU Graduate School.

International students only: TOEFL (Minimum score of 550 paper-based test; 213 computer-based test) or IELTS.

### **Program Description**

The Master of Arts in interior design increases students' understanding of the relationship between human behavior and interior environments through advanced study and hands-on research. The program builds on the design studio experience to provide students with an opportunity for further exploration and discovery in the field. Students gain knowledge and skills that prepare them to analyze information and relationships, evaluate issues, and set priorities, while creating functional and high-quality design solutions for complex projects.

### **Graduate Opportunities**

The Master of Arts in interior design positions students for successful careers in a wide array of settings. Graduates provide design services as practicing professionals, work in academia as interior design educators, and pursue research in the field of interior design. This graduate degree also provides a strong interdisciplinary knowledge and practice background for those working toward doctoral studies.

### **Positions Held by Recent Graduates**

Recent graduates have been hired by notable firms: Callison, Malcomb Architects, Interior Architects, Holland Roth Architects, Burgess Weaver Design Group, Hansen Architects, JL Warren Interiors, and Clodagh.

### **Contact Information**

Jaime Rice, Ed.M., Academic Coordinator

Washington State University Spokane

Interdisciplinary Design Institute

PO Box 1495

Spokane, WA 99210-1495

Telephone: 509-358-7945

Fax: 509-358-7900

E-mail: [jlrice@wsu.edu](mailto:jlrice@wsu.edu)

### **Faculty Interests**

**Nancy Blossom**, Chair, FIDEC, IIDA: History theory and criticism, environment-behavior relationships, curriculum and pedagogy. [blossom@wsu.edu](mailto:blossom@wsu.edu)

**Nancy Clark Brown**: Innovative teaching methodologies, lighting design, theoretical and spatial frameworks of the body in interior space. [ncbrown@wsu.edu](mailto:ncbrown@wsu.edu)



**Tina Johansen:** Design accuracy versus design creativity; codes and regulations as they relate to accessibility design; how the design of the built environment affects disabled tenants' satisfaction with their living environment; universal design. *johansen@wsu.edu*

**Robert Krikac:** The integration of history, theory, and research with the practice of interior design; sketching as thinking; interdisciplinary design and issues related to the design of commercial offices. *rkrikac@wsu.edu*

**Janetta McCoy:** The impact of the physical work environment on the intellectual and physical performance of people within organizations; leadership in design and creative teamwork; stress as an outcome of the work environment; gender bias in teaching evaluations; design for children with autism and development disabilities. *janettamccoy@wsu.edu*

**Matt Melcher:** Poetics of assembly, detail and materiality, graphic communication, and representation; urban space as interior design; light and phenomenology; process as product in the design discipline. *melcher@wsu.edu*

**Jo Ann Asher Thompson,** FIDEC, FIIDA, ASID: Environment-behavior relationships; distance learning education; cognitive perceptions of interior space; linking education and practice; criticism and theory. *jatadm@wsu.edu*

**John Turpin:** Interior design history; women's studies in interior design; design criticism and theory. *jturpin@wsu.edu*

### **Interior Design**

520 Historical Perspectives of Interior Space 3 Prereq graduate standing. Historical perspectives of interior environments, spatial distributions, furnishings, and related design elements from ancient Egypt to the 18th century.

525 Interior Design Graduate Studio I 5 (0-10) Prereq I D 426. Graduate studio; application of advanced design theories, philosophies and research methodologies to enhance undergraduate design foundations through interdisciplinary studio experiences.

526 Interior Design Graduate Studio II 5(0-10) Prereq I D 525. Graduate studio; individual thesis topics and the application of advanced design theories, philosophies, and research methodologies to student's focus topic.

528 International Design and Industry Experience 3 Study abroad working with design and industry representatives in Europe. Graduate level counterpart of ID 428. Credit not granted for both I D 428 and 528.

530 Philosophies and Theories of the Built Environment 3 Same as Arch 530.

540 Research Methods 3 Same as Arch 540.

550 Design Applications 2 Same as Arch 550.

560 Interdisciplinary Seminar 3 Same as Arch 560.

561 Interdisciplinary Seminar II 3 Same as Arch 561.

594 Readings in Interior Design 3 Prereq graduate standing. Exploration of current topics through readings in interior design.

597 Advanced Design Theory 3 Prereq I D 425. Environmental and product design theory and development.

598 Topics in Interior Design V 1-3 May be repeated for credit; cumulative maximum 6 hours.

600 Special Projects or Independent Study Variable credit. S, F grading.

700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.

702 Master's Special Problems, Directed Study and/or Examination Variable credit. S, F grading.

## Program in Materials Science

### Doctor of Philosophy (Materials Science)

*Professor and Chair, K. Hipps; Professors, S. Antolovich, G. Collins, J. T. Dickinson, C. Kang, M. Kuzyk, K. Liddell, K. Lynn, U. Mazur, J. McHale, G. Norton, M. Osman, K. Peterson, R. Poshusta, L. Wang, R. Willett, H. Zbib; Associate Professors, D. Bahr, A. Bandyopadhyay, S. Dexheimer, W. Johns, A. DeQuan Li, C. Richards, R. Richards, L. Smith, B. Pate, M. Wolcott; Assistant Professors, D. Blume, S. Bose, D. Chiang, D. Field, M. Kang, M. P. Laborie, M. McCluskey, S. Mesarovic, L. Scudiero, J. Zhang; Adjunct Faculty, L. Wang.*

Materials science includes the principles and practice of designing, synthesizing, characterizing, preparing, and fabricating useful materials. The Materials Science Program accepts qualified bachelor's and master's graduates in the sciences and engineering who now wish to pursue graduate research for a PhD in the area where the disciplines overlap. Materials science is an interdisciplinary program and this feature is emphasized in the research activities.

Requirements for the Materials Science PhD include a minimum of 72 credit hours of which at least 34 hours are graded course work. The common ground for all participants in materials science is covered by the core of courses (16 credits) required of all students. The core provides a general overview to the field as well as advanced courses in thermodynamics, solid state physics, applied mathematics, and materials characterization. All students must attend the materials science seminar series, which provides an opportunity to find out the current research activities in the program and associated departments. After completion of the core of courses, students then select additional courses (a minimum of 18 credit hours) in areas that are applicable to their research program. These courses can come from any area of physical science, engineering, and mathematics.

All students complete an original research dissertation (MatS 800). After admission to candidacy for the degree, students select a research supervisor from the materials science faculty. A broad spectrum of contemporary research areas is available.

### Materials Science

**501 Advanced Topics in Materials Science** 2 or 3 Chemical crystallography, microstructure, ultra-structure, theories of crystalline and non-crystalline solids, rheology and fracture mechanism of materials. May be repeated for credit; cumulative maximum 6 hours. Cooperative course taught by WSU, open to UI students (Met 544).

**503 Advanced Topics in Materials Engineering** V 1-3 May be repeated for credit; cumulative maximum 6 hours.

**505 Advanced Materials Science** 4 Same as MAT S 505.

**513 Crystal Plasticity** 3 Rec Math 440. Dislocation theory; slip; climb; mechanical properties of polycrystalline materials, and application to important deformation processes.

**514 Thermodynamics of Solids** 3 Rec MSE 312. Thermodynamic properties of solid solutions; models for substitutional and interstitial solutions; configurational and non-configurational contributions; calculation of phase diagrams.

**515 Electronic Properties of Materials** 3 Electron energy bands in solids, electrical conduction in metals and semi-conductors, applications to semi-conduction devices based on silicon and III-V compounds.

**516 Phase Transformations** 3 Rec MSE 314, 416. Thermodynamics, nucleation, interface motion, mechanisms and kinetics of chemical reactions between solid metals and their environment.

517 **Thin Films** 3 Prereq graduate standing or senior in engineering or science. Materials science aspect of thin films, including growth, characterization, and properties for electrical, mechanical, corrosion, and optical behavior.

519 **Corrosion and Oxidation of Metals** 3 Prereq MSE 316. Basic corrosion and oxidation mechanisms for various metals with emphasis on those pertaining to stainless steels.

521 **Statistics of Microstructures** 3 Prereq Math 440, 540 or permission of instructor. Stereology, orientation and spatial distributions, percolation, measurement techniques application to modeling of microstructures.

523 **Ceramics Processing** 3 Prereq graduate standing. Fundamentals of ceramic processing science for thin films and bulk ceramics.

537 **Fracture Mechanics and Mechanisms** 3 Fracture mechanics and mechanisms and the microstructural origins of toughness in metals polymers, and composites.

543 **Natural and Synthetic Polymeric Materials** 3 Rec MSE 402. Glassy, crystalline, and rubbery states of synthetic and natural polymers

546 **Parameters for Synthesis of Wood Composition Materials** 3 Theory and practice of wood composite materials, manufacture and development. Cooperative course taught by WSU, open to UI students (ForPr 537).

547 **Basic Principles of Adhesion** 3 Rec MSE 402. Principles of interfacial bonding applied in the engineering of polymers, wood and heterophase systems.

548 **Reinforced Polymer and Wood-based Composites** 3 Fundamentals of composite materials having polymers and wood as major components.

549 **Nondestructive Testing of Wood-Based Materials** 3 Same as CE 536.

592 **Transmission Electron Microscopy** 3 Development of the principles and applications of electron optics in microscopy.

600 **Special Projects or Independent Study** Variable credit. S, F grading.

700 **Master's Research, Thesis, and/or Examination** Variable credit. S, F grading.

702 **Master's Special Problems, Directed Study, and/or Examination** Variable credit. S, F grading.

800 **Doctoral Research, Dissertation, and/or Examination** Variable credit. S, F grading.

### **Mechanical Engineering**

501 **Continuum Mechanics** 3 Prereq graduate standing. Unified presentation of principles common to all branches of solid and fluid mechanics; viscous fluids, elasticity, viscoelasticity, and plasticity.

509 **MEMS Engineering** 3 (2-3). Prereq graduate standing or permission of instructor. Introduction to the design, fabrication and application of microelectromechanical systems.

515 **Advanced Heat Transfer** 3 Rec M E 404, 521. Derivation of the energy conservation equation; laminar and turbulent forced convection heat transfer with internal and external flows; free convection. Cooperative course taught jointly by WSU and UI (ME 546).

516 **Conduction and Radiation Heat Transfer** 3 3 Prereq M E 404. Principles of conduction and radiation heat transfer with focus on solving conduction and radiation problems of engineering interest.

521 **Fundamentals of Fluids** 3 Prereq C E 315 or M E 303. Governing equations of fluid mechanics accompanied by applications of Navier-Stokes equation to simple flow situations, boundary layer analysis.

522 **Fundamentals of Fluids II** 3 Rec M E 521. Viscous shear layers including heat and mass transfer, compressibility effects, vortex dynamics, stability and transition, turbulence analysis and modeling.

523 **Engineering Acoustics** 3 Prereq graduate standing. Fundamentals of acoustics including wave theory; transmission through layers; generation and reception, low frequency models; application to

sound measurement, transducers, loudspeaker cabinet design, and nondestructive testing; acoustic design project required. Cooperative course taught by UI (ME 513), open to WSU students.

**526 Microscopic Thermodynamics** 3 Microscopic development of equilibrium; classical and quantum particle statistics; statistical description of real and ideal gases, solids, and liquids. Cooperative course taught jointly by WSU and UI (ME 526).

**527 Macroscopic Thermodynamics** 3 Advanced thermodynamics from macroscopic viewpoint; basic postulates, equilibrium, stability, property relations; application to thermal-fluid and solid mechanics; irreversible thermodynamics. Cooperative course taught jointly by WSU and UI (ME 527).

**530 Elasticity** 3 Prereq graduate standing. Theory of kinematics of solid deformable bodies; conservation laws applied to an elastic continuum; generalized linear stress-strain behavior with applications.

**531 Theory of Plasticity** 3 Rec M E 501. The fundamentals of the theory of plasticity; the classical theory of plasticity; the classical theory and modern continuum theories of large elasto-plastic deformations.

**532 Finite Elements** 3 Same as C E 532. Cooperative course taught jointly by WSU and UI (CE 546).

**534 Mechanics of Composite Materials** 3 Prereq ME 414. Analysis of micromechanical and macromechanical behavior of composite materials with emphasis of fiber-reinforced composite; prediction of properties; stiffness and strength theories; laminated beams and plates; dynamic behavior; environmental effects. Cooperative course taught jointly by WSU and UI (ME 534).

**537 Fracture Mechanics and Mechanisms** 4 Same as MSE 537.

**540 Advanced Dynamics of Physical Systems** 3 Newtonian dynamics, rotating coordinate systems; Lagrangian and Hamiltonian mechanics; gyroscopic mechanics, other applications. Cooperative course taught by WSU, open to UI students (M E 504).

**541 Advanced Mechanical Vibrations** 2 or 3 Rec M E 449. Response of single and multi degree of freedom systems; finite element formulation; matrix methods, random vibrations. Cooperative course taught by WSU, open to UI students (ME 572).

**542 Optimal Control of Dynamic Systems** 3 Introduction to optimal control theory, differential games, and multiple criteria systems. Applications in engineering, biology, economics, agriculture, and medicine. Cooperative course taught by WSU, open to UI students (ME 542).

**544 Optimal Systems Design** 3 Parameter design optimization techniques for nonlinear systems; theory, numerical methods, and applications; multiple criteria optimal trade-off analysis and game theory.

**545 Nonlinear Dynamics** 3 Rec ME 540 or 541. Fundamentals of nonlinear oscillations, stability theory, perturbation methods, and chaotic behavior in nonlinear dynamical systems.

**551 Turbulent Flow** 3 Rec C E 521 or M E 521. Turbulent flow; dimensional analysis, statistical models and descriptions of organized structures.

**552 Experimental Methods in Thermal-Fluid Science** 3 (2-3) Theory and practice in the use of instrumentation for measuring temperature, velocity, pressure and concentration; measurement of classical flow fields.

**553 Two-Phase Flow** V 1-3 May be repeated for credit, cumulative maximum 3 hours. Rec M E 521. Fundamentals of the flow of fluids with two phases and applications. Cooperative course taught by WSU, open to UI students (ME 553).

**556 Numerical Modeling in Fluid Mechanics** Prereq C E 315. Same as C E 556.

**561 Combustion** 3 Rec M E 521. General combustion phenomena, chemical reactions, combustor modeling, laminar and turbulent flame theory, emissions. Cooperative course taught by WSU, open to UI students (ME 561).

562 **Nuclear Reactor Theory** 3 Prereq ME 461; Differential equations. Basic reactor neutronic theory including the transport equation; multi-group, multi-region diffusion theory; kinetics; and perturbation theory.

565 **Nuclear Reactor Engineering** 3 Prereq ME 461. Reactor power distribution; thermal and exposure limits; critical heat flux and pressure design; neutronic/thermal hydraulic relationships; transient/accident analysis.

569 **Advanced Topics in Thermal and Fluid Sciences** V 1-3 Advanced topics in thermodynamics, heat transfer or fluid mechanics; analytical and experimental methods. May be repeated for credit.

574 **Foundations of CAD** 3 Topics fundamental to the creation of CAD, engineering visualization, and virtual reality based engineering software. Cooperative course taught by WSU, open to UI student (M E 574).

575 **Geometric Modeling** 3 Study of the mathematics behind the creation of complex shapes for CAD using curves, surfaces, and solids.

579 **Advanced Topics in Design and Manufacturing** V 1-3 May be repeated for credit.

598 **Seminar** 1 Current research interests. May be repeated for credit. S, F grading.

600 **Special Projects or Independent Study** Variable credit. S, F grading.

700 **Master's Research, Thesis, and/or Examination** Variable credit. S, F grading.

702 **Master's Special Problems, Directed Study, and/or Examination** Variable credit. S, F grading.

800 **Doctoral Research, Dissertation, and/or Examination** Variable credit. S, F grading.

Materials Science and Engineering

(See Mechanical and Materials Engineering)

## Department of Mathematics

[www.math.wsu.edu](http://www.math.wsu.edu)

Degrees offered: **M.S., Ph.D.**

Faculty working with graduate students: **26**

Graduate students: **35**

Students receiving assistantships or scholarships: **94%**

Tests required: **TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

### Requirements

Applicants to graduate study in the department of mathematics should have a background in mathematics equivalent to that provided by an undergraduate degree (major) in mathematics from a U.S. university. To apply, submit a letter of application stating qualifications, personal goals, and objectives of graduate study; official copies of all college transcripts; 3 confidential letters of recommendation; and official TOEFL or IELTS scores (international students only).

### Program Description

The department of mathematics offers graduate programs leading to the degrees of M.S. in mathematics (which also has an applied mathematics option and a mathematics teaching option), Ph.D. in mathematics, and Ph.D. in mathematics with teaching emphasis. Courses of study are available in all of the principal branches of mathematics with special emphasis in the applied areas of operations research, computational mathematics, applied statistics, discrete mathematics, and mathematical modeling, as well as in the more traditional fields of number theory, finite geometry, to-

pology, algebra, and analysis.

### Contact Information

K. A. Ariyawansa, Ph.D.  
Chair, Graduate Studies Committee  
Department of Mathematics  
Washington State University  
PO Box 643113  
Pullman, WA 99164-3113  
Telephone: 509-335-3152  
Fax: 509-335-1188  
E-mail: ari@wsu.edu

### Graduate Opportunities

Faculty positions in universities; Research scientist positions in national laboratories;  
Engineer/scientist positions in industries

### Positions Held by Recent Graduates

Professor and chairman of mathematics, University of North Dakota; Chairman, Department of Computer Science, Boise State University; Associate professor of mathematics, Portland State University; Assistant professor of mathematics, University of Wisconsin-Stevens Point  
Research manager, Delta Dental Corporation, Eagan, Minnesota; Software design engineer, Microsoft Corporation, Redmond, Washington; Senior engineer/scientist, United Defense LP, Minneapolis, Minnesota; Research scientist, SANDIA National Laboratory, New Mexico

### Faculty Interests

**K. A. "Ari" Ariyawansa:** Theoretical, algorithmic, applicational and software aspects of mathematical programming, optimization and operations research; applied statistics; and applied mathematics.  
*ari@wsu.edu*

**Sandra Cooper:** Rational approximation with an emphasis on orthogonal Laurent polynomials and continued fraction; math, science, and engineering education with a particular focus on gender, race, and ethnicity issues. *scooper@math.wsu.edu*

**Duane DeTemple:** Combinatorial geometry, graph theory, and mathematics education.  
*detemple@math.wsu.edu*

**Robert Dillon:** Developing mathematical and computational models of biological and environmental systems as well as numerical methods for the partial differential equations associated with these models. *dillon@math.wsu.edu*

**Alan Genz:** Numerical computation of multiple integrals, especially those arising in statistical analysis; parallel implementation of various algorithms. *alangen@wsu.edu*

**Richard Gomulkiewicz:** Development and analysis of mathematical models that describe the population-level responses of species facing novel environments, the evolution of environmentally sensitive traits, and the evolution of sexually selected traits. *gomulki@wsu.edu*

**Matt Hudelson:** Probabilistic approaches to geometric and combinatorial problems; methods for maximizing the content of a  $j$ -simplex bounded by the unit  $d$ -cube; questions concerning random walks on graphs. *hudelson@math.wsu.edu*

**Michael Jacroux:** Development of optimal and robust experimental designs for estimates in linear, nonlinear and spatial statistical models. *jacroux@wsu.edu*

**Krishna Jandhyala:** Solving change-point problems that deal with statistical inference of models where changes in parameters might occur at unknown times. *jandhyala@wsu.edu*

**Michael Kallaher:** Combinatorics and finite geometry, in particular, in obtaining “reasonable” classification of finite translation planes that arise in block design problems and coding theory; affine planes. *mkallaher@wsu.edu*

**Darrell Kent:** Topology with a primary focus on convergence space, Cauchy space, ordered topological space, uniform and quasi-uniform space, completion, and compactifications. *dkent@wsunix.wsu.edu*

**Alexander Khapalov:** Control theory of semilinear partial differential equations; control and stabilization of bilinear and nonlinear ODE’s. *khapala@math.wsu.edu*

**Bala Krishnamoorthy:** Theoretical and computational aspects of integer programming and combinatorial optimization; bioinformatics and computational biology; finding potential applications of operations research techniques in computational biology. *bkrishna@math.wsu.edu*

**Haijun Li:** Stochastic convexity, comparison methods for stochastic processes, aging properties of first passage times for Markov processes, multivariate distributions with given marginals, and the application of these topics in reliability and queuing theory. *lih@math.wsu.edu*

**V. S. “Mano” Manoranjan:** Mathematical and computer modeling of nonlinear phenomena that arise in engineering and life sciences; computational linear algebra; developing efficient numerical techniques suitable for parallel computing. *ziya@wsu.edu*

**Judith McDonald:** Matrix analysis with focuses in four areas: the inverse eigenvalue problem, eventually nonnegative matrices, M-matrices, and complex ray patterns. *jmcdonald@math.wsu.edu*

**Robert Mifflin:** Developing efficient computational methods for solving applied optimization problems defined with constraints on the problem variables and/or nonsmooth functions of the variables. *mifflin@math.wsu.edu*

**Alexander Panchenko:** Network approximation for effective parameters of concentrated suspensions, homogenization of unconsolidated composites and media with moving interfaces, modeling of osteoporosis and blood circulation, and inverse conductivity problem with rough conductivities. *panchenko@math.wsu.edu*

**Francis Pascual:** Experimental designs that are robust to model misspecification and designs for model discrimination; correct selection problems and multiple comparisons in logistic regression. *jpascual@math.wsu.edu*

**Edward Pate:** Muscle physiology, especially in constructing mathematical models that are guided by experimental findings. *epate@wsu.edu*

**Mark Schumaker:** Mechanisms for transport through ion Channels, with current focus on models that incorporate information from molecular dynamics. *schumaker@wsu.edu*

**Michael Tsatsomeros:** Matrix analysis, applied linear algebra with current emphasis on nonnegative matrix theory and generalizations, numerical range of matrix polynomials. *tsat@math.wsu.edu*

**David Watkins:** Computational linear algebra and scientific computing, with special emphasis on eigenvalue problems. *watkins@math.wsu.edu*

**William Webb:** Number theory and combinatorics, especially fair division, recurrence sequences, binomial and generalized binomial coefficients and polynomials over finite fields; application of these concepts in cryptography. *webb@math.wsu.edu*

**David Wolkind:** Modeling phenomena from the natural and engineering sciences by means of mathematical methods; main emphasis on comparing mathematical predictions with experimental or

observational data. *dwoalkind@wsu.edu*

**Hong-Ming Yin:** Partial differential equations arising in physical sciences and engineering; specifically, problems in microwave heating, thermal effects on semiconductors, and solid-liquid/solid-solid change processes. *hyin@wsu.edu*

### Mathematics

500 Proseminar 1 May be repeated for credit; cumulative maximum 2 hours. S, F grading.

501 Real Analysis 3 Prereq Math 402. Metric spaces, convergence, continuous functions, infinite series, differentiation and integration of functions of one and several variables.

502 Introduction to Functional Analysis 3 Prereq Math 420, 501. Normed linear spaces Banach spaces, introduction to Hilbert space, linear operations.

503 Complex Analysis 3 Prereq Math 501. Analytic functions, complex integration, Taylor and Laurent series, conformal mapping, Riemann surfaces and analytic continuation. Cooperative course taught jointly by WSU and UI (Math 531).

504 Measure and Integration 3 Prereq Math 501. Lebesgue measure, Lebesgue integration, differentiation, L spaces general measure and integration, Radon-Nikodym Theorem, outer measure and product measures. Cooperative course taught jointly by WSU and UI (Math 571).

505 Abstract Algebra 3 Prereq Math 421. Groups, rings, fields and homological algebra.

506 Abstract Analysis 3 Prereq Math 502. Generalized measure and integration, topological vector spaces, duality, advanced topics in functional analysis. Cooperative course taught jointly by WSU and UI (Math 572).

507 Advanced Theory of Numbers 3 May be repeated for credit, cumulative maximum 6 hours. Analytic and algebraic number theory. Cooperative course taught by WSU, open to UI students (Math 507).

508 Topics in Applied Analysis 3 Prereq Math 502. Advanced treatment of applications using techniques from fundamental analysis, convexity, analytic function theory, asymptotics, differential equations. Cooperative course taught by WSU, open to UI students (Math 508).

509 Foundations of Mathematics 3 The basis of mathematics in logic and set theory; continuum hypothesis; Godel's theorems, recent developments. Cooperative course taught by WSU, open to UI students (Math 509).

510 Topics in Probability and Statistics 3 Prereq stat course. Same as Stat 510. Credit not granted for both Math 410 and 510.

511 (554) Advanced Linear Algebra 3 Prereq Math 420. Vector spaces, unitary equivalence, similarity, Jordan forms, inner products, spectral theory, singular value decomposition, norms and inequalities. Cooperative course taught jointly by WSU and UI (Math 550).

512 Ordinary Differential Equations 3 Prereq Math 402. Existence of solutions; linear systems; qualitative behavior, especially stability; periodic solutions. Cooperative course taught jointly by WSU and UI (Math 539).

515 Statistical Packages 3 (2-3) Same as Stat 515.

516 Simulation Methods 3 Model formulation and simulation in business, industry, and government; simulation languages; analysis of simulation output; applications. Graduate level counterpart of Math 416; additional requirements. Credit not granted for both Math 416 and 516.

518 Mathematical and Scientific Visualization 3 Prereq graduate standing. Three-dimensional computer imaging of scientific, engineering, and mathematical phenomena using modern techniques for curve and surface display in computer-aided design. Graduate level counterpart of Math 418; additional requirements. Credit not granted for both Math 418 and 518.



523 Statistical Methods for Engineers and Scientists 3 Same as Stat 523. Credit not granted for both Math 423 and 523.

525 General Topology 3 Prereq Math 402. Sets, metric spaces, topological spaces; continuous mappings, compactness, connectedness, local properties, function spaces, and fundamental groups. Cooperative course taught jointly by WSU and UI (Math 511).

526 Advanced Topology 3 Prereq Math 421, 525. General topology; basic ideas of algebraic topology. Cooperative course taught jointly by WSU and UI (Math 512).

527 Algebraic Topology I 3 Prereq Math 526. Basic homotopy theory and application. Cooperative course taught by UI (Math 523) open to WSU students.

528 Algebraic Topology II 3 Prereq Math 527. Continuation of Math 527. Cooperative course taught by UI (Math 524), open to WSU students.

531 Intersections of Culture and Mathematics 3 (2-2) May be repeated for credit. Graduate-level counterpart of Math 431; additional requirements. Credit not granted for both Math 431 and 531.

532 Mathematics for College and Secondary Teachers 2 Prereq graduate standing. Pre-algebra and algebra from a mature point of view; properties of systems; open sentences; equations; functions and graphs. Graduate level counterpart of Math 432; additional requirements. Credit not granted for both Math 432 and 532.

534 Approaches to Mathematics Teaching 3 Prereq Math 531, 532. Instruction and curricula of mathematics content for community college and high school, covering basic arithmetic through calculus.

536 Statistical Computing 3 (2-3) Same as Stat 536.

540 Applied Mathematics I 3 Prereq graduate standing. Partial differential equations; Fourier series and integrals; Bessel functions; calculus of variations; vector calculus; application. Graduate level counterpart of Math 440; additional requirements. Credit not granted for both Math 440 and 540.

541 Applied Mathematics II 3 Prereq graduate standing complex variable theory including analytical functions, infinite series, residues, and conformal mapping; Laplace transforms; applications. Graduate level counterpart of Math 441; additional requirements. Credit not granted for both 441 and 541.

543 Approximation Theory 3 Prereq Math 448. Univariate polynomial and rational approximation techniques; approximation using splines and wavelets; selected topics in multivariate approximation; algorithms for approximation. Cooperative course taught by WSU, open to UI students (Math 543).

544 Advanced Matrix Computations 3 Prereq Math 548. Advanced topics in the solution of linear systems and eigenvalue problems, including parallel matrix computations. Cooperative course taught by WSU, open to UI students (Math 548).

545 Numerical Analysis of Evolution Equations 3 Prereq Math 448. Discretization and numerical solution of partial differential equations of evolution; stability, consistency, and convergence; shocks; conservation of forms. Cooperative course taught by WSU, open to UI students (Math 545).

546 Numerical Analysis of Elliptic PDEs 3 Prereq Math 448. Methods of discretizing elliptic partial differential equations and solving the resulting systems of equations; error analysis. Cooperative course taught by WSU, open to UI students (Math 547).

548 Numerical Analysis 3 Prereq graduate standing. Fundamentals of numerical computation; finding zeroes of functions, approximation and interpolation; numerical integration (quadrature); numerical solution of ordinary differential equations. Graduate level counterpart of Math 448; additional requirements. Credit not granted for both Math 448 and 548.

550 Advanced Topics in Geometry 3 Projective, affine, and non-Euclidean geometries and their relation to abstract algebra and differential geometry. (a/y) Cooperative course taught by WSU, open to UI students (Math 554).

551 Ring Theory 3 Ideals quotient rings, modules, radicals, semi-simple Artinian rings, Noetherian rings. (a/y) Cooperative course taught by UI (Math 551), open to WSU students

552 Galois Theory 3 Field extension, automorphisms, normality, splitting fields, radical extension, finite fields, separability. Cooperative course taught by UI (Math 552), open to WSU students.

553 Graph Theory 3 Prereq graduate standing. Graphs and their applications, directed graphs, trees, networks, Eulerian and Hamiltonian paths, matrix representations, construction of algorithms. Graduate level counterpart of Math 453, additional requirements. Credit not granted for both Math 453 and 553.

555 Topics in Combinatorics 3 May be repeated for credit; cumulative maximum 6 hours. Combinatorics, generating functions, recurrence relations, inclusion-exclusion, coding theory; experimental design, graph theory.

556 Introduction to Statistical Theory 3 Same as Stat 556. Credit not granted for both Math 456 and 556.

560 Partial Differential Equations I 3 Prereq Math 402. Partial differential equations and other functional equations: general theory, methods of solution, applications. Cooperative course taught by WSU, open to UI students (Math 540).

561 Partial Differential Equations II 3 Prereq Math 560. Continuation of Math 560. Cooperative course taught by WSU, open to UI students (Math 542).

563 Mathematical Genetics 3 Prereq MbioS 301; Stat 412, 430, or 443; Math 273. Mathematical approaches to population genetics and genome analysis; theories and statistical analyses of genetic parameters.

564 Nonlinear Optimization I 3 Prereq advanced multivariate calculus and a programming language; Rec Math 464, 544. Theory and algorithms for unconstrained nonlinear optimization problems, including line search, trust region, conjugate gradient, Newton and quasi-Newton methods.

565 Nonlinear Optimization II 3 Prereq Math 273, 564; programming language. Theory and algorithms for constrained linear and nonlinear optimization including interior point, quadratic programming, penalty, barrier and augmented Lagrangian methods.

566 Optimization in Networks 3 Prereq graduate standing. Formulation and solution of network optimization problems including shortest path, maximal flow, minimum cost flow, assignment, covering, postman and salesman. Credit not granted for both 466 and 566.

567 Integer and Combinatorial Optimization 3 Prereq Math 464. Theory and applications of integer and combinatorial optimization including enumerative, cutting plane, basis reduction, relaxation and matching methods.

568 Statistical Theory I 3 Same as Stat 548.

569 Statistical Theory II 3 Same as Stat 549.

570 Mathematical Foundations of Continuum Mechanics I 3 Prereq advanced calculus and differential equations. The basic mathematical theory of continuum mechanics and its relation to perturbation techniques and stability methods. Cooperative course taught by WSU, open to UI students (Math 570).

571 Mathematical Foundations of Continuum Mechanics II 3 Prereq Math 570. Continuation of Math 570. Cooperative course taught by WSU, open to UI students (Math 573).

572 Quality Control 3 Prereq Stat/Math 360 or 443. Same as Stat 572.

573 Reliability Theory 3 Same as Stat 573.

574 (564) Topics in Optimization 3 May be repeated for credit. Prereq advanced multivariable calculus and a programming language, Rec Math 464, 544. Advanced topics in the theory and computing methodology in optimization with emphasis on real-life algorithmic implementations. Cooperative course taught by WSU, open to UI students (Math 564).

- 581 Seminar in Analysis V 1-3 May be repeated for credit. Cooperative course taught jointly by WSU and UI (Math 541).
- 582 Seminar in Algebra V 1-3 May be repeated for credit. Cooperative course taught jointly by WSU and UI (Math 561).
- 583 Seminar in Applied Mathematics V 1-3 May be repeated for credit. Cooperative course taught by WSU, open to UI students (Math 583).
- 584 Seminar in Topology and Geometry V 1-3 May be repeated for credit. Cooperative course taught by WSU, open to UI students (Math 584).
- 585 Seminar in Number Theory V 1-3 May be repeated for credit. Cooperative course taught by WSU, open to UI students (Math 587).
- 586 Mathematical Modeling in the Natural Sciences 3 Graduate level counterpart of Math 486; additional requirements. Credit not granted for both 486 and 586.
- 590 Seminar in Mathematics Education V 1-3 Prereq graduate standing. Topics in mathematics education.
- 591 Seminar in the History of Mathematics I 1 Topics in the history of mathematics to 1800.
- 592 Seminar in the History of Mathematics II 1 Topics in the history of mathematics from 1800 to present.
- 597 Mathematics Instruction Seminar 1 May be repeated for credit; cumulative maximum 5 hours. prereq graduate standing
- 600 Special Projects or Independent Study Variable credit. S, F grading.
- 602 Internship V 2-12 May be repeated for credit. Prereq 40 hrs graduate work. A structured internship from 3-9 months; teaching at the postsecondary level or applied work in a non-academic environment. S, F grading.
- 700 Master's Research, Thesis and/or Examination Variable credit. S, F grading.
- 702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.
- 800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

## School of Mechanical and Materials Engineering

[www.mme.wsu.edu](http://www.mme.wsu.edu)

**Degrees offered: M.S., Ph.D. Mechanical Engineering; M.S. Materials Science Engineering**

Faculty working with graduate students: **32**

Graduate students: **102**

Students receiving assistantships or scholarships: **93%**

Degree offered: **Pullman, Tri-Cities, Vancouver**

Tests required: **TOEFL or IELTS, GRE recommended**

Deadline: **Fall—January 10**

**Spring—July 1**

### Admission Requirements

Applicants should have a B.S. degree from an accredited program in mechanical engineering or materials science and engineering. Students with bachelor degrees in other engineering disciplines, mathematics, and the physical sciences are routinely admitted but may be required to meet additional course requirements. A minimum grade point average GPA of 3.0 on a 4.0 scale is required for admittance to the M.S. program, and 3.4 for the Ph.D. program. To apply please submit a Graduate School online application.

Also required are three letters of recommendation; a resume; a statement of purpose; a completed Student Interest Profile form; official transcripts from all non-WSU colleges or universities previously attended; official GRE scores; and TOEFL or IELTS scores (international students only). Get more information at <http://www.mme.wsu.edu/grad/apply.html>.

### **Program Description**

Our School offers specialization in disciplines such as MEMS, micro fluidics, biometric sensors, biomaterials, CAD, composites, computational mechanics, crystal growth, fluid mechanics, laser machining, multiphase processing, nanomaterials, portable power, sustainable manufacturing, thin films, and virtual reality. Our students are both full-time and part-time. Funding is available for dedicated, quality fulltime students. We also participate in the interdisciplinary programs leading to the degrees of M.S. in Engineering, Ph.D. in Engineering Science, and Ph.D. in Materials Science.

### **Contact Information**

Graduate Student Services  
School of Mechanical and Materials Engineering  
Washington State University  
201 Sloan Hall, PO Box 642920  
Pullman, WA 99164-2920  
Telephone: 509-335-4546  
Fax: 509-335-4662  
E-mail: [gradapp@mme.wsu.edu](mailto:gradapp@mme.wsu.edu)

### **Graduate Opportunities**

University research and teaching positions, research positions in national laboratories, post doctoral positions in national laboratories, and technical positions in leading companies.

Positions Held by Recent Graduates

Our graduates are working in leading corporations, national laboratories, and universities including: Autodesk, Boeing, Hewlett-Packard, Hitachi, Intel, Lawrence Livermore National Laboratory, Los Alamos National Laboratory, Micron Technology, Northrop Grumman, PACCAR, Pacific Northwest National Laboratory, Parametric Technology Corp., Sandia Livermore, Sandia Albuquerque, Tektronix, U.S. Army, ARDEC, Boise State University, California State University-Chico, Florida Atlantic University, Princeton University, University of California, Berkeley University of Central Florida, University of Delaware, University of Kentucky, University of New Mexico, and University of South Florida.

### **Faculty Interests**

**Stephen D. Antolovich:** High temperature fracture and fatigue in superalloys and intermetallic compounds; modeling of deformation and fracture processes. [steve\\_antolovich@wsu.edu](mailto:steve_antolovich@wsu.edu).

**David F. Bahr:** Mechanical properties of thin films; micromechanics of deformation, fracture, and adhesion; MEMS devices; corrosion and environmentally assisted cracking.  
[dbahr@wsu.edu](mailto:dbahr@wsu.edu)

**Amit Bandyopadhyay:** Processing of ceramics, metals and composites using rapid prototyping/solid; freeform fabrication; ferroelectric thin and thick films for MEMS devices.  
[amitband@wsu.edu](mailto:amitband@wsu.edu)

**Susmita Bose:** Nano-structured materials, biomaterials for bone implants; ferroelectric thin and thick films for MEMS. [bose@wsu.edu](mailto:bose@wsu.edu)

**Gary J. Cheng:** Laser materials processing, micro/nano manufacturing, metal forming, mechanical properties of materials. *cheng1@wsu.edu*

**Jow-Lian Ding:** Thermomechanics, shock dynamics, electromechanics, phase transformation, finite element and finite difference methods applied to solid mechanics. *ding@mme.wsu.edu*

**Prashanta Dutta:** Transport modeling in micro/nano-scales, micro/nano biosensors, computational fluid dynamics. *prashanta@wsu.edu*

**David P. Field:** Metal deformation and recrystallization; grain boundary structure; thin film and IC interconnect structure/properties relationships. *dffield@wsu.edu*

**Walter J. Grantham:** Nonlinear and optimal control systems; control of chaotic systems; differential games and game theory. *grantham@wsu.edu*

**David V. Hutton:** Manufacturing automation, CAD/CAM, structural dynamics, mechanical vibration. *dv\_hutton@wsu.edu*

**Sankar Jayaram:** Virtual reality applications; CAD/CAM; artificial intelligence and knowledge-based systems; parametric and feature-based design. *sjayaram@wsu.edu*

**Uma Jayaram:** CAD/CAM, virtual reality for design evaluations and ergonomic studies, ontology methods in engineering design, integrated learning/training using computer and immersive environments. *ujayaram@wsu.edu*

**William E. Johns:** Urea-formaldehyde science, U-F colloids, conformation analysis of U-F condensates, donor/acceptor interactions at interfaces. *w\_johns@wsu.edu*

**William C. Kinsel,** Tri-Cities: Engineering mechanics, dynamics, and biomechanics. *kinsel@tricity.wsu.edu*

**Marie-Pierre G. Laborie,** Affiliate Faculty: Biocomposites, wood adhesion, polymer viscoelasticity; morphology and properties of wood/polymer interphases. *mlaborie@wsu.edu*

**Ben Li:** Heat and mass transfer, electrohydrodynamics, magnetohydrodynamics; free surface deformation and marangoni flows. *meli@wsu.edu*

**David C. Lin,** Affiliate Faculty: Incorporating neuromuscular systems into engineered robotic systems. *davidlin@wsu.edu*

**Kelvin Lynn:** Defects in semiconductors and low and high k materials, room temperature radiation detectors; thermal simulated spectroscopies; positron interactions in solids. *kgl@wsu.edu*

**Sinisa Dj. Mesarovic:** Micromechanics of materials, small-scale plasticity, phase transformations, instabilities and powder metallurgy. *smesarovic@wsu.edu*

**M. Grant Norton:** Application of transmission electron microscopy to materials science; defect studies in single crystals and gemstones; synthesis and characterization of nanomaterials; ceramics. *mg\_norton@wsu.edu*

**Charles Pezeshki:** Landscape-level forest fire dynamics; complex dynamics applied to ecological processes. *pezeshki@wsu.edu*

**Cill Richards:** MEMS power, microfluidics, spray combustion, two-phase flows, air breathing engines. *cill@wsu.edu*

**Robert F. Richards:** Heat and mass transfer, thermodynamics, micro-electro-mechanical systems (MEMS), micropower. *richards@mme.wsu.edu*

**Lloyd V. Smith:** Processing, durability, and degradation of fiber reinforced polymers; testing and modeling ball impact sports. *lvsmith@wsu.edu*

**David E. Stock:** Experimental and numerical fluid mechanics, including computations of flow about buildings, complex terrain, and forest canopies. [stock@wsu.edu](mailto:stock@wsu.edu)

**Timothy R. Troutt:** Turbulence structure, particle transport in turbulent flows; aeroacoustics, investigations of the production of sound by turbulence. [troutt@mme.wsu.edu](mailto:troutt@mme.wsu.edu)

**Anita Vasavada,** Affiliate Faculty: Musculoskeletal biomechanics, especially head and neck biomechanics and whiplash injury. [vasavada@wsu.edu](mailto:vasavada@wsu.edu)

**Russell V. Westphal,** Tri-Cities: Viscous flows and their control: swept wing boundary layer transition and drag reduction, pressure probe and hot-wire anemometry. [westphal@wsu.edu](mailto:westphal@wsu.edu)

**Michael P. Wolcott,** Affiliate Faculty: Design and manufacture of wood composites, interactions between natural fiber and synthetic polymers. [wolcott@wsu.edu](mailto:wolcott@wsu.edu)

**Hussein M. Zbib:** Constitutive modeling and numerical analysis; plasticity, superplasticity, materials instabilities, damage and fracture; micromechanics; dislocation dynamics, composites. [zbib@wsu.edu](mailto:zbib@wsu.edu)

### **Materials Science and Engineering**

501 Advanced Topics in Materials Science 2 or 3 May be repeated for credit; cumulative maximum 6 hours. Chemical crystallography, microstructure, ultra-structure, theories of crystalline and non-crystalline solids, rheology and fracture mechanism of materials. Cooperative course taught by WSU, open to UI students (Met 544).

503 Advanced Topics in Materials Engineering V 1-3 May be repeated for credit; cumulative maximum 6 hours.

505 Advanced Materials Science 4 Provides a broad baseline in materials science and will include relationships between structure and properties at graduate level. Same as MAT S 505.

506 Biomaterials 3 Prereq MSE 201 and permission of instructor. Overview of the different types of materials used in biomedical applications such as implants and medical devices

513 Crystal Plasticity 3 Rec Math 440. Dislocation theory; slip; climb; mechanical properties of polycrystalline materials, and application to important deformation processes.

514 Thermodynamics of Solids 3 Rec MSE 312. Thermodynamic properties of solid solutions; models for substitutional and interstitial solutions; configurational and non-configurational contributions; calculation of phase diagrams.

515 Electronic Properties of Materials 3 Electron energy bands in solids, electrical conduction in metals and semi-conductors, applications to semi-conduction devices based on silicon and III-V compounds.

516 Phase Transformations 3 Rec MSE 314, 416. Thermodynamics, nucleation, interface motion, mechanisms and kinetics of chemical reactions between solid metals and their environment.

517 Thin Films 3 prereq graduate standing or senior in engineering or science. Materials science aspect of thin films, including growth, characterization, and properties for electrical, mechanical, corrosion, and optical behavior.

519 Corrosion and Oxidation of Metals 3 Prereq MSE 316. Basic corrosion and oxidation mechanisms for various metals with emphasis on those pertaining to stainless steels.

520 Seminar 1 May be repeated for credit; cumulative maximum 3 hours. Reporting problems, research and research methods in materials science and engineering. S, F grading.

521 Statistics of Microstructures 3 Prereq Math 440, 540 or permission of instructor. Stereology, orientation and spatial distributions, percolation, measurement techniques and application to modeling of microstructures.

523 Ceramics Processing 3 Prereq graduate standing. Fundamentals of ceramic processing science for thin films and bulk ceramics.

- 537 Fracture Mechanics and Mechanisms 3 Fracture mechanics and mechanisms and the microstructural origins of toughness in metals polymers, and composites.
- 549 Nondestructive Testing of Wood Based Materials 3 Same as C E 536.
- 592 Transmission Electron Microscopy 3 Development of the principles and applications of electron optics in microscopy.
- 600 Special Projects or Independent Study Variable credit. S, F grading.
- 700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.
- 702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.

### **Mechanical Engineering**

- 501 Continuum Mechanics 3 Prereq graduate standing. Unified presentation of principles common to all branches of solid and fluid mechanics; viscous fluids, elasticity, viscoelasticity, and plasticity.
- 509 MEMS Engineering 3 (2-3). Prereq graduate standing or instructor's permission. Introduction to the design fabrication and application of microelectromechanical systems
- 515 Advanced Heat Transfer 3 Rec M E 404, 521. Derivation of the energy conservation equation; laminar and turbulent forced convection heat transfer with internal and external flow; free convection.. Cooperative course taught jointly by WSU and UI (M E 546).
- 516 Conduction and Radiation Heat Transfer 3 Prereq M E 404. Principles of conduction and radiation heat transfer with focus on solving conduction and radiation problems of engineering interest.
- 520 Multiscale Modeling in Thermodynamics of Materials 3 Prereq Math 540 or Phys 571; Math 570, M E 501, 521, 526, 531 or MSE 513. Multiscale problems in thermodynamics of materials; practical and computational aspects of homogenization, granular materials, dislocation plasticity and atomistic methods.
- 521 Fundamentals of Fluids 3 Prereq M E 303 or C E 315. Governing equations of fluid mechanics accompanied by applications of Navier-Stokes equation to simple flow situations, boundary layer analysis.
- 522 Fundamentals of Fluids II 3 Rec M E 521. Viscous shear layers including heat and mass transfer, compressibility effects, vortex dynamics, stability and transition, turbulence analysis and modeling.
- 523 Engineering Acoustics 3 Prereq graduate standing. Fundamentals of acoustics including wave theory; transmission through layers; generation and reception, low frequency models; application to sound measurement, transducers, loudspeaker cabinet design, and nondestructive testing; acoustic design project required. Cooperative course taught by UI (M E 513), open to WSU students.
- 525 Biomechanics 3 Prereq B E 320, C E 215 or MSE 301; Math 315. Same as B E 525.
- 526 Microscopic Thermodynamics 3 Microscopic development of equilibrium; classical and quantum particle statistics; statistical description of real and ideal gases, solids, and liquids. Co-operative course taught jointly by WSU and UI (M E 526).
- 527 Macroscopic Thermodynamics 3 Advanced thermodynamics from macroscopic viewpoint; basic postulates, equilibrium, stability, property relations; application to thermal-fluid and solid mechanics; irreversible thermodynamics. Cooperative course taught jointly by WSU and UI (M E 527).
- 530 Elasticity 3 Prereq graduate standing. Theory of kinematics of solid deformable bodies; conservation laws applied to an elastic continuum; generalized linear stress-strain behavior with applications.
- 531 Theory of Plasticity 3 Rec M E 501. The fundamentals of the theory of plasticity; the classical theory of plasticity; the classical theory and modern continuum theories of large elasto-plastic deformations.
- 532 Finite Elements 3 Same as C E 532.
- 534 Mechanics of Composite Materials 3 Prereq M E 414. Analysis of micromechanical and macromechanical behavior of composite materials with emphasis on fiber-reinforced composite;

prediction of properties; stiffness and strength theories; laminated beams and plates; dynamic behavior; environmental effects. Cooperative course taught jointly by WSU and UI (M E 534).

537 Fracture Mechanics and Mechanisms 3 Same as MSE 537.

540 Advanced Dynamics of Physical Systems 3 Newtonian dynamics, rotating coordinate systems; Lagrangian and Hamiltonian mechanics; gyroscopic mechanics, other applications. Cooperative course taught by WSU, open to UI students (M E 504).

541 Advanced Mechanical Vibrations 2 or 3 Rec M E 449. Response of single and multi degree of freedom systems; finite element formulation; matrix methods, random vibrations. Cooperative course taught by WSU, open to UI students (M E 572).

542 Optimal Control of Dynamic Systems 3 Introduction to optimal control theory, differential games, and multiple criteria systems. Applications in engineering, biology, economics, agriculture, and medicine. Cooperative course taught by WSU, open to UI students (M E 542).

544 Optimal Systems Design 3 Parameter design optimization techniques for nonlinear systems; theory, numerical methods, and applications; multiple criteria optimal trade-off analysis and game theory.

545 Nonlinear Dynamics 3 Rec M E 540 or 541. Fundamentals of nonlinear oscillations, stability theory, perturbation methods, and chaotic behavior in nonlinear dynamical systems.

551 Turbulent Flow 3 Rec M E 521 or C E 550. Turbulent flow; dimensional analysis, statistical models and descriptions of organized structures.

552 Experimental Methods in Thermal-Fluid Science 3 (2-3) Theory and practice in the use of instrumentation for measuring temperature, velocity, pressure and concentration; measurement of classical flow fields.

553 Two-Phase Flow V 1-3 May be repeated for credit, cumulative maximum 3 hours. Rec M E 521. Fundamentals of the flow of fluids with two phases and applications. Cooperative course taught by WSU, open to UI students (M E 553).

556 Numerical Modeling in Fluid Mechanics 3 Same as C E 556. Cooperative course taught by WSU, open to UI students (M E 556).

561 Combustion 3 Rec M E 521. General combustion phenomena, chemical reactions, combustor modeling, laminar and turbulent flame theory, emissions. (a/y) Cooperative course taught by WSU, open to UI students (M E 561).

562 Nuclear Reactor Theory 3 Prereq ME 461; differential equations. Basic reactor neutronic theory including the transport equation; multi-group, multi-region diffusion theory; kinetics; and perturbation theory.

565 Nuclear Reactor Engineering 3 Prereq M E 461. Reactor power distribution; thermal and exposure limits; critical heat flux and pressure design; neutronic/thermal hydraulic relationships; transient/accident analysis.

569 Advanced Topics in Thermal and Fluid Sciences V 1-3 May be repeated for credit. Advanced topics in thermodynamics, heat transfer or fluid mechanics; analytical and experimental methods.

574 Foundations of CAD 3 Topics fundamental to the creation of CAD, engineering visualization, and virtual reality based engineering software. Cooperative course taught by WSU, open to UI student (M E 574).

575 Geometric Modeling 3 Study of the mathematics behind the creation of complex shapes for CAD using curves, surfaces, and solids.

579 Advanced Topics in Design and Manufacturing V 1-3 May be repeated for credit.

598 Seminar 1 May be repeated for credit. Seminar on current research interests. S, F grading.

600 Special Projects or Independent Study Variable credit. S, F grading.

700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.

702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.



800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

### **Program in Medical Sciences (Basic)**

The Program in Basic Medical Sciences does not offer degrees. It is part of a five-state, five-university cooperative program in medical education, WWAMI, with the Doctor of Medicine degree being granted by the University of Washington School of Medicine. Ordinarily, only students enrolled at the University of Washington School of Medicine register to take Medical Science courses. Matriculated graduate and senior undergraduate students may register for credit in certain Medical Science courses under appropriate circumstances. In such cases prior approval must be obtained from the faculty member chairing the course and the WWAMI director. Permission to register will usually depend on the student also having approval from his/her academic advisor (senior undergraduate students must also obtain approval from the Dean of the Graduate School) and be limited to not more than two Medical Science courses per semester. Medical Science courses 505 (preceptorship), and 513, 522, and 535 (Introduction to Clinical Medicine I, II, III respectively) are closed to all but WWAMI medical students.

### **Medical Science**

510 Histology 3 (2-3) Description and microscopic examination of cell types, tissue and major organs of the human body.

512 Basic Mechanisms in Cellular Physiology 4 Basic physiological mechanisms, primarily at the cellular level.

514 Molecular and Cellular Biology I 3 Classical molecular and cellular biochemistry, cellular physiology and molecular genetics.

516 Systems of Human Behavior I 2 Physical and psychological development of the individual; conceptual systems and models of behavior related to medicine.

520 Cell and Tissue Response to Injury 3 Patterns of cell and tissue response to injury; inflammation; neoplasia.

524 Molecular and Cellular Biology II 2 Continuation of Med S 514.

526 Systems of Human Behavior II 2 Continuation of Med S 516 with an emphasis on models of behavior, normality and abnormality related to medicine. S, F grading.

531 Head, Neck, Ear, Nose and Throat 5 (4-3) Gross anatomy, including skull, pharynx, and larynx; audition and balance.

532 Nervous System 5 (4-3) Normal structure and function of the nervous system, including the eye.

534 Microbiology and Infectious Disease 6 (5-3) Biology of microbial pathogens and the mechanisms of pathogenesis; clinical manifestations, epidemiology and general principles of diagnosis, therapy and prevention of infectious disease.

600 Special Projects or Independent Study V 1-6 May be repeated for credit; cumulative maximum 6 hours.

## School of Molecular Biosciences

<http://molecular.biosciences.wsu.edu>

Degrees offered: **M.S., Ph.D.**

Faculty working with graduate students: **30**

Graduate students: **55**

Students receiving assistantships or scholarships: **100%**

Tests required: **GRE; TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

### Admission Requirements

Applicants should have an undergraduate major in biochemistry, biophysics, cell biology, genetics, microbiology, biology, chemistry, or closely related fields. To apply, submit:

a personal statement describing your qualifications, goals, and objectives in pursuing graduate research in molecular biosciences;

official GRE scores;

official transcripts from all colleges attended;

three letters of recommendation;

the School of Molecular Biosciences application available on-line at the school's web page;

and the Graduate School application.

### Program Description

The School of Molecular Biosciences offers many exciting opportunities for graduate students to explore the vast range of life science research while working toward degrees in the sub-disciplines of biochemistry, biophysics, cell biology, genetics, and microbiology. Entering students do rotations through research laboratories to choose a thesis advisor. Over 30 research laboratories are associated with the School of Molecular Biosciences, investigating problems in diverse systems, including bacteria, yeast, plants, and animals.

### Contact Information

Kelly G. McGovern

School of Molecular Biosciences

Washington State University

PO Box 644234

Pullman, WA 99164-4234

Telephone: 509-335-4566

Fax: 509-335-1907

E-mail: [smbgrad@wsu.edu](mailto:smbgrad@wsu.edu)

## Graduate Opportunities

Alumni have gone on to high-profile postdoctoral opportunities and successful careers in academic and industrial science, especially in the biotechnology industry. Career opportunities include positions in food, agricultural, pharmaceutical, and biotechnology industries, private or government laboratories and departments, and nonprofit institutions such as clinical and hospital laboratories and research institutes. With the advent of the “biological revolution,” which will continue well into the 21st century, new opportunities with links to the worlds of public health, business, law, and government are ever expanding.

## Positions Held by Recent Graduates

Postdoctoral positions in nationally renowned laboratories at University of California, Berkeley, California Institute of Technology, University of Colorado Health Sciences Center, University of Minnesota, University of Pennsylvania Wistar Institute, Washington University in St. Louis, Stanford University, Johns Hopkins University, the Mayo Institute, and the Fred Hutchinson Cancer Research Center

Faculty Positions at tier-one research universities and outstanding undergraduate institutions such as the University of Kansas, University of Minnesota, Texas Tech, and the U.S. Naval Academy

Industrial positions at Amgen, Battelle, Infectious Disease Research Institute, Kemin Industries, Miltenyi Biotechnology, Myriad Genetics, PathoGenesis, and Sunesis

## Faculty Interests

**John Dahl:** Stringent response in the latent survival of *Mycobacterium tuberculosis*.  
*johndahl@wsu.edu*

**William B. Davis:** Protein-DNA interactions involved in DNA oxidation damage and repair, as well as charge transfer through DNA. *wbdavis@wsu.edu*

**Lisa M. Gloss:** Protein folding of oligomeric histones and nucleosome assembly; halophilic enzymes.  
*lmgloss@wsu.edu*

**Howard Grimes:** Biochemistry of lipoxygenase function in carbon and nitrogen mobilization and their role as soybean vegetative storage proteins. *grimes@wsu.edu*

**Michael Griswold:** Molecular detail of mammalian spermatogenesis and the influence of Sertoli cells on germ cell differentiation and maturation. *griswold@mail.wsu.edu*

**Terry Hassold:** Meiotic chromosome abnormalities. *terryhassold@wsu.edu*

**Chengtao Her:** Genomics and proteomics approaches investigating mammalian DNA mismatch repair pathways. *cher@wsu.edu*

**Howard Hosick:** Mechanisms of breast cancer development, including the role of growth factors and angiogenesis as well as inhibitory ‘nutriceuticals’ in garlic. *hosick@wsu.edu*

**Patricia Hunt:** Mammalian germ cell development and meiotic cell cycle control.  
*pathunt@wsu.edu*

**Michael Kahn:** Molecular machinery in the symbiotic interaction between nitrogen-fixing rhizobia and legumes. *kahn@wsu.edu*

**ChulHee Kang:** Protein and DNA X-ray crystallography targeted toward rational drug design, with an emphasis on cancer treatments, heart disease, and antibacterials.  
*chkang@wsunix.wsu.edu*

**Kwan Hee Kim:** Role of vitamin A and retinoic acid receptors in spermatogenesis and testis development. *khkim@wsu.edu*

**Andris Kleinhofs:** Genomic characterization of the large-genome cereal barley, facilitated by use of tools from the small-genome cereal rice. *andyk@wsu.edu*

**Michael Konkel:** Characterization of *Campylobacter jejuni* interactions with gastrointestinal mucosal cells, focusing on proteins that promote bacterial binding and host cell entry.  
*konkel@mail.wsu.edu*

**Nancy Magnuson:** Study of the proto-oncogene kinase Pim-1 in the molecular mechanisms of proliferation and differentiation of lymphoid, myeloid, and epithelial cells.  
*magnuson@mail.wsu.edu*

**John H. Nilson:** Deciphering the higher order genetic pathways that regulate the temporal, spatial, and hormonal regulation of the luteinizing hormone (LH) genes expressed in pituitary gonadotropes.  
*jhn@wsu.edu*

**Raymond Reeves:** Protein-DNA interactions involved in the regulation of gene transcription in human cells, focusing on the non-histone chromatin protein, HMG-A. *reevesr@wsu.edu*

**Eric Shelden:** Cytoskeletal regulation in cell division, motility, and differentiation, including the role of heat shock protein (hsp) in cytoskeletal response to cellular injury.  
*eshelden@wsu.edu*

**Michael Skinner:** Interaction of different cell types during the development of the spermatozoa and oocyte, and the role of basic-helix-loop-helix transcription factors in control of this development.  
*skinner@wsu.edu*

**Michael J. Smerdon:** Molecular details of DNA excision repair in the context of chromatin structures.  
*smerdon@wsu.edu*

**Loverine Taylor:** Signal transduction pathways in pollen-pistil interactions and fertilization and the role of natural products in plant reproduction. *ltaylor@wsu.edu*

**Diter von Wettstein:** Synthesis of flavan-3-ols in barley and transgenic methods to produce recombinant proteins in barley. *diter@wsu.edu*

**John Wyrick:** Role of histone modifications in global gene expression and protein-DNA interactions; development of bioinformatic tools to analyze gene expression microarray data.  
*jwyrick@mail.wsu.edu*

**Luying Xun:** Biochemistry of microbial degradation and biotransformation of xenobiotics.  
*xun@mail.wsu.edu*

### **Molecular Bioscience**

501 Cell Biology 3 Prereq MBioS 301, 303. Graduate-level counterpart of MBioS 401; additional requirements. Credit not granted for both MBioS 401 and 501. Cooperative course taught by WSU, open to UI students (Genet/PISc 550).

503 Molecular Biology I 3 Prereq MBioS 301, 303. DNA replication and recombination in prokaryotes and eukaryotes; recombinant DNA methods and host/vector systems; genome analysis; transgenic organisms.

504 Molecular Biology II 3 Prereq MBioS 301, 303. Gene expression and regulation in prokaryotes and eukaryotes, including transcription, RNA processing, and translation; chromatin structure; DNA repair.

513 General Biochemistry 3 Graduate-level counterpart of MBioS 413; additional requirements. Credit not granted for both 413 and 513. Cooperative course taught by WSU, open to UI students (MMBB 541).

514 General Biochemistry 3 Graduate-level counterpart of MBioS 414; additional requirements. Credit not granted for both 414 and 514. Cooperative course taught by WSU, open to UI students

(MMBB 542).

520 Eukaryotic Molecular Genetics 3 Prereq MBioS 301, 303. Graduate-level counterpart of MBioS 420; additional requirements. Credit not granted for both 420 and 520.

521 Cell Biotechnology V 1-3 Prereq MBioS 303, 401. Contemporary cell biotechnology; techniques including: cell culture, immunology (including preparation and use of monoclonal antibodies), nucleic acid hybridization (including in situ).

523 Fundamentals of Oncology 3 Same as P/T 572.

524 Cellular and Molecular Aspects of Development 3 Same as Biol 573.

525 Advanced Topics in Genetics V 1-2 May be repeated for credit. Prereq MBioS 520 or 511. Recent research in selected areas of genetics.

526 Advanced Topics in Cell Biology V 1-3 May be repeated for credit; cumulative maximum 7 hours. Current research in cell structure and function. Cooperative course taught by WSU, open to UI students (Genet/PISc 592).

527 Perspectives in Biotechnology 3 Graduate-level counterpart of MBioS 427; additional requirements. Credit not granted for both MBioS 427 and 527.

528 Molecular and Cellular Reproduction 3 (2-2) Course will review the state of the art concepts of the molecular, cellular, and physiological aspects of mammalian reproduction.

529 Selected Topics in Cell Biology 1 Prereq MBios 401 or c// MBios 501. Selected topics in cell biology using current literature.

530 Plant Molecular Genetics 3 Prereq MBioS 520. Plant molecular genetics with emphasis on systems specific to plants and plant genetic engineering. Cooperative course taught by WSU, open to UI students (Genet 570/PISc 571).

532 Plant Transmission Genetics 3 Same as CropS 504.

535 Molecular Genetics of Plant and Pathogen Interactions 2 Same as PI P 535.

537 Plant Cell Biology 3 Prereq graduate standing. Same as Biol 537.

540 Immunology 4 The immune system at the animal, cellular, and molecular levels. Credit not granted for both MBioS 440 and 540. Cooperative course taught by WSU, open to UI students (MMBB 512).

541 Research Seminar 1 May be repeated for credit. Literature reviews and research reports.

542 General Virology 3 Graduate-level counterpart of MBioS 442; additional requirements. Credit not granted for both MBioS 442 and 542.

544 Microbial Transformation 3 Prereq MBioS 303, MBioS 450. Use of microbes in the biodegradation of wastes and bioprocessing to produce valuable chemical stocks. Cooperative course taught by UI (MMBB 568), open to WSU students.

546 Selected Topics in Microbiology 1 May be repeated for credit; cumulative maximum 2 hours. Prereq 9 hours 300-400-level Micro.

547 Advanced Topics in Microbiology V 1-3 May be repeated for credit.

548 Selected Topics in Virology 1 May be repeated for credit. Prereq MBioS 542 or c//; by interview only. Selected topics in virology using the current literature.

549 Seminar in Immunology 1 May be repeated for credit; cumulative maximum 2 hours. Prereq course in immunology. Seminar series on advances in immunology.

550 Microbial Physiology 3 Graduate-level counterpart of MBioS 450; additional requirements. Credit not granted for both MBioS 450 and 550 .

554 Chromosome Structure and Function 3 Same as Crops 554.

561 Biochemical Signaling in Plants, Animals and Microorganisms 3 Prereq MBioS 513. New research on intra and extra cellular biochemical signaling, including communication in plants and hormone action in animals.

566 Physical Biochemistry 3 Graduate-level counterpart of MBioS 466; Prereq MBioS 456 or one year of Physical Chemistry. Techniques for the study of biological structure and function; spectroscopy, magnetic resonance, diffusion, sedimentation, electron microscopy, diffraction and scattering. Credit not granted for both 466 and 566.

568 Advanced Topics in Biochemistry V 1-3 May be repeated for credit. Prereq MBioS 513 or c//. Recent research in selected areas of biochemistry.

571 Advanced Topics in Plant Biochemistry 2 Prereq MBioS 514; basic botany. Biochemistry unique to plants; new research advances.

574 Protein Biotechnology 3 Biotechnology related to the isolation, modification and large scale commercial production, patenting and marketing of useful recombinant proteins and products.

576 Advanced Molecular Techniques I 1 (0-3) Prereq MBioS 514 or c//. Modern laboratory technique in molecular biosciences.

577 Advanced Molecular Techniques II 1 (0-3) Prereq MBioS 514 or c//. Modern laboratory techniques in molecular biosciences.

578 Bioinformatics 3 (2-3) Graduate-level counterpart of MBioS 478; additional requirements. Credit not granted for both 478 and 578. Cooperative course taught by WSU, open to UI students (MMBB 578).

579 Molecular Biosciences Seminar 1 or 2 May be repeated for credit; cumulative maximum 10 hours. Required of all graduate students in molecular biosciences.

581 Seminar in Animal Physiology 1 Same as A S 540.

582 Seminar in Reproductive Biology 1 Prereq graduate standing. Same as A S 582. S, F grading.

593 Research Proposal 2 May be repeated for credit; cumulative maximum 4 hours. Written and oral presentation of an area of molecular biosciences.

600 Special Projects or Independent Study Variable credit. S, F grading.

700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.

702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.

800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

## **Program in Molecular Plant Sciences**

### **Degrees Granted: Master of Science in Molecular Plant Sciences; Doctor of Philosophy**

Graduate students in the molecular plant sciences program at WSU study with some of the best minds in America to understand the characteristics and mechanisms of plants. They use this knowledge to develop lifesaving medicines, keep our food safe, and evolve agricultural systems to feed expanding global populations. The molecular plant sciences program incorporates plant physiology, biochemistry, and molecular biology, and is considered one of the top programs of its kind in the world. Among the program's faculty are three National Academy of Sciences members and some of the most influential plant science researchers in the world.

### **Finances**

All of our students receive financial support via mechanisms including training grants, individual research grants, predoctoral fellowships, and teaching assistantships. As a first-year student you will have the opportunity to visit several different labs and spend a few weeks in each of these settings. Afterward, you will be able to make an informed decision in pursuing the science that interests you.

### **Accelerated Ph.D. Program Research Assistantships**

This new program enables students who have already chosen a research area to enter directly into a faculty member's laboratory and begin research their first year. Prospective students must be nominated for this assistantship by the faculty member whose lab they wish to enter, so it is essential that interested applicants contact faculty members directly to discuss their research.

### **Faculty**

The commitment that each of our faculty has to his or her students and their success is integral to a positive graduate student experience. You will receive superb training and individual attention from outstanding scientists. The quality of our program attracts some of the best young scientists in the world, which is vitally important to new students. These people, your peers, will make an outstanding contribution to your development as a scientist and become your future friends and colleagues.

#### **John Browse**

Lipid and membrane biochemistry; pathways and regulation of lipid synthesis and membrane formation in higher plants; chilling and freezing tolerance in plants.

#### **Asaph Cousins**

Plant metabolism and physiology; plant energy metabolism; carbon and oxygen isotope exchange in plants.

#### **Rod Croteau**

Terpenoid natural products chemistry; pathways and enzymes of terpenoid biosynthesis and catabolism in plants.

#### **Amit Dhingra**

Horticultural genomics, plastid transformation, organelle genomics, photobiology and photosynthesis.

#### **Gerald Edwards**

Photosynthesis, including effects of environmental stress and potential global climate change; mechanism and evolution of carbon assimilation

#### **Axel Elling**

Recombinant DNA techniques, protein-protein interaction assays, plant tissue culture, microscopy and functional genomics

#### **John K. Fellman**

Phytochemistry, chemistry and biochemistry of fruits and their products; postharvest plant physiology.

#### **Kulvinder S. Gill**

Molecular basis of chromosome pairing control; genome organization and amplification; distribution of genes and recombination; characterization of agronomically important traits.

#### **Howard D. Grimes**

Biochemistry, molecular biology, and genetic engineering of sucrose transport and selective proteolysis in plant cells.

#### **Lee Hadwiger**

Molecular biology of plant disease resistance; plant gene regulation by elicitors from fungi and bacteria.

#### **Hanjo Hellmann**

The ubiquitin proteasome pathway; vitamin B6 biosynthesis.

#### **Scot Hulbert**

Molecular genetics and evolution of the interactions between pathogens and plants.

#### **Michael Kahn**

Nitrogen fixation; interactions between plant and bacterial metabolism to support symbiotic nitrogen fixation.

**Ananth Kalyanaraman**

Computational biology and bioinformatics; high-performance computing; combinatorial pattern matching.

**ChulHee Kang**

Protein and DNA X-ray crystallography.

**Andris Kleinhofs**

Molecular genetics of plant disease resistance genes; gene isolation, characterization and interaction with other proteins and with pathogens; signaling pathways leading to disease resistance.

**Michael Knoblauch**

Cell biology and the physiology of plant tissues, especially the phloem.

**N. Richard Knowles**

Physiological and biochemical changes associated with aging; development of oxidative stress and associated effects on intermediary metabolism; mechanisms of membrane deterioration and protein catabolism during aging.

**David Kramer**

Energetics and control of photosynthesis; electron transfer reactions; coupling of electron transfer reactions to proton pumping and to ATP synthesis; evolution of bioenergetics; photosynthesis in extreme environments.

**Mark Lange**

Use and development of tools for the integration of post-genomic technologies (microarrays, proteomics, metabolite profiling) to study the global regulation of metabolic pathways; particular interest in isoprenoid metabolism.

**Norman Lewis**

Biochemistry of plant phenolics; biochemistry of plant cell-wall synthesis and unique plant constituents; effects of gravity on metabolic pathways in plants.

**Dorrie Main**

Bioinformatics; plant genome databases; comparative genomics of rosaceous crops.

**Andrew G. McCubbin**

Pollen-pistil interactions; floral growth and development.

**Roy Navarre**

The molecular basis of disease resistance mechanisms and inducible defenses, such as systemic acquired resistance, in potato.

**Michael Neff**

Interactions between various signaling pathways that modulate plant development.

**Tom Okita**

Biochemistry of starch synthesis and protein localization; metabolic genetic engineering of plants for increased productivity; mRNA localization and the role of the cytoskeleton and endoplasmic reticulum.

**Patricia Okubara**

Host molecular responses to beneficial and pathogenic soil microbes; molecular diagnoses of and host resistance to soilborne pathogens.

**Hanu R. Pappu**

Virus genomics and proteomics, plant-virus interactions, molecular epidemiology, crop biotechnology/virus resistant transgenic plants.

**B. W. Poovaiah**

Molecular and biochemical aspects of calcium/calmodulin-mediated signaling in plants.

**Kerry Ringer**

Impacts of winemaking techniques and viticulture techniques on the volatile compounds and volatile precursors found in grapes and wine, particularly the fruity and floral terpenes.



**Sanja Roje**

Metabolism of tetrahydrofolate-bound one-carbon units in plastids; biosynthesis of riboflavin in plants.

**Camille Steber**

Hormonal regulation of seed dormancy and germination.

**Mechthild Tegeder**

Molecular and physiological mechanisms of nitrogen transport; regulation of transport; flower/seed development; plant productivity.

**Linda S. Thomashow**

Genetics, biochemistry and physiology of plant-microbe interactions; plant growth-promoting rhizobacteria; rhizosphere microbiology and ecology; mechanisms of gene regulation and expression; microbial genomics.

**Diter von Wettstein**

Molecular biology of cereals; breeding by mutation and functional genomics.

**John J. Wyrick**

Functional genomics; regulation of gene expression; chromatin structure; covalent histone modifications.

**Bud Ryan**

*In Memoriam*

**Molecular Plant Sciences**

515 Seminar in Molecular Plant Sciences 1 May be repeated for credit; cumulative maximum 4 hours. A cross-discipline seminar, including botany, crop and soil sciences, horticulture, plant pathology, and molecular plant sciences.

561 Biochemical Signaling in Plants, Animals and Microorganism 2 Same as MBioS 561.

570 Advanced Topics in Molecular Plant Sciences 1 May be repeated for credit; cumulative maximum 3 hours. Oral presentation of a current research paper.

571 Research Proposal 2 May be repeated for credit; cumulative maximum 4 hours. Written and oral presentation of an area of molecular plant sciences.

587 Advanced Topics in Plant Biochemistry 2 Same as MbioS 571.

600 Special Projects or Independent Study Variable credit. S, F grading.

700 Master's Research, Dissertation and/or Examination Variable credit. S, F grading.

800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

**School of Music**

<http://libarts.wsu.edu/music>

Degree offered: **M.A.**

Faculty working with students: **38**

Graduate students: **20**

Students receiving assistantships or scholarships: **50%**

Tests required: **TOEFL or IELTS (international only)**

Deadline: **Fall—January 10**

**Spring—July 1**

## **Admission Requirements**

The School of Music requires an audition, official transcripts, and three letters of recommendation. In addition, please submit: for a composition emphasis, a composition portfolio with recordings; for the music education emphasis, your written philosophy of teaching; a performance emphasis (including conducting) requires a more in-depth audition. Please contact the music program for more details. Once admitted to WSU, each student takes assessments in music theory, history, and keyboard skills, and auditions for music ensembles during the week prior to the first day of classes.

## **Program Description**

The music program in the School of Music offers the degree of Master of Arts in music, which may be earned through study in areas of music education, composition, music history and literature, conducting, and performance studies.

Four emphases are available

Music education--provides advanced studies for experienced or prospective teachers.

Performance--selected by students wishing to teach at the college level or enter professions as music performance and conducting.

Composition--prepares students to enter professions in music, including composers and arrangers.

Jazz emphasis--focuses on one or more aspects of jazz music--performance, composition, arranging, pedagogy, or history for example--in preparation for careers in jazz.

The program offers both thesis and non-thesis options, designed according to the goals of the student. Composition emphasis students must complete the thesis option.

## **Contact Information**

Graduate Coordinator in Music  
School of Music  
Washington State University  
PO Box 645300  
Pullman, WA 99164-5300  
Telephone: 509-335-3898  
Fax: 509-335-4245  
E-mail: [music@wsu.edu](mailto:music@wsu.edu)

## **Graduate Opportunities**

Graduate students have opportunities to conduct and rehearse ensembles; perform and make recordings with world acclaimed faculty artists; prepare for major competitions in performance and composition; and tour nationally and internationally with performing ensembles. WSU graduate students have won numerous awards in major competitions for performance and composition. A recent student won first place in jazz bass and jazz instrumental composition at the Lionel Hampton Jazz Festival, and another student was twice named the top female jazz vocalist by *Downbeat* magazine.

### Positions Held by Recent Graduates

Recent graduates hold teaching positions at universities and in the public school system at all levels. Positions include: director of jazz studies at West Valley College in Saratoga, CA; teacher at the Joy of Music Academy in Boston; and teacher at the American School in Rome. Other students have continued their postgraduate work at other prestigious schools of music and performed at major music festivals.

### Faculty Interests

**Charles Argersinger:** Jazz piano; theory and composition; first prize winner in composition for the United Nations 50th anniversary in 1995 and recent winner of the MACRO award.

*argersin@wsu.edu*

**Meredith Arksey,** String Area Coordinator: Violin/viola; numerous performances as chamber musician for the Silver Bay Association Chamber Series in New York State.

*marksey@wsu.edu*

**Sarah Bahauddin:** Oboe, theory, graduate studies. Research on African Blackwood in Africa and woodwind instrument making. *bahauddin@wsu.edu*

**Noel Barbuto:** VoJazz, Crimson Revue: Voice; active stage performer in regional musical theatre productions. *nbarbuto@wsu.edu*

**Gerald Berthiaume,** Director of the School of Music and Theatre Arts: Piano; performances nationally/internationally as soloist, accompanist, and chamber musician; former U.S. artistic ambassador to the Middle East. *berthia@wsu.edu*

**Sheila Converse:** Vocal pedagogy, women in music; recent presenter at the International Conference on Nadia Boulanger. Member of the Honors Faculty.

*sconverse@wsu.edu*

**Paula Elliot:** Music librarian; co-editor of *Careers in Music Librarianship II*, published by the Music Library Association. *elliotp@wsu.edu*

**Ryan Hare:** Bassoon; theory and composition; composition "Intrada" on CD entitled *Intrada*, published and distributed by Present Sounds Recordings. *rhare@wsu.edu*

**Don Hower,** Director of Cougar Marching Band: Trombone; former director of bands and instrumental ensembles at Benedictine College and the University of Pittsburgh; former member of the United States Army field band. *howerde@wsu.edu*

**Dave Jarvis,** Percussion Ensemble Director: Percussion; compositions published by Southern Music Company and Honeyrock Publishing Company; recent CD with the Dozier-Jarvis-Young Quartet entitled *You Guys from Around Here?*; educational clinician with Yamaha Corp. of America.

*djarvis@wsu.edu*

**Michelle Mielke,** Undergraduate Program Coordinator, Coordinator of the Piano Pedagogy Lab School: Piano pedagogy, piano; research and performance focus on music of Alexina Louie and Aaron Copland.

*mmielke@mail.wsu.edu*

**Jeffrey Savage,** Keyboard Area Coordinator: Piano, accompanying; performances and master classes in China at the Guangxi Arts College and the Shenzhen School of the Arts.

*jrsavage@wsu.edu*

**Karen Hsiao Savage:** Piano, accompanying; accompanist for the Aspen Music Festival and the Perlman Music Program in New York and Shanghai. *khsavage@wsu.edu*

**Jill Schneider:** Organ, elementary music education, music history; reviewer of *Integrating Music in the Elementary Classroom*, 5th Edition, 2001. *jill\_schneider@wsu.edu*

**Jennifer Scriggs:** Horn; numerous performances as principal horn of the Spokane Symphony; other performances with the Utah Festival Opera, Fort Worth Symphony, and Dallas Symphony.  
*scriggs@earthlink.com*

**Anthony Taylor:** Clarinet, music history; numerous performances with symphonies such as the Spokane Symphony, Spokane Opera, Boise Philharmonic, and orchestras in Arkansas, Florida, and Ohio; article published in *Classical Singer* and review in *The Clarinet*.  
*anthotaylo@wsu.edu*

**David Turnbull,** Brass Area Coordinator, Wind Symphony Conductor: Trumpet, conducting, symphonic band; former member of the Royal Brass Ensemble (Japan) and Kansas City Symphony; featured soloist with the Philharmonic of Pleven (Bulgaria) and at the Grammy Foundation Award Presentation Concert (Las Vegas, 2003); numerous performances with Jazz Northwest. *turnbull@mail.wsu.edu*

**Nicholas Wallin,** Symphony Orchestra Conductor: Low brass; D.M.A. thesis entitled "Stasis and the Death Drive: The Tritone and Motivic Meaning in Richard Wagner's *Der Ring des Nibelungen*"; former conductor of the Baltimore Youth Symphony and Chesapeake Valley Youth Symphony.  
*nwallin@wsu.edu*

**John Weiss,** University Singers Conductor: Voice, choral music education; recently presented at the International Physiology and Acoustics of Singing Conference. *jweiss@wsu.edu*

Julie Anne Wieck, Director of Opera and Broadway Musicals: Voice; active recitalist and solo performer. *jwieck@wsu.edu*

**Lori J. Wiest,** Director of Choral Activities, Voice Area Coordinator, Madrigal Singers Conductor, Concert Choir Conductor: Choral conducting; editor of *Student Times* for the ACDA *Choral Journal*; conductor of choral performances in Italy, Germany, and Russia.  
*lwiest@mail.wsu.edu*

**Ann Yasinitsky,** Woodwind Area Coordinator: Flute; featured as soloist and chamber player on several Vienna Modern Masters CDs, including the Distinguished Performers Series, VMM 2013; recipient of a National Endowment for the Arts Solo Recitalist Fellowship Grant.  
*ayasinitsky@wsu.edu*

**Greg Yasinitsky,** Jazz Area Coordinator: Saxophone, composition, big band; recipient of the New York Composers Commission award; one of the most published composers in jazz with over 120 works in print, performed in over 30 countries around the world.  
*yasinits@wsu.edu*

**Eugene Zenzen:** Cello, bass; numerous performances as soloist, chamber musician, and orchestra member throughout the U.S. and in Japan. *zenzen@wsu.edu*

### **Music Performance Studies**

- 501 Graduate Organ 2 or 4 May be repeated for credit.
- 502 Graduate Piano 2 or 4 May be repeated for credit.
- 503 Graduate Voice 2 or 4 May be repeated for credit.
- 504 Graduate Horn 2 or 4 May be repeated for credit.
- 505 Graduate Trumpet 2 or 4 May be repeated for credit.
- 506 Graduate Trombone 2 or 4 May be repeated for credit.
- 507 Graduate Baritone 2 or 4 May be repeated for credit.
- 508 Graduate Tuba 2 or 4 May be repeated for credit.
- 509 Graduate Percussion 2 or 4 May be repeated for credit.
- 510 Graduate Violin 2 or 4 May be repeated for credit.
- 511 Graduate Viola 2 or 4 May be repeated for credit.
- 512 Graduate Violoncello 2 or 4 May be repeated for credit.

- 513 Graduate Contrabass 2 or 4 May be repeated for credit.
- 514 Graduate Flute 2 or 4 May be repeated for credit.
- 515 Graduate Oboe 2 or 4 May be repeated for credit.
- 516 Graduate Clarinet 2 or 4 May be repeated for credit.
- 517 Graduate Bassoon 2 or 4 May be repeated for credit.
- 518 Graduate Saxophone 2 or 4 May be repeated for credit.
- 519 Secondary Performance Study 1 or 2 May be repeated for credit, cumulative maximum 6 hours. Prereq bachelor's degree in music. Instruction on instruments or voice other than major performing medium.

### **Music Performing Groups**

- 528 Opera Workshop 1 (0-4) May be repeated for credit; cumulative maximum 8 hours. Graduate level counterpart of Mus 428; additional requirements.
- 531 Concert Choir 1 (0-4) May be repeated for credit; cumulative maximum 8 hours. Graduate level counterpart of Mus 431; additional requirements.
- 533 Vocal Ensembles 1 (0-4) May be repeated for credit; cumulative maximum 8 hours. Graduate level counterpart of Mus 433; additional requirements.
- 534 Symphony Orchestra 1 (0-4) May be repeated for credit; cumulative maximum 8 hours. Graduate level counterpart of Mus 434; additional requirements.
- 535 Chamber Ensembles 1 (0-4) May be repeated for credit; cumulative maximum 8 hours. Graduate level counterpart of Mus 435; additional requirements.
- 537 Wind Symphony 1 (0-4) May be repeated for credit; cumulative maximum 8 hours. Graduate level counterpart of Mus 437; additional requirements.
- 538 Jazz-Lab Band 1 (0-4) May be repeated for credit; cumulative maximum 8 hours. Graduate level counterpart of Mus 438; additional requirements.
- 539 Vocal Jazz Ensemble 1 (0-4) May be repeated for credit; cumulative maximum 8 hours. By audition only. Graduate level counterpart of Mus 439; additional requirements.
- 540 Jazz Combos 1 (0-4) May be repeated for credit; cumulative maximum 8 hours. By audition only. Graduate level counterpart of Mus 440; additional requirements.
- 541 Accompanying 1 (0-4) May be repeated for credit; cumulative maximum 8 hours. Graduate level counterpart of Mus 441; additional requirements.

### **Theory**

- 550 Seminar in Analysis 2 May be repeated for credit; cumulative maximum 4 hours. Prereq senior or graduate standing. Required of all graduate students. Applications of analytical techniques to develop a basis for musical understanding and interpretation.
- 553 Seminar in Music Theory 2 Prereq senior or graduate standing. May be repeated for credit; cumulative maximum 4 hours.
- 556 Graduate Seminar in Advanced Composition V 2 (1-2) or 3 (1-4) May be repeated for credit; cumulative maximum 10 hours. Prereq by interview only. The creation of works for either traditional acoustic ensembles or electro-acoustic media.
- 559 Seminar in Advanced Jazz Composition V 1-3 May be repeated for credit; cumulative maximum 12 hours. Graduate-level counterpart of Mus 459; additional requirements. Credit not granted for both Mus 459 and 559.

### **History and Literature**

- 560 Introduction to Graduate Studies in Music 2 Required of all graduate students in Mus. Basic bibliographic and research techniques; written presentations related to area of emphasis.
- 561 Seminar in Literature of 20th Century Music 2 Prereq senior or graduate standing..

Impressionism, expressionism, neoclassicism, neoromanticism, jazz and recent electronic music.

562 Symphonic Literature 2 Prereq senior or graduate standing. Symphony orchestra and symphonic form from its beginning to modern times studied from the score.

565 Seminar in Major Performance Literature 2 Prereq Mus 351 or c//. May be repeated for credit; cumulative maximum 6 hours. Survey/performance of solo & chamber literature for voice, keyboard, strings, winds, brass, percussion, choral, band, orchestra.

566 Seminar in Music History 2 May be repeated for credit; cumulative maximum 6 hours. Prereq senior or graduate standing. Various historic periods and composers.

### **Music Education, Pedagogy, and Conducting**

575 Advanced Conducting 2 or 3 May be repeated for credit. Prereq Mus 482. Rehearsing orchestras, bands, and choruses. Public performance may be required.

580 Instrumental Music Education 1 Graduate counterpart of Mus 480; additional requirements. Credit not granted for both Mus 480 and 580.

586 Seminar in Piano Pedagogy 2 Graduate level counterpart of Mus 486; additional requirements. Credit not granted for both 486 and 586.

588 Choral Methods and Materials I 2 (0-6) Prereq senior or graduate standing. Preparation in the administration of choral programs from auditions to the selection and rehearsal of choral literature. Credit not granted for both Mus 488 and 588.

589 Choral Methods and Materials II 2 Prereq Mus 588. Development of skills in choral arranging, curriculum construction, research, and job placement. Credit not granted for both Mus 489 and 589.

590 General Music Materials/Methods 4 (3-2) Prereq senior or graduate standing. Graduate level counterpart of Mus 490; additional requirements. Credit not granted for both Mus 490 and 590.

591 Vocal Pedagogy 2 (1-3) Prereq graduate standing. Pedagogy methods course in voice; anatomy of the singing process; methodology of teaching voices in various learning and teaching styles. Graduate level counterpart of Mus 491; additional requirements. Credit not granted for both Mus 491 and 591.

### **Problems, Research, Recitals and Thesis**

522 Graduate Recital 2 May be repeated for credit; cumulative maximum 4 hours. Private screening and public performance as required within each performance emphasis.

596 Topics for Music V 1-4 Varying subjects offered at graduate level.

600 Special Projects or Independent Study Variable credit. S, F grading.

700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.

702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.

The degrees in theatre are currently on moratorium. New students will not be admitted until further notice. Selected graduate courses are offered each semester.

The Theatre Program in the School of Music and Theatre Arts offers both the Master of Arts and the Master of Arts in Teaching. The Master of Arts degree requirements and program are intended to provide a general education in theatre with the opportunity to emphasize the specific areas of acting, directing, theatre history, and child drama. The Master of Arts in Teaching (a joint offering with the College of Education) provides training for both experienced and prospective teachers of drama in elementary and secondary schools. The master of arts and master of arts in teaching programs offer both thesis and non-thesis options, designed to meet the needs and goals of each student.

Course work in the Theatre Program includes a variety of studies in acting, directing, design, theatre history, theatre for youth, dramatic literature, and performance theory. Core curriculum requirements for all graduate students include 501 Research Methods, 502 Production Analysis (2 credits), 541

Theatre History, 542 Theatre History and one course from among 450 Advanced Acting, 463 Theatre Design, or 561 Play Directing. In addition, 4 credits of 700 Thesis or 702 Special Problems are required. Specific degree requirements for the Master of Arts in Teaching vary depending on whether the student is already certified to teach. Students should consult the Theatre Program's Graduate Handbook for details. Internships with professional theatre companies are available to help students bridge the gap between their educational experiences and the professional world.

Theatre facilities include an intimate, experimental theatre space, a versatile proscenium/thrust stage, a concert hall for musical productions, and a Performing Arts Coliseum seating over 1800. Graduate students are encouraged to explore all forms of theatre arts from avant-garde plays and modern performance techniques to more traditional dramas and modes of production. The School of Music and Theatre Arts sponsors an active summer theatre for which graduate credit is available.

The Theatre Program has a number of graduate assistantships available in the areas of acting, costuming, technical theatre management, and teaching.

### **Theatre Arts and Drama**

501 Research Methods and Dramaturgy 3 Prereq graduate standing. Theory, methods and practice of graduate level research as applied to both scholarship and theatre production.

502 Production Analysis 1(0-3) May be repeated for credit; cumulative maximum 6 hours. Analysis and comparison of theatre productions through discussion and written evaluation. Required of Theatre Arts majors. Credit not granted for both Drama 402 and 502.

504 Instructional Practicum 1 May be repeated for credit; cumulative maximum 4 hours. Instruction and guidance in teaching theatre arts and drama. S, F grading.

541 History of the Theatre I 3 Major developments of all aspects of theatre arts from preliterate times of 1650.

542 History of the Theatre II 3 Major developments of all aspects of theatre arts from 1650 to 1800.

561 Performance III: Directing 3 (0-6) Graduate level counterpart of Theat 461; additional requirements. Advanced work in stage direction; weekly exercises focusing on modern, non-realistic theatrical forms and culminating in directing a one-act play. Credit not granted for both Drama 461 and 561.

563 Scene Design: Art and Practice 3 (0-6) Prereq graduate standing. The art of scene design, conceptualization and actualization; design analysis, research, and technical skills needed to execute renderings and models.

564 Creative Drama 3 Prereq graduate standing. Philosophy and techniques of informal drama; practical experience integrated into the curriculum; emphasis on application to educational setting. Graduate level counterpart of Drama 464; additional requirements. Credit not granted for both Theat 464 and 564.

565 Seminar in Drama 3 May be repeated for credit; cumulative maximum 6 hours. Seminar in various periods, movements, and phases of drama.

590 Graduate Internship in Professional Theatre V 2-15 Prereq Drama 501 and completion of one academic year of master's level course work in Theatre Arts and Drama at WSU. Internship positions at upper levels of administration or production that requires expertise in specific areas; theories/practical application. S, F grading.

600 Special Projects or Independent Study Variable credit. S, F grading.

700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.

702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.

## Department of Natural Resource Sciences

www.natural-resources.wsu.edu

Degrees offered: **M.S., Ph.D.**

Faculty working with students: **15**

Graduate students: **22**

Students receiving assistantships or scholarships: **59%**

Tests required: **GRE; TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

### Admission Requirements

Official copies of all college transcripts, three letters of recommendation, department supplemental application form.

### Program Description

The Department of Natural Resource Sciences offers programs of graduate study and research leading to a master of science in natural resource sciences and a master of sciences in natural resources. The M.S. in natural resource sciences emphasizes original research by the student.

The programs in natural resource sciences and environmental sciences and regional planning offer a joint Ph.D. degree, which provides an atmosphere of scholarship coupled with research opportunities. These produce graduates capable of responding to the complicated issues of use, management, and protection of the environment and its natural resources.

The department has laboratory facilities and greenhouses on campus. Field facilities are located at the 12,000 acre Colockum Multiple-Use Research Unit located near Wenatchee, WA. The University of Idaho is eight miles from the Pullman campus and offers cross-listed courses in conjunction with WSU in natural resource management and sciences.

### Contact Information

Natural Resource Sciences  
115 Johnson Hall  
P.O. Box 646410  
Pullman, WA 99164-6410  
Telephone: (509) 335-6166  
Email: nrs@wsu.edu

### Graduate Opportunities

There are a variety of career options, such as work with state/federal land management or regulatory agencies, municipal or county government, public interest groups, natural resource industries, private land management, the consulting industry, and research/development in either the private or public sectors. Graduates may work as foresters, wildlife biologists, information specialists, game managers, consultants, researchers and in a variety of roles in developing countries. In addition, with further education our graduates are involved in environmental education in grade schools and high schools, in the legal profession, and in natural resource law enforcement.



### **Positions Held by Recent Graduates**

Bear handler - San Diego Zoo; Teacher - Biology/Natural Resources, Eastern Washington University (Cheney); Fluvial Geomorphologist Resources Staff - Natural Resource Conservation Service USDA; Assistant Professor – California; Assistant Professor - University of Arkansas;

Geographic Information Systems Specialist- State of Maine; Wildlife Technician - Alaska Department of Fish and Wildlife; Consultant - Consulting firm in New Jersey; Various postdoctoral positions

### **Faculty**

**Baumgartner, David** (emeritus)

baumgartner@wsu.edu

(509) 335-2964

**Blatner, Keith**

blatner@wsu.edu

(509) 335-6166

**Carroll, Matthew**

carroll@wsu.edu

(509) 335-2235

**Chapman, Roger** (emeritus)

(509) 335-6166

**DePuit, Edward** (adjunct)

ejdeput@fs.fed.us

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**Natural Resources**

518 Forest Growth and Yield 2 Prereq graduate standing. Factors influencing forest yields, traditional prediction methods; development and application of growth and yield simulators. Credit not granted for both NATRS 418 and 518.

519 Advanced Topics V (1-3) May be repeated for credit; cumulative maximum 6 hours.

521 Human Dimension of Wildlife Management 2 Prereq NATRS 435. An exploration of the elements involved in the management of wildlife for non-consumptive activities, the impacts of such activities on wildlife, the role of national parks and protected areas in providing wildlife viewing opportunities, and public attitudes toward wildlife species. Cooperative course taught by UI (WLF 520), open to WSU students.

524 Plant Ecophysiology 3 Prereq course in general Ecology or Botany. Adaptations of individual plant species to their environment, emphasizing ecophysiological mechanisms that influence plant establishment, below and above ground productivity. Field trips required. Cooperative course taught by UI (Rnge 560), open to WSU students.

525 Experimental Plant Ecology 1 (0-3) Experimental techniques in plant ecology with orientation toward environmental and physiological measurement in field and laboratory research. Cooperative course taught by WSU, open to UI students (Rnge 525).

526 Population Analysis 1 Prereq NATRS/Entom/Zool 529, biometry. Analysis, diagnosis, interpretation, and forecasting of population change.

527 Forest Gene Resource Management 3 Prereq graduate standing. Genetic principles applied to forest ecosystems management; origin and function of genetic diversity; implications of silvicultural practices on gene pools. Field trips required. Cooperative course taught by UI (For/Genet 428/528), open to WSU students.

528 Resolving Environmental Conflicts 4 (3-3) Same as R S 535. Graduate-level counterpart of NATRS 428; additional requirements. Credit not granted for both NATRS 428 and 528.

529 Principles of Population Dynamics 1 Prereq general ecology. Development of the theory of population dynamics from Malthus to the present.

531 Wildlife Nutrition 3 (2-3) Nutritional requirements and interactions of wildlife populations. Credit not granted for both NATRS 431 and 531. Cooperative course taught by WSU, open to UI students (WLF 531).

535 Wildlife Ecology 4 (3-3) Prereq Bio S 372. The ecology of wildlife species and the contributing biological processes. Overnight field trip required. Credit not granted for both NATRS 435 and 535.

536 Advanced Wildlife Management 4 (3-3) Prereq NATRS 435. Management criteria for wild vertebrate populations. Field trip required. Credit not granted for both NATRS 436 and 536.

538 Natural Resource Policy and Administration 3 Graduate-level counterpart of NATRS 438; additional requirements. Credit not granted for both NATRS 438 and 538.

541 Population Ecology and Conservation 4 (3-3) Prereq graduate standing. Course focusing on ecology, conservation, management of vertebrate populations, especially threatened and endangered

species; designed for wildlife and conservation biology majors. Graduate level counterpart of NATRS 441; additional requirements. Credit not granted for both NATRS 441 and 541.

545 Advanced Ecosystem and Landscape Management 2 Prereq enrollment in NRI or by interview only. Ecosystems and landscape management principles, assessments, monitoring, design, and practice, incorporating biological and socioeconomic perspectives.

546 Upland Game Ecology 2 Prereq NATRS 435. Ecology and management of wildlife species using forest and rangeland habitats; current management problems and procedures. Cooperative course taught by UI (WLF 546), open to WSU students.

550 Conservation Biology 3 Ecological and genetic considerations for maintenance of biological diversity and their practical applications to resource management. Credit not granted for both NATRS 450 and 550.

551 Rangeland Vegetation Ecology 3 Prereq two ecology courses. Ecological concepts of dynamics and distribution of plant communities; secondary succession processes, soil-vegetation relationships and development of vegetation classification schemes. Cooperative course taught by UI (Rnge 551), open to WSU students.

554 Restoration Ecology 3 (2-3) Graduate-level counterpart of NATRS 454; additional requirements. Credit not granted for both NATRS 454 and 554. Cooperative course taught by UI (Rnge 552), open to WSU students.

556 Foraging Ecology of Herbivores 2 Prereq graduate standing or permission of instructor. Synthesis of foraging behavior concepts including nutritive quality of forages, digestive and metabolic constraints, and diet and habitat selection. Cooperative course taught jointly by WSU and UI (Rnge 556).

560 Watershed Management 3 Principles and practices of management of forest and rangelands for protection, maintenance and improvement of water resource values. Credit not granted for both NATRS 460 and 560.

564 Landscape Ecology 3 (2-3) Graduate -level counterpart of NATRS 464; additional requirements. Credit not granted for both NATRS 464 and 564.

575 Advanced Remote Sensing 2 (1-4). Same as Soils 574.

588 Advance Topics in Wildlife V 1-3 May be repeated for credit; cumulative maximum 10 hours. Biology and management of wildlife species. Cooperative course taught jointly by WSU and UI (WLF, For, FWR, Rnge, and RRTT 503).

593 Special Topics Seminar 1 May be repeated for credit. Prereq 20 hrs NATRS. Literature and problems.

594 Environmental and Natural Resources Issues and Ethics 3 Prereq senior standing. May be repeated for credit; cumulative maximum 7 hours. Ethical systems applied to natural resources; issues of professionalism and ethics in natural resource management. Cooperative course taught by WSU open to UI students (RRT 594).

595 Seminar in Natural Resource Sciences 1 May be repeated for credit. Literature review; preparation and presentation of reports in natural resource sciences.

600 Special Projects or Independent Study Variable Credit. S, F grading.

700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.

702 Master's Special Problems, Directed Study and/or Examination Variable credit. S, F grading.

800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

## Program in Neuroscience

[www.vetmed.wsu.edu/depts-vcapp](http://www.vetmed.wsu.edu/depts-vcapp)

Degrees offered: **M.S., Ph.D. in Veterinary Science or Neuroscience**

Faculty working with graduate students: **27**

Graduate students: **27**

Students receiving assistantships or scholarships: **100%**

Tests required: **GRE; TOEFL or IELTS (international students only)**

Deadline for admission: **Fall – December 31**

### Admission Requirements

Applicants for admission to the neuroscience program must have a minimum grade point average (GPA) of 3.0 (on a 4.0 scale), either on the basis of the last 60 graded semester or 90 graded quarter hours of undergraduate study, or on the basic science portion (first 60 credit hours) of a professional curriculum.

Applicants generally will be expected to have completed courses in organic chemistry, calculus, physics, and a minimum of three courses in different areas of the biological sciences.

Applicants are advised to have a basic statistics course prior to entering the neuroscience or veterinary science programs.

Deficiencies in any of these areas must be cleared during the period of graduate study before the preliminary exam.

### Program Description

Innovation by WSU scientists advances the world's understanding of how nerve cells in the brain produce our feelings and behaviors and how disturbances in the delicate organization of the brain lead to poor health. These neuroscientists seek answers to questions that touch on every aspect of life, including feeling, eating, sleeping, remembering, sensing, and maintaining health. The brain's intricate web of billions of cells is flexibly inter-linked. This plasticity allows connections to be changed in response to the environment; in some brain areas fifty percent of the connections change daily. This complex dynamic network generates emotion, motivation, sleep, and memory. How these parts of our selves emerge from the flexible interactions among brain areas is one of the most intriguing, fundamental questions of life. Better understanding of this complexity is the key to reducing the societal impact of obesity, memory loss, mental illness, and drug addiction, and to enhancing performance and health.

The M.S. program is designed to provide broad training in the specific aspects of neuroscience and related disciplines to prepare students for careers in teaching, research, and service.

The objectives for the Ph.D. level training are to prepare the candidate for a career as an independent investigator (i.e., competition for NIH, NSF and private foundation grants as the principal investigator).

### Contact Information

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### Positions Held by Recent Graduates

Postdoctoral position at Harvard University; National Institute of Mental Health projects at UC Irvine; University of Washington and Washington State University; Medical school, veterinary school, or private practice as M.D. or D.V.M.; Tenure-track faculty positions at Oregon Health and Science University, Southern Colorado University, Washington State University, Whitworth College, University of Washington, St. Cloud State University, Tuskegee University, and the Institute of Animal Health and Nutrition; Biotech companies such as Smith Cline Beecham, Merck, Acordia Inc., Venturi Group, and Zymogenetics

### Faculty Interests

Animal Well-Being and Human-Animal Interactions

**Ruth C. Newberry** ([http://www.vetmed.wsu.edu/research\\_vcapp/newberry.aspx](http://www.vetmed.wsu.edu/research_vcapp/newberry.aspx)) I study factors affecting the behavior and well-being of animals, with a focus on identifying environmental enrichment strategies that minimize aggression, cannibalism and other injurious behaviors.

**Jaak Panksepp** (<http://www.vetmed.wsu.edu/depts-vcapp/people/Panksepp-endowed.aspx>) I am the founder of the now rapidly expanding scientific specialty called Affective Neuroscience. My research interests are devoted to understanding the basic brain mechanisms that allow organisms to have various affective feelings, especially emotional ones that are important for understanding psychiatric disorders in both humans and other animals. This knowledge should help us to understand the comfort zones by which all animals live their lives, and give us better ideas for all kinds of emotional distress including those that result in drug addictions. Our research focuses on the instinctual emotional behaviors of animals, while accepting the importance of experienced lives in understanding what brains really do.

### Behavioral

**Rebecca Craft** ([http://www.vetmed.wsu.edu/research\\_vcapp/craft.aspx](http://www.vetmed.wsu.edu/research_vcapp/craft.aspx)) My research goals are to determine whether the rewarding effects of drugs differ in females vs. males, whether females' and males' perception of drug effects differ, whether any of the effects of commonly used psychoactive drugs differ between the sexes, and the underlying neurobiological mechanisms of such sex differences.

**Dennis G. Dyck** ([http://www.vetmed.wsu.edu/research\\_vcapp/dyck.aspx](http://www.vetmed.wsu.edu/research_vcapp/dyck.aspx)) My laboratory focuses on clinical management of schizophrenia and immunological responses to the chronic stresses of care-giving.

**Patricia Talcott** ([http://www.vetmed.wsu.edu/research\\_vcapp/talcott.aspx](http://www.vetmed.wsu.edu/research_vcapp/talcott.aspx)) My current position involves teaching in the veterinary curriculum and providing diagnostic toxicology service to Washington Animal Disease Diagnostic Laboratory and the University of Idaho's Analytical Sciences Laboratory. The veterinary toxicology service currently receives over 1300 cases per year, totaling more than 4,100 tests. These cases come from all over the Northwest and include submissions

involving all animal species.

**Jay Wright** ([http://www.vetmed.wsu.edu/research\\_vcapp/wright.aspx](http://www.vetmed.wsu.edu/research_vcapp/wright.aspx)) My research program concerns memory dysfunction, such as that seen with Alzheimer's disease. I am developing new drug therapies in an attempt to reduce memory problems.

### **Cardiovascular & Muscle Physiology**

**Ken Campbell** ([http://www.vetmed.wsu.edu/research\\_vcapp/campbell.aspx](http://www.vetmed.wsu.edu/research_vcapp/campbell.aspx)) I study the relation between contraction systems (muscle), the mechanical load against which contractile systems must work, and the excitation systems (nervous system and other bioelectric generators such as cardiac pacemakers) that drive contraction. This triad of physiologic systems (muscle-load-excitation) co-evolved according to the outcomes of interactions that favored the survival of the organism.

Articulation of aspects of interactions that lead to favorable functional outcomes (i.e., enhanced mechanical energy exchange between the organism and its environment) becomes the center piece of a deeper understanding of the integrated organism and the foundations for a biomimetic engineering.

**Murali Chandra** ([http://www.vetmed.wsu.edu/research\\_vcapp/chandra.aspx](http://www.vetmed.wsu.edu/research_vcapp/chandra.aspx)) My research focuses on understanding the molecular mechanisms responsible for regulation of the contractile machinery of heart muscle cells and how myofilament remodeling is linked to pathogenesis of heart diseases.

**Wenji Dong** ([http://www.vetmed.wsu.edu/research\\_vcapp/dong.asp](http://www.vetmed.wsu.edu/research_vcapp/dong.asp)) Research in my laboratory focuses on the cardiac muscle regulation at the healthy and diseased states. Specifically, we study the regulatory mechanism of cardiac thin filament in response to protein phosphorylation and cardiomyopathy mutations of contractile proteins. We also are interested in developing a next-generation biosensor to detect multiple cardiac biomarkers for heart disease diagnosis.

**Bryan K. Slinker** ([http://www.vetmed.wsu.edu/research\\_vcapp/slinker.aspx](http://www.vetmed.wsu.edu/research_vcapp/slinker.aspx)) I study the regulation of cardiac function, cardiac angiotensins, and biostatistics.

### **Central Nervous System**

**Stacia B. Moffett** ([http://www.vetmed.wsu.edu/research\\_vcapp/moffett.aspx](http://www.vetmed.wsu.edu/research_vcapp/moffett.aspx)) Research in my lab focuses on invertebrate neurobiology, CNS regeneration and behavioral recovery.

**James O. Schenk** ([http://www.vetmed.wsu.edu/research\\_vcapp/schenk.aspx](http://www.vetmed.wsu.edu/research_vcapp/schenk.aspx)) I study neurochemistry, in vivo and in vitro measurements of neuro-transmitters and transmitter uptake mechanisms.

### **Cognitive Neuropsychology**

**Maureen Schmitter-Edgecombe** ([wsu.edu/psychology/facultystaff/clinical/facultypages/schmitter-edgecombe.html](http://wsu.edu/psychology/facultystaff/clinical/facultypages/schmitter-edgecombe.html)) My research focuses on evaluating attention and memory issues in both neurological normal (i.e., both young and older adults) and clinical populations (e.g., closed-head injury, Parkinson's disease).

### **Disease**

**Mark DeSantis** ([http://www.vetmed.wsu.edu/research\\_vcapp/desantis.aspx](http://www.vetmed.wsu.edu/research_vcapp/desantis.aspx)) The cells of the nervous system can develop incorrectly, get sick, or be injured. Sometimes they die; sometimes they recover or our bodies compensate. I am seeking to understand what is going on with cells and the body during those times.

**Joe Harding** ([http://www.vetmed.wsu.edu/research\\_vcapp/harding.aspx](http://www.vetmed.wsu.edu/research_vcapp/harding.aspx)) My research focuses on the development of new treatment options for neurodegenerative diseases including Alzheimer's, Parkinson's, and stroke.

**Steve Simasko** ([http://www.vetmed.wsu.edu/research\\_vcapp/simasko.aspx](http://www.vetmed.wsu.edu/research_vcapp/simasko.aspx)) The goal of the research in my laboratory is to develop physiological insights, from the cellular and molecular level to the integrated behavior of the whole animal, into the processes that influence diseases with significant behavioral components, such as obesity and addiction.

### **Drug Abuse and Interactions**

**Yan Dong** ([http://www.vetmed.wsu.edu/research\\_vcapp/dongy.aspx](http://www.vetmed.wsu.edu/research_vcapp/dongy.aspx)) Our long-term research interest is to understanding the neural mechanisms through which the brain perceives, differentiates, and prioritizes the motivational signals. We use drug addiction as the animal model. Our central hypothesis is that repeated exposure to strong incentive stimuli, such as cocaine intake, rewires the microcircuits within the brain reward pathway, leading to pathological prioritization of drug-related motivation. We employ multidisciplinary approaches including in vitro and in vivo electrophysiological recordings, molecular manipulations, biochemical assays and behavioral tests to examine this hypothesis.

**Barbara Sorg** ([http://www.vetmed.wsu.edu/research\\_vcapp/sorg.aspx](http://www.vetmed.wsu.edu/research_vcapp/sorg.aspx)) I am examining the effects of stress and cocaine on the brain and behavior. I also study how certain environmental chemicals affect the brain and behavior.

**Mike Morgan** ([http://www.vetmed.wsu.edu/research\\_vcapp/morgan.aspx](http://www.vetmed.wsu.edu/research_vcapp/morgan.aspx)) The goal of my research is to determine the neural mechanisms underlying pain modulation and morphine tolerance.

**Raymond M. Quock** ([http://www.vetmed.wsu.edu/research\\_vcapp/quock.aspx](http://www.vetmed.wsu.edu/research_vcapp/quock.aspx)) Our research program focuses on elucidating pharmacological mechanisms of anxiety and pain control.

### **Eating Controls**

**Robert and Sue Ritter** ([http://www.vetmed.wsu.edu/research\\_vcapp/ritter-r.aspx](http://www.vetmed.wsu.edu/research_vcapp/ritter-r.aspx) OR [http://www.vetmed.wsu.edu/research\\_vcapp/ritter-s.asp](http://www.vetmed.wsu.edu/research_vcapp/ritter-s.asp)) Our research focuses on eating disorders associated with brain function.

**Suzanne M. Appleyard** ([http://www.vetmed.wsu.edu/research\\_vcapp/Appelyard\\_S.aspx](http://www.vetmed.wsu.edu/research_vcapp/Appelyard_S.aspx)) The main focus of my lab is to determine how neuronal circuits control energy balance and whether these pathways are altered during disease states such as obesity.

### **Endocrine System**

**Hurbert Schwabl** (<http://www.crb.wsu.edu/3FacultyPages/Schwabl.html>) My research is in environmental physiology with focus on the role of the endocrine system in physiological and behavioral responses of animals, in particular of birds, to the environment.

### **Exercise Physiology**

#### **Sally E. Blank**

([http://www.spokane.wsu.edu/academic/health\\_sciences/exercise\\_science/faculty\\_SBlankbio.asp](http://www.spokane.wsu.edu/academic/health_sciences/exercise_science/faculty_SBlankbio.asp)) My research focuses on stress physiology and the role of exercise stress in mechanisms regulating immunity and skeletal muscle metabolism.

**E. Carolyn Johnson** ([http://www.vetmed.wsu.edu/research\\_vcapp/johnson\\_c.aspx](http://www.vetmed.wsu.edu/research_vcapp/johnson_c.aspx)) My research targets control of angiogenesis, the role of angiogenesis in atherosclerosis and the effects of different stressors such as exercise and hypoxia on microvascular growth.



## Motor Control

**David Lin** ([http://www.vetmed.wsu.edu/research\\_vcapp/lin.aspx](http://www.vetmed.wsu.edu/research_vcapp/lin.aspx)) I study the contribution of muscle and spinal reflex properties for the control of posture and movement. The research in my laboratory extends from single muscle fibers to human postural control.

**Leslie Sprunger** ([http://www.vetmed.wsu.edu/research\\_vcapp/sprunger.aspx](http://www.vetmed.wsu.edu/research_vcapp/sprunger.aspx)) Normal, coordinated movement requires complex interactions between body and brain. My lab uses an integrative approach to study neural control of movement, movement disorders, and the role of genetic mechanisms known to influence the severity of neurologic disease.

**Anita Vasavada** ([http://www.vetmed.wsu.edu/research\\_vcapp/vasavada.aspx](http://www.vetmed.wsu.edu/research_vcapp/vasavada.aspx)) My research explores the interaction of musculoskeletal biomechanics and neural control in both normal and diseased states. In particular, I use computer modeling and motion analysis to study control of head movements and basal ganglia disorders such as Parkinson's disease.

## Neural Plasticity

**Krzysztof Czaja** ([http://www.vetmed.wsu.edu/research\\_vcapp/czaja.aspx](http://www.vetmed.wsu.edu/research_vcapp/czaja.aspx)) The research interest of our group is to investigate functional, chemical and structural plasticity involved in cell survival or death within the nervous system. Our major efforts are devoted to the study of postnatal adaptive changes of neural circuits to intrinsic or extrinsic inputs. Most of our work is concentrated on primary sensory neurons using cell biology, molecular biology and neuroanatomy.

## Reproduction

**Heiko Jansen** ([http://www.vetmed.wsu.edu/research\\_vcapp/jansen.aspx](http://www.vetmed.wsu.edu/research_vcapp/jansen.aspx)) Research in my laboratory centers around understanding how the brain controls reproduction. Specifically, we study the brains of seasonal breeders because these species undergo an annual (reversible) cycle of fertility and infertility. Our goal is to identify the neural processes leading to these profound physiological changes in an effort to facilitate reproductive function.

**Catherine M. Ulibarri** ([http://www.vetmed.wsu.edu/research\\_vcapp/ulibarri.aspx](http://www.vetmed.wsu.edu/research_vcapp/ulibarri.aspx)) I am studying the molecular, behavioral and neuroanatomical aspects of sexual differentiation.

## Sleep

**Greg Belenky** ([http://www.vetmed.wsu.edu/research\\_vcapp/belenky.aspx](http://www.vetmed.wsu.edu/research_vcapp/belenky.aspx)) We conduct laboratory and field studies of sleep and performance in humans.

**Lynn Churchill** ([http://www.vetmed.wsu.edu/research\\_vcapp/churchill.aspx](http://www.vetmed.wsu.edu/research_vcapp/churchill.aspx)) I investigate how different regions of the brain play a role in sleep function.

**James Krueger** ([http://www.vetmed.wsu.edu/research\\_vcapp/krueger/](http://www.vetmed.wsu.edu/research_vcapp/krueger/)) Humans spend about 27 years of our life asleep. Therefore, sleep and associated problems are clearly of direct importance to the quality of our life. A necessary step in determining the function of sleep is to find out how the brain produces sleep. My laboratory is looking into the biochemical mechanisms responsible for sleep and sleep function.

**David Rector** ([http://www.vetmed.wsu.edu/research\\_vcapp/rector.aspx](http://www.vetmed.wsu.edu/research_vcapp/rector.aspx)) My lab is focused on mechanisms of high level sensory processing performed by the brain and in developing novel neurophysiological and imaging techniques for whole animal recordings.

**Parijat Sengupta**, Ph.D. ([http://www.vetmed.wsu.edu/research\\_vcapp/sengupta.aspx](http://www.vetmed.wsu.edu/research_vcapp/sengupta.aspx)) Protein-protein communications direct most cellular functions. My research aims to understand dynamics of a subset of protein-protein interactions that is relevant to cell signaling and signal transduction. I use a

host of biophysical techniques, molecular biology and confocal microscopy for my research.

**Hans P. A. Van Dongen** ([http://www.vetmed.wsu.edu/research\\_vcapp/hans\\_vandongen.aspx](http://www.vetmed.wsu.edu/research_vcapp/hans_vandongen.aspx)) My research focuses on the neurobehavioral effects of sleep deprivation and the underlying sleep/wake and circadian regulatory mechanisms, through laboratory experiments as well as mathematical modeling.

**Jonathan Wisor** ([http://www.vetmed.wsu.edu/research\\_vcapp/wisor.asp](http://www.vetmed.wsu.edu/research_vcapp/wisor.asp)) My research utilizes genetics and pharmacology to study the neurobiological basis for sleep need and the circadian timing of sleep.

### **Vision and Hearing**

**Peter G. Fuerst** ([http://www.vetmed.wsu.edu/research\\_vcapp/fuerst.asp](http://www.vetmed.wsu.edu/research_vcapp/fuerst.asp)) The differential adhesion hypothesis of neural development posits that spatial-organization and synaptic coupling of the nervous system is organized by, Ig-superfamily and other cell adhesion molecules. The retina is a well-characterized neural tissue containing at least fifty-five types of neurons whose integration into functional circuits is required for vision and circadian behavior. The retina is therefore a relatively simple neural tissue and yet sufficiently complex to study the differential adhesion hypothesis. The vertebrate Down Syndrome Cell Adhesion Molecule (Dscam) gene family, composed of Dscam and Dscam-Like1, is emerging as a key mediator of spatial and synaptic organization within the developing retina. Our research is focused on identifying the mechanism by which molecular recognition cues such as Dscam and DscamL1 pattern the nervous system using a combination of fluorescent and transgenic mouse models to image the developing nervous system.

**Robert Patterson** ([http://www.vetmed.wsu.edu/research\\_vcapp/patterson.aspx](http://www.vetmed.wsu.edu/research_vcapp/patterson.aspx)) My research centers around basic visual mechanisms of depth and motion perceptions. This research is important to the development of synthetic vision (virtual reality) displays in human engineering.

**Christine Portfors** ([http://www.vancouver.wsu.edu/fac/portfors/portfors\\_home.html](http://www.vancouver.wsu.edu/fac/portfors/portfors_home.html)) In my laboratory we are studying the neural mechanisms used by bats and mice to analyze complex sounds such as communication sounds. We use a variety of neurophysiological, neuroanatomical and behavioral techniques to study the auditory system of these animals.

**Deborah Stenkamp** ([http://www.vetmed.wsu.edu/research\\_vcapp/stenkamp.aspx](http://www.vetmed.wsu.edu/research_vcapp/stenkamp.aspx)) My lab is researching the cellular and molecular mechanisms of vertebrate retinal development.

**Michael Varnum** ([http://www.vetmed.wsu.edu/research\\_vcapp/varnum.aspx](http://www.vetmed.wsu.edu/research_vcapp/varnum.aspx)) I am investigating the molecular mechanisms underlying the activity of ion channels that are vital to vision and olfaction. Current experiments are directed toward understanding the functional basis for identified retinal diseases that been linked to mutations in the genes encoding these proteins.

### **Neuroscience**

502 Faculty Research in Pharmacology/Toxicology 1 Same as P/T 502.

505 Principles and Methods of Toxicology 3 Same as P/T 505.

506 (504) Principles of Pharmacology I 3 Same as P/T 506.

507 Principles of Therapeutics 3 Same as P/T 507.

509 Affective Neuroscience 3 Prereq graduate standing. Graduate-level counterpart of Neuro 409; additional requirements. Credit not granted for both Neuro 409 and 509.

513 Advanced Neuroanatomy 4 Same as V An 513.

520 Fundamentals of Neuroscience 4 (3-3) Prereq instructor permission or graduate standing. Functional aspects of the brain from cell membrane to higher integrative processes. Cooperative

course taught by WSU, open to UI students.

521 Mammalian Neuroscience 3 (2-3) Same as V M 521P.

526 Domestic and Exotic Animal Behavior 2 (1-3) Same as VM 526P.

529 Integrative Neuroscience 3 3 Prereq graduate standing; biochemistry course. Basic biochemical processes in the nervous system and their significance for normal and abnormal function. Cooperative course taught by WSU, open to UI students (Zool 529).

531 Neuroscience Laboratory Rotation 1(0-3) Prereq graduate standing. Fourteen-week rotation through each of two research laboratories; learning procedures and techniques in neuroscience. May be repeated for credit; cumulative maximum 2 hours. S/F grading.

540 Special Topics in Integrative Neuroscience 3 May be repeated for credit; cumulative maximum 6 hours. Concepts and controversies in neuroscience involving integrative properties of cell systems.

541 Special Topics in Cellular and Molecular Neuroscience 3 May be repeated for credit; cumulative maximum 6 hours. Concepts and controversies in neuroscience that involve nerve cell function and regulation.

542 Special Topics in Disciplinary Neuroscience 3 May be repeated for credit; cumulative maximum 6 hours. Concepts and controversies in neuroscience that revolve around traditional approaches to nervous system study.

543 Special Topics in Behavioral/Clinical Neuroscience 3 May be repeated for credit; cumulative maximum 6 hours. Concepts and controversies in neuroscience that involve normal and pathological aspects of behavior.

553 Development and Plasticity of the Nervous System 2 Same as Biol 553.

561 Biological Signal Processing 3 Development of quantitative models and analysis of neural systems. Cooperative course taught by UI (Neur 5231), open to WSU students.

577 Behavioral Pharmacology 3 Same as Psych 577.

584 Sensory Basics of Behavior 3 Same as Psych 584.

590 Seminar 1 Presented by advanced graduate students and faculty (both in VCAPP and around WSU) on their research areas. May be repeated for credit; cumulative maximum 4 hours. S/F grading.

592 Research Writing and Seminar 3 May be repeated for credit; cumulative maximum 6 hours. Written and oral communication of scientific information; formal instruction while preparing research proposals and departmental seminar.

600 Special Projects or Independent Study Variable credit. S, F grading.

700 Master's Research, Dissertation and/or Examination Variable credit. S, F grading.

800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

## **Intercollegiate College of Nursing**

[www.nursing.wsu.edu](http://www.nursing.wsu.edu)

Degree offered: **Master of Nursing, Ph.D. in Nursing**

Faculty working with graduate students: **41**

Graduate students: **200**

Priority Application Deadlines: **Fall—January 10 (Master's)**

**Spring—July 1 (Master's), Summer—January 10 (Ph.D.)**

Degree offered: **Master's: Spokane, Tri-Cities, Vancouver, Yakima, and Walla Walla; Ph.D.: Spokane and Vancouver**

Test required **PhD: TOEFL for students whose first language is other than English**

## **Admission Requirements**

Specific components for the College of Nursing graduate programs are included in the WSU Graduate School application.

Prerequisites for master's program: bachelor's degree in nursing, minimum of 3.00 GPA from undergraduate work, recent history-taking and physical assessment skills, completion of a basic statistics course, Washington State RN licensure or eligibility, and recommendations addressing the applicant's professional nursing competence and ability to succeed as a graduate student. A written or personal interview is required.

Prerequisites for doctoral program: master's degree in health care field, minimum of 3.50 GPA in master's program, statement of professional goals and research interests, example of scholarly work, resume, letters of reference, and transcripts of former college work.

## **Program Description**

The program prepares students for leadership positions in advanced nursing practice. Areas of concentration are: family nurse practitioner, psychiatric/mental health nurse practitioner, and community-based/population-focused nursing, which has sub-specialties of nursing administration, education, care management of adults or children, and an individualized study option. Each concentration may be completed in two years of full-time study; part-time study is also available. The doctorate in nursing program accepted its first class in summer 2007. The program prepares students as nurse scientists, equipped to assume roles as faculty in schools and colleges of nursing, and/or to function as nurse researchers.

## **Contact Information**

### **Master's Degree:**

Tamara Kelley, Academic Coordinator, or Anne Hirsch, Senior Associate Dean  
WSU College of Nursing  
PO Box 1495  
Spokane, WA 992210-1495  
Telephone: 509-324-7334; 509-324-7335;  
FAX: 509-324-7336  
e-mail: kelleyt@wsu.edu; hirsch@wsu.edu;

### **Doctorate:**

Eileen Swalling Academic Coordinator, or Ruth Bindler, Director, PhD in Nursing  
WSU College of Nursing  
PO Box 1495  
Spokane, WA 99210-1495  
Telephone: 509-324-7297; 509-324-7403  
FAX: 509-358-7341  
e-mail: eswalling@wsu.edu; bindler@wsu.edu

## **Graduate Opportunities**

Professional nursing leadership positions; Clinical practice in rural and urban settings

Advanced nurse practitioner positions in private practice, clinics, and hospitals; Private practice available for nurse practitioners; Leaders in community-based projects; Nursing faculty

### **Positions Held by Recent Graduates**

Faculty at WSU College of Nursing and colleges throughout Washington State

Family Nurse Practitioner in hospitals, clinics, offices

Psychiatric Mental Health Practitioner in clinics, private practice

Researchers in universities, national nursing research positions

### **Faculty Interests**

**Carol Allen**, Ph.D., RN: Cultural competency, transcultural nursing, homelessness, educational outcomes of international experience.

**Merry Armstrong**, DNSc, ARNP: Psychiatric/mental health nursing, substance abuse.

**Jacquelyn Banasik**, Ph.D., ARNP: Clinical research in critical care; basic physiological research; cardiovascular.

**Ruth Bindler**, Ph.D., RNC: Cardiovascular and diabetes risk in children, child and adolescent obesity, ethnic disparities.

**Margaret Auld Bruya**, DNSc, ARNP: Acute care, primary care of homeless women and children, development of nursing programs for underserved/undereducated populations.

**Chayan Boonpongmanee**, Ph.D., RN: Maternal-child nursing, women's health.

**Marie Scott Brown**, Ph.D., RN: Family health care, cross-cultural approaches to health care.

**Karen Busch**, Ph.D., RN: Psychiatric/mental health nursing.

**Patricia Butterfield**, Ph.D., RN, Dean: Occupational environmental health, rural health disparity, social justice in public health.

**Rebecca Cardell**, DNSc, ARNP: Psychiatric/mental health nursing, inpatient suicide.

Sheela Choppala, Ph.D., RN: Health disparities, community clinics, child and adolescent mental health.

**Cynthia Corbett**, PhD.: Home health care, diabetes.

**Kenneth Daratha**, Ph.D.: Diabetes, obesity, informatics.

**Lorrie Dawson**, Ph.D., ARNP: Symptom interpretation, functional status, community-acquired pneumonia, complementary and alternative healthcare practices.

**Dawn Doutrich**, PhD: Transcultural nursing, ethics, workforce diversity.

**Alice Dupler**, JD, RN: Quality improvement outcome measurement on long term care settings.

**Linda Eddy**, Ph.D., ARNP: Nursing education evaluation, experiences of underrepresented minority clients and nurses.

**Phyllis Eide**, Ph.D., RN: Qualitative investigation of breast cancer survivorship and support group dynamics.

**Roberta Emerson**, Ed.D., RN: Effect of nursing interventions in critical care, nursing education.

**Mel Haberman**, Ph.D., RN, Associate Dean for Research: Oncological nursing.

**Zana R. Higgs**, Ed.D., RN: Community health nursing, nursing education.

**Anne Hirsch**, DNS, ARNP, Associate Dean for Academic Affairs: Infertility, women's health, nursing education.

**Renee Hoeksel**, Ph.D., RN: Pain management and health outcomes of critically ill elders.

**Mary Jayne Johnson**, Ph.D., ARNP: Medication adherence and chronic illness, psychometric theory.

**David Kahn**, Ph.D., RN: Qualitative research methodology.

**Louise Kaplan**, Ph.D., ARNP: Advanced practice nurse and scope of practice issues, health policy.

**Suzan Kardong-Edgren**, Ph.D., RN: Cultural competency, use of technology to improve learning.

**Janet Katz**, Ph.D., RN: Native American nurses and workforce, culture, pain.

**Diane Kinzel**, Ph.D., RN: Homeless populations.

**Janet Lohan**, Ph.D., RN: Adolescent mental health issues; grief and loss reaction of bereaved families.

**Judy Meyers**, Ph.D., RN: End of life care and treatment decisions.

**Kris Miller**, DNSc, RN: Children's developmental concepts of health, illness, and injury.

**Bobbi Morrison**, Ph.D., RN: Women's health, surgically-induced menopause.

**Janet Purath**, Ph.D., ARNP: Cardiovascular health promotion, nurse practitioner interventions.

**Lorna Schumann**, Ph.D., ARNP: AIDS, educational research, international research, primary care.

**Billie Severtsen**, Ed.D., RN: Ethical decision-making, hermeneutics.

**Denise Smart**, Ph.D., RN: Maternal/child nursing, epidemiology, disaster nursing.

**Mary Sobralske**, Ph.D., RN: Cross-cultural care.

**Angela Starkweather**, Ph.D., ARNP: Psychoneural immunology, neuroscience, proinflammatory cytokines, stress, pain.

**Roxanne Vandermause**, Ph.D., RN: Substance use, experiences of women with stigmatized health problems.

## **Nursing**

503 Scientific Inquiry in Nursing 2 Prereq graduate standing in nursing or permission of the instructor. Scientific inquiry applied to theoretical and philosophical foundations in nursing.

504 Methods of Nursing Research 4 Prereq Nurs 503 or c//. Research process as foundational to both conduct of scientific inquiry and utilization of findings.

507 Health Care Policy Analysis V 2-3 Prereq graduate standing. Analysis of health care system policy; exploration of issues of clinical management and community resource utilization including advocacy techniques.

513 Innovative Leadership and Management V 3, 4 (3-3), or 5 (3-6) Prereq graduate student in Nursing. Key issues affecting nursing administration; nursing and management theories for application in nursing service settings.

517 Financial Management V 2 (2-0) to 3 (2-3) Application of economic theory and principles of financial management to the role of nurse manager.

519 Teaching in the Information Age 3 prereq basic computer skills; permission of instructor. Focus on educational paradigms consistent with distance education; development of a variety of multimedia materials for nursing education.

520 Nursing Education in a Multicultural Society V 3 (0-9) to 5 (0-15) Prereq permission of instructor. Application of learning theories and strategies useful in teaching diverse populations; taught in a distance degree format.

521 Teaching, Learning and Evaluation in Nursing V 3 (3-0) to 5 (3-6) Prereq graduate standing in Nursing or permission of instructor. Exploration of concepts related to teaching-learning, assessment of diverse learning needs, instructional strategies and design, evaluation of performance outcomes.

523 Nursing Education: Past, Present, and Future V 3 (3-0) to 5 (3-6) Prereq graduate standing in Nursing or permission of instructor. Exploration of curriculum history, development, future predictions; program evaluation, instructional resources, leadership, and policy development in academic and service settings.

534 Research Seminar: Grant Development 1 Prereq graduate standing. Seminar focusing on grant writing and advanced skills for critically reviewing grant applications.

535 Philosophy of Nursing Science 2 Prereq Nurs 534; 535 or c//. Structure and organization of fields of knowledge in science including historical and philosophical tenets of inquiry.

536 Nursing Theory: Foundations for knowledge Development 2 Prereq graduate standing in nursing. Theory development analysis; Theory critique; nursing knowledge examination; impact of theory on nursing science, applied to student's phenomenon of interest.

537 Role Analysis: Advanced Practice 2 (1-3) Prereq graduate student in Nursing. Emphasis on role analysis including interdisciplinary relationships, consultative skills, responsibility, activities, and functions of the advanced practice nurse.

538 Technology in Nursing 2 Prereq graduate standing in nursing. Impact of technology in nursing practice, research and education with resulting changes in roles, practice models and values.

540 Family and Partner Psychotherapy 4 (2-6) Prereq Nurs 541 and 543 or master's degree in psych/mental health nursing or written permission of instructor. Introduction to theory and practice of family/partner therapy including role of therapist in treatment of family as a unit.

541 Psychiatric/Mental Health Nursing: Individuals 4 (3-3) Prereq graduate standing in nursing; Nurs 562; 581 or c//. Theories of psychopathology and appropriate nursing interventions with individuals across the age continuum.

542 Psychiatric/Mental Health Advanced Practice Role Development 2 Prereq BSN degree. Advanced practice psychiatric/mental health nursing role development emphasizing systems theory and definition of scope and standards of independent and collaborative roles.

542 Role Development and Practice Management for the Psychiatric Mental Health Practitioner 2 Prereq admission to the PMHNP program or permission of instructor. Advanced practice role development, definition of scope and standards of independent and collaborative practice of the psychiatric nurse practitioner.

543 Psychiatric Mental Health Nursing 4 (3-3) Prereq Nurs 541, Nurs 581. Introduction to theory and practice of group psychotherapy; Milieu and other selected theories are studied and applied to nursing practice.

545 Advanced Concepts of Psychiatric/Mental Health Nursing; Children and Adolescents 5 (3-6) Prereq Nurs 541 and 543 or written permission of instructor. Advanced study of intervention models for psychopathologies evidenced during childhood and adolescence; practicum emphasizes assessment, psychiatric diagnosis, and psychotherapeutic intervention.

546 Practicum in Psychiatric / Mental Health Nursing 4 (1-9) or 5 (1-12) Prereq Nurs 581, 541, 543, 562; PharP 525 or c//. Individualized clinical experience/seminar designed to provide advanced competency, accountability, leadership in psychiatric/mental health nursing.

548 Psychiatric Nurse Practitioner Internship V 1-9 Prereq Nurs 546, PharP 525, by interview only. Application and integration of theory, research findings, assessment and intervention in the care of clients with psychiatric disorders.

549 Addiction Perspectives 2 Prereq Graduate standing in nursing or permission of instructor. Overview of the theories, physiology, course and epidemiology of addictions; assessment, evaluation, prevention, and treatment for substance abuse.

550 International, Interdisciplinary, and Transcultural Health Care 3 Prereq graduate standing in nursing or permission of instructor. Focuses upon diverse health beliefs and practices of clients and members of the interdisciplinary health care team.

- 552 Family Nursing in the Community V 2-4 Theoretical approaches to the analysis of normal and at-risk families; application of family assessment and intervention models when planning care.
- 554 Epidemiological Approaches to Community Health 3 Prereq graduate standing in Nursing. Epidemiologic application to health; implications for health promotion, disease prevention. Focus: knowledge and skills required to obtain and use data-bases.
- 555 Community-Based/Population-Focused Nursing Internship V 1-9 May be repeated for credit; cumulative maximum 9 hours. Prereq Nurs 550, 552, 554, 554, and 556 or permission of instructor. Application and integration of theory, research findings, and community analyses/macro-level intervention strategies in performing community-based/population-focused nursing. S, F grading.
- 556 Community-Based/Population-Focused Role Practicum V 3 (2-3) or 4 (2-6) to 6 (2-12) Prereq permission of instructor. Culminating analysis, development, and enactment of advanced practice roles in teaching, practice, or administration of community-based/population focused nursing.
- 557 Care Management with At-Risk Infant and Young Child Populations 3 Prereq graduate standing in nursing or permission of instructor. Analysis of biopsychosocial health risks of infants and young children using models of risk and resiliency in advanced nursing practice.
- 558 Care Management with At-Risk Older Child and Adolescent Populations 3 Prereq graduate standing in nursing or permission of instructor. Analysis of biopsychosocial health risks of older children and adolescents using models of risk and resiliency in advanced nursing practice.
- 559 Advanced Nursing Practice with At-Risk Child and Youth Populations Practicum V 2-4 Prereq graduate standing in nursing or permission of instructor; Nurs 557 and 558 or c//. Application of concepts/models of childhood risk and resiliency in advanced nursing practice with community-based at-risk older children and adolescents.
- 560 Promoting Health of Community-Based Adults V 2 (2-0) to 4 (2-6) Analysis and evaluation of strategies, interventions, and programs to promote the health of at-risk adult community populations.
- 561 Advanced Assessment and Diagnosis for the Psychiatric Mental Health Practitioner 3 Prereq Admission to PMHNP program. Assessment and diagnosis of psychiatric illnesses; focus on physical and psychiatric history, mental status exam and strategies of psychometric evaluation.
- 562 Advanced Health Assessment and Differential Diagnoses 4(3-3) Prereq graduate standing in Nurs. Advanced holistic health assessment/differential diagnosis; analysis of data from biological, sociological, psychological, cultural, and spiritual dimensions.
- 563 Advanced Pharmacological Concepts and Practice 4 (3-3) Prereq graduate standing in Nurs. Pharmacology for clinical practice including decision-making, prescribing, drug monitoring, and patient education associated with prescriptive authority.
- 564 Health Promotion in Nursing Practice 2 or 3 Prereq graduate standing in Nursing. Theoretical bases including cultural variations for selected health promotion strategies for neonates through elderly clients.
- 565 Information Management for Nursing Practice 3 (2-3) Prereq computer competency in word processing/spreadsheets. Application/evaluation of nursing informatics; use for management of patient care data in nursing practice and administration.
- 566 Community Analysis and Program Planning V 2 (1-3) to 3 (2-3) Prereq graduate standing in Nurs. Application of core public health functions in community analysis, program development and program evaluation.
- 567 Primary Care: Adults and Elders 4 (2-9) Prereq Nurs 562, 563, 581. Assessment, differential diagnosis, therapeutic intervention with adults; developmental changes; opportunities to provide diagnostic, maintenance, and follow-up care.
- 568 Primary Care: Infants, Children and Adolescents 4 (1-9) Prereq Nurs 562, 563, 581. Assessment, differential diagnosis, and therapeutic intervention with infants, children, and adolescents in rural and urban settings.



- 569 Primary Care: Family 4 (1-9) Prereq Nurs 562, 563, 581, or 582. Assessment, differential diagnosis, therapeutic intervention with individuals in childrearing, childrearing, and multigenerational families.
- 571 Adult and Elders: Inpatient Management of Chronic Problems 6 (3-9) Prereq Nurs 562, 563, 581, c// in 575. Diagnosis and treatment of inpatient adults and elders with low to medium acuity.
- 570 [D] Clinical Decision Making 1 (0-3) Prereq Nurs 581, 562, 563; concurrent with first clinical course. Provides a framework for systematic collection, organization, interpretation, and communication of data for the development of differential diagnosis.
- 572 Nursing Science: Chronic Biobehavioral Nursing Outcomes 3 Prereq admission to graduate program. Concepts, theories and research relevant to preventing and managing chronic conditions across the lifespan.
- 573 Ecology of Nursing Inquiry II 2 Prereq Nurs 536. Ecological concepts relevant to nursing science to devise components of formal research plan.
- 574 Nursing Science Colloquium 1 Prereq graduate standing in nursing. Participation in community of scholars to critically analyze, synthesize and articulate scientific issues related to selected nursing phenomena.
- 575 Diagnostic Testing and Interpretation 3 (2-3) Prereq graduate standing in Nurs. Analysis of diagnostic findings across the age continuum for clinical decision making; selected diagnostic and treatment skills for advanced practice.
- 577 Health Care Ethics 2 or 3 Prereq graduate standing in Nursing. Ethical theories including deontology, teleology, virtue ethics and their applicability to ethical dilemmas in nursing. Credit not granted for both Nurs 477 and 577.
- 578 Plateau Tribes: Culture and Health 3 (2-3) History, culture and health care needs of the Plateau Indian Tribes are addressed: includes both classroom and practicum experience. Graduate level counterpart of Nurs 478; additional requirements. Credit not granted for both 478 and 578.
- 579 Vulnerable Populations; The Homeless 3 Prereq graduate nursing status or by permission. Analysis of factors placing persons at risk for homelessness; proposal of policy changes based on research and experiential learning.
- 581 Advanced Pathophysiology 4 Prereq graduate standing in nursing or permission of instructor. Advanced cellular and system pathophysiology of individuals with neurological, endocrine, immune, hematology, cardiopulmonary, renal, gastrointestinal, bone and skin disorders.
- 583 Promoting Health of Community-Based Elders V 2-4 Advanced practice role in assessment, nursing intervention and public policy regarding multidimensional physical, emotional and social problems of community-based elderly.
- 584 Nursing Science: Systems of Health Care Delivery 3 Prereq Nurs 536. Health care delivery systems in the US and worldwide addressing barriers to care, social justice, vulnerability and access disparity.
- 585 Faculty Role Seminar 1 Prereq completion of coursework; completion of preliminary examination or c//. Analysis of current issues related to faculty role in nursing education.
- 586 Faculty Role Practicum 2 Prereq admission to graduate program or by permission. Analysis, development and enactment of selected aspects of the faculty role.
- 587 Research Inquiry: Qualitative Methods I 3 Prereq graduate standing in nursing. Qualitative methodologies, issues and techniques of data collection, analysis and interpretation; issues of ethics and bias.
- 588 Research Inquiry: Quantitative Methods I 3 Prereq graduate standing in nursing. Quantitative methodologies, issues and techniques of data collection, analysis and interpretation.
- 589 Psychometrics in Health Care Research 2 Prereq Nurs 588; 6 credits of graduate statistics.

Application of psychometric theory and techniques for constructing, analyzing and testing instruments to measure nursing and educational interventions and outcomes.

590 Research Inquiry: Quantitative Methods II 2 Prereq Nurs 588; Nurs 589. Advanced theoretical and practical application of selected quantitative and methodological strategies.

591 Mixed Methods for Outcome Evaluation 2 Prereq graduate standing in nursing. Outcomes and evaluation in nursing and health care from both a qualitative and quantitative methods and application perspective.

592 Research Inquiry: Qualitative Methods II 2 Prereq Nurs 587. Application of qualitative methodologies, techniques of qualitative data analysis, presentation of qualitative findings, rigor, data management and research dissemination.

593 Preliminary Examination Seminar 1 Prereq completing of 30 core credits in PhD program. Methods to synthesize material from coursework to present and analyze scholarly nursing science knowledge. S, F grading.

594 Nursing Care of Children in a School Setting 3 (2-3) Prereq graduate standing in nursing. Assessment of the school age population including high risk students; development, management, and evaluation of school health services.

595 Internship V 1-10 May be repeated for credit; cumulative maximum 10 hours. Prereq Nurs 562, 563, 581; one of Nurs 567, 568, 569, 571, or 572. Application and integration of theoretical content, research findings, and assessment and intervention strategies into primary care practice. S, F grading.

596 Post-Master's Psychiatric Nurse Internship V 1-9 May be repeated for credit; cumulative maximum 9 hours. Prereq prior completion of course work for a clinical nurse specialist in Psychiatric Mental Health Nursing or Psychiatric Nurse Practitioner, malpractice insurance as an ARNP with prescriptive authority, by interview only. Supervised performance of the ARNP role in psychiatric nursing care for patients presenting primary psychiatric disorders.

597 Advanced Topics in Nursing V 1-3 May be repeated for credit; cumulative maximum 6 hours.

598 Advanced Topics in Nursing V 1-3 May be repeated for credit; cumulative maximum 6 hours.

599 Independent Study Variable credit. S, F grading.

700 Master's Research, Thesis, and/or Examination. Variable credit. S, F grading.

702 Master's Special Problems, Directed Study, and/or Examination. Variable credit, S, F, grading.

799 Dissertation Seminar 1 May be repeated for credit. Prereq graduate students in nursing. Best practices for doctoral research and presentation. S, F grading.

799 Doctoral Research, Dissertation, and/or Examination V 1-18 May be repeated for credit. S, F grading.

## **Program in Nutrition**

<http://fshn.wsu.edu>

Degree offered: **Ph.D.**

Faculty working with graduate students: **12**

Graduate students: **8**

Graduate students receiving assistantships or scholarships: **100%**

Tests required: **GRE; TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

## **Requirements**

The application process has two main parts: 1) Applying online to the Graduate School and 2) applying to the Department of Food Science and Human Nutrition by sending in copies of transcripts, a resume, three letters of recommendation (one from the major advisor), a letter of interest, GRE scores, and TOEFL or IELTS scores (if applicable). A master's degree that demonstrates the ability to conduct and report research is normally required. Exceptions will be made for students with outstanding academic records and demonstrated research abilities.

## **Program Description**

The doctoral degree in nutrition requires a minimum of 34 credit hours of 300, 400, and 500-level graded course work beyond a master's degree. Candidates for the Ph.D. in nutrition may choose one of two tracks: a) the biological nutrition option, which emphasizes the biochemical and physiological aspects of nutrition in humans and animals; or b) the behavioral nutrition option, which emphasizes nutrition education, community nutrition, and other behavioral aspects of nutrition.

Faculty research expertise encompasses chronic disease prevention and management, including the following areas: Vitamin B6 status, immune function, and human cancer; calcium and magnesium status and diseases of aging; effects of isoflavones on postmenopausal women; the role of antioxidants in immunity and health; diabetes education; impact of breast feeding on postpartum and amenorrheal women; influence of lactation and breastfeeding on maternal and child health; food insecurity; nutrition education for low-income audiences; and food safety and nutrition education.

Emphasis in dietetics: Students entering the graduate program may choose to pursue the didactic requirements to become a Registered Dietitian (R.D.) concurrent with their graduate studies. An R.D. is a nationally recognized credential in foods and nutrition. After completing the required courses, students obtain a Verification Statement, which is required to compete nationally for dietetic internships. Interested students should contact the director of the general dietetics program at WSU for further information or visit the food science and human nutrition website (<http://fshn.wsu.edu>).

## **Graduate Opportunities**

Academia, research, public health, industry.

## **Positions Held by Recent Graduates**

Researchers, university faculty, health-related sales, nutrition educators, public health administrators, postdoctoral associates.

## **Related Programs**

Ph.D. in food science

## **Contact Information**

Jodi Anderson

Department of Food Science and Human Nutrition

Washington State University

FSHN #106, PO Box 646376

Pullman, WA 99164-6376

Telephone: 509-335-4763

Fax: 509-335-4815

E-mail: [fshn@wsu.edu](mailto:fshn@wsu.edu)

## Faculty Interests

**Kathy A. Beerman:** Effects of isoflavones on health parameters in postmenopausal women; impact of breastfeeding on postpartum, amenorrheal women.

*beerman@wsu.edu*

**Sue Butkus,** WSU Puyallup: Development of nutrition education programs for high-risk, low-income population groups; ways to make nutrition education programs more effective and improve evaluation and accountability; ways to increase access to food in low-income populations; how field gleaners use food gleaned after the commercial harvest; evaluating the effectiveness of a diabetes awareness and education project in reducing complications and death from diabetes among minority populations. *butkus@wsu.edu*

**Boon P. Chew:** The role of carotenoids and other antioxidants in immune modulation, cancer prevention, anti-inflammatory action, and cognitive function in canine, feline, rodent, and human models. *boonchew@wsu.edu*

**Miriam Edlefsen:** Nutrition education with an emphasis in the areas of hunger and food security in the U.S. and food safety; preadolescent attitudes and behavior toward calcium-rich foods.

*medlefsen@wsu.edu*

**Ronald L. Kincaid:** Trace element metabolism in animals; changes in gene expression of metalloproteins during trace element deficiencies, and subsequent effects upon immunity; maternal transfer of trace elements to the fetus; changes in trace element metabolism during fetal development; mechanisms of intestinal absorption. *rkincaid@wsu.edu*

**Linda K. Massey,** WSU Spokane: Dietary effects on kidney stone risk; effect of dietary salt on bone turnover, calcium kidney stone risk, and hypercalciuric effects of caffeine in calcium kidney stone formers; effect of vitamin C supplements on urinary oxalate in healthy non-stoneformers and calcium stoneformers. *massey@wsu.edu*

**Shelley McGuire:** How breastfeeding and lactation influence both maternal and child health and well-being (using both human and animal models); how maternal diet influences milk fat content, and thus energy intake and fatty acid consumption of the breastfeeding child; the regulation of postpartum amenorrhea. *smcguire@wsu.edu*

**John P. McNamara:** Regulation of energy metabolism in pregnancy, lactation, and growth; adipose tissue metabolism in swine, cattle, and lab animals; identifying mechanisms of genetic and nutritional regulation of metabolism during pregnancy and lactation and estimating their parameters; endocrine, biochemical, and neuro-physiological regulatory adaptations leading to the most efficient use of nutrients; testing computer-assisted, mechanistic models of metabolism during pregnancy and lactation. *mcnamara@wsu.edu*

**Mark L. Nelson:** Forage evaluation and nutrition of grazing and forage-fed animals; optimizing animal productivity when forages are fed as the major dietary ingredient by altering ruminal fermentation of fiber and/or protein. *nelsonm@wsu.edu*

**Jill Armstrong Shultz:** Sociocultural factors that influence dietary practices, with an emphasis on minority and understudied groups; diabetes education, food insecurity, and cultural issues in community nutrition programs; social science research methodologies and statistical analyses; understanding goal setting experiences of patients with Type 2 diabetes; determining coping strategies of food bank clients; evaluating the impact of 5-A-Day For Better Health educational materials on WIC clientele. *armstroj@wsu.edu*

**Terry D. Shultz:** Determining the relationships between vitamin B-6 nutritional status, immune function, and human cancer development; vitamin B-6 metabolism in the context of dietary intake, nutrient requirements, folate (i.e., one-carbon) metabolism, DNA synthesis, and cancer prevention;

human cancer cell response and modulation of DNA synthesis and repair-gene expression; immune response; human metabolic feeding studies and cell culture studies to investigate vitamin B-6 adequacy and gene/nutrient interactions, immunity, and cancer prevention. *shultz@wsu.edu*

**Raymond Wright**, Interim Chair, FSHN: Utilization of glucose by preimplantation embryos; identification of specific biochemical pathways; formation and study of trophoblastic vesicles; improving short-term culture systems; use of sucrose and other cryoprotectants to improve freezing success rate; in vitro fertilization in domestic animals; early embryo metabolism and the utilization of energy substrates. *raywright@wsu.edu*

### **Nutrition**

- 500 Seminar in Nutrition 1 May be repeated for credit; cumulative maximum 5 hours. Seminar on current research issues in nutrition.
- 507 Advanced Nutrient Metabolism 3 Same as A S 507.
- 508 Seminar - Written 2 May be repeated for credit. Same as FSHN 508.
- 513 Mineral and Vitamin Metabolism 4 Same as A S 513.
- 520 Research Methods in Human Nutrition 3 Same as FSHN 520.
- 521 Research Techniques in Nutrition 3 (1-6) Same as FSHN 521.
- 526 Advanced Community Nutrition 3 Same as FSHN 526.
- 531 Advanced Lifecycle Nutrition 2 Rec 300-400-level lifecycle nutrition course; c//FSHN 436. Same as FSHN 531.
- 533 Pathophysiology of Human Nutrition 3 Same as FSHN 533.
- 600 Special Projects or Independent Study Variable credit. S, F grading.
- 800 Doctoral Research, Dissertation, and/or examination Variable credit. S, F grading.

### **Program in Pharmacology/Toxicology**

[www.pharmacy.wsu.edu/PharmTox](http://www.pharmacy.wsu.edu/PharmTox)

Degrees offered: **M.S. and Ph.D.**

Faculty working with graduate students: **19**

Graduate students: **10**

Students receiving assistantships or scholarships: **90%**

Tests required: **GRE; TOEFL or IELTS (international students only)**

Deadline: **Fall—December 15**

### **Admission Requirements**

Undergraduates considering graduate study in pharmacology and toxicology should have a major in biology or chemistry or a related science. To apply, submit an application to the WSU Graduate School with official transcripts from all undergraduate and graduate schools attended; a letter describing your research interests, career goals, and research experience; official GRE scores; official TOEFL or IELTS scores (international students only).

### **Program Description**

The graduate program in pharmacology and toxicology began as the graduate program in pharmaceutical sciences and has been awarding graduate degrees since 1931. This research-oriented program prepares students for careers in independent research and teaching in pharmacology, toxicology, and related fields. The program awards doctoral and master's degrees.

The research interests of the faculty are very broad; active areas of research include:

cancer biology and therapy; gene therapy and delivery; pharmacokinetics; proteomics; reproductive biology; neuropharmacology

The diversity in faculty research interests provides students with a solid foundation in many areas of molecular, cellular, and whole animal pharmacology and toxicology and gives them a wide variety of research programs from which a dissertation proposal may be selected.

The curriculum provides students with exposure to virtually all areas of current research in molecular and cellular biochemistry, immunology, molecular biology, pharmacology, pharmaceuticals, and toxicology. Formal course requirements are flexible to tailor programs to individual needs.

The graduate program in pharmacology and toxicology also sponsors a Summer Undergraduate Research Fellowship (SURF) Program in pharmacology and toxicology. The SURF program provides a hands-on, ten week, paid research experience for undergraduate students with outstanding scientific aptitude who are considering a career in research. The summer fellows will work on a pharmaceutical or biomedical research project under direct supervision of a graduate faculty researcher member.

### Contact Information

Paula Marley, Principal Assistant  
Graduate Program in Pharmacology and Toxicology  
Department of Pharmaceutical Sciences  
College of Pharmacy  
PO Box 646534  
Pullman, WA 99164-6534  
Telephone: 509-335-5545  
Fax: 509-335-5902  
E-mail: bbr@wsu.edu

### Faculty Interests

**Paul Benny**, Radiopharmaceutical chemistry. Development and characterization of radioactive metal complexes for diagnosis and treatment of biological diseases. *bennyp@wsu.edu*; 509-335-3858

**Margaret Black**, Cancer Research: research focuses on two overlapping areas: suicide gene therapy of cancer and structure to function studies of enzymes involved in nucleotide metabolism. *blackm@wsu.edu*; 509-335-6265

**John J. Brown**, Environmental toxicology and invertebrate endocrinology: researching the effect of Insect Growth Regulators on both target and non-target organisms. *brownjj@wsu.edu*; 509-335-5505

**Rebecca Craft**, Behavioral pharmacology: Sex differences in the psychopharmacology of opioids and cannabinoids (reinforcing analgesic, motoric and other effects); gonadal steroid modulation of pain, analgesia and mood. *craft@wsu.edu*; 509-335-5040

**Sayed Daoud**, Researches cancer pharmacology and the use of genomics and proteomics to understand the molecular signaling of p53 and its target genes in tumors and normal cells. Cancer pharmacology, tumor biology, cancer chemotherapy, genomics, proteomics, p53, cell signaling, mass spectrometry, DNA microarrays. *daoud@mail.wsu.edu*; 509-335-8910

**Neal M. Davies**, Pharmacology and Toxicology: natural products including plant phytochemicals. Nanoparticle design and delivery. Pre-clinical and clinical absorption. Gastrointestinal and kidney

toxicity of non-steroidal anti-inflammatory drugs and anti-cancer agents.  
Pharmacokinetic/Pharmacodynamic modeling. *ndavies@wsu.edu*; 509-335-4754

**Yan Dong**, Researches the neural mechanisms through which the brain perceives, differentiates, and prioritizes motivational signals, using drug addiction as the animal model.  
*yandong@vetmed.wsu.edu*; 509-335-5960

**Catherine A. Elstad**, Pharmacology, Cancer Biology and Immunopharmacology: Modulation of tumor phenotype by extracellular matrix; tumor cell-matrix interactions with consequences for tumor differentiation, metastasis, heterogeneity, drug-sensitivity, and therapeutic interventions.  
*elstad@wsu.edu*; 509-335-8030

**Joseph W. Harding**, Researches the functional importance and mechanism of action of neuropeptides. Particularly interested in a family of peptides called angiotensins and how they regulate cardiovascular function, body water balance, and cognitive function via interactions with brain sites.  
*hardingj@vetmed.wsu.edu*; 509-335-7927

**Arash Hatefi**, Genetically engineered protein polymers for targeted cancer gene therapy. Design and biosynthesis of nature-inspired vectors for systematic gene therapy. Development of biocompatible biomaterials for localized virus or drug delivery. *ahatefi@wsu.edu*; 509-335-5648

**Herbert H. Hill**, Bioanalytical chemistry: development of analytical instrumentation for trace organic analysis. Gas chromatography, liquid chromatography, mass spectrometry, and ion mobility spectrometry. *hhill@wsu.edu*; 509-335-5648

**James P. Kehrer**, Cancer research and toxicology interests focus on the following: Molecular mechanisms; thioredoxin and apoptosis; role of thioredoxin in cell signaling; role of lipocalin expression (24p3 and NGAL) and Akt signalling pathways, free radical toxicity; glutathione and apoptosis. *kehrer@wsu.edu*; 509-335-4750

**Kwan Hee Kim**, Toxicology: focuses on the function of retinoids (vitamin A) and their receptors in embryonic and postnatal testis development. Physiological approaches using rodents and transgenic mice; cell biology approaches; molecular approaches using real-time PCR, cloning, Western blot analysis, and transfections. *khkim@wsu.edu*; 509-335-7022

**Gary G. Meadows**, Cancer biology, immunotoxicology: tumor biology with emphasis on the signalling and molecular mechanisms. *meadows@mail.wsu.edu*; 509-335-2227

**Katrina Mealey**, Pharmacogenetics, the study of genetic determinants of response to drug therapy. Current work focuses on the MDR1 polymorphism in herding breed dogs (Collies, Australian Shepherds, Shelties, etc), and its implications for multidrug sensitivity.  
*kmealey@vetmed.wsu.edu*; 509-335-2988

**Kathryn E. Meier**, Research foci concerns the interplay between phospholipid metabolism and protein phosphorylation in signal transduction cascades, with the goal to identify new therapeutic targets for cancer therapy. Our model systems are human prostate, ovarian, and breast cancer lines.  
*kmeier@wsu.edu*; 509-335-3573

**Raymond M. Quock**: Neuropharmacology, Neurotoxicology, Behavioral Pharmacology: pharmacology of anxiety and pain control, nitrous oxide and other anesthetic drugs; opioid and cannabinoid analgesic drugs; benzodiazepine anxiolytic agents; pharmacogenetics. *quockr@wsu.edu*; 509-335-5956

**Steven M. Simasko**, Neurobiological mechanisms involved in the control of feeding, sleep, and alcohol abuse. Experimental approaches include cellular assays, tissue level measurements and behavioral measurements. *simasko@vetmed.wsu.edu*; 509-335-6497

**Barbara Sorg**, Studies focus on the influence of stress on brain alterations produced by repeated exposure to drugs of abuse, such as cocaine. Also the development of an animal model for multiple

chemical sensitivity syndrome, a mysterious illness in humans whereby chemicals in the home and workplace produce illness. *sorg@vetmed.wsu.edu*; 509-335-4709

### **Pharmacology/Toxicology**

- 502 Faculty Research in Pharmacology/Toxicology 1 Prereq graduate standing. Introduction to faculty research for incoming graduate students. S, F grading.
- 505 Principles and Methods of Toxicology 3 Prereq MBioS 563 or c//. 300-level organ/mammalian physiology (or instructor consent). Basic concepts in mammalian toxicology and the methodology currently employed for toxicological investigations. Cooperative course taught by WSU, open to UI students (FST 505).
- 506 Principles of Pharmacology I 3 Prereq MBioS 513 or c//, college-level physiology course or c//. Mechanisms of drug action and the factors that modify drug responses. Cooperative course taught by WSU, open to UI students (FST 506).
- 507 Principles of Therapeutics 3 Prereq 300-level organ/mammalian physiology; P/T 506. Organ systems pharmacology, including drug actions, effects, side effects and interaction of medications used in therapeutics.
- 510 Advanced Pharmacokinetics / Toxicokinetics 3 Prereq P/T 506. Kinetics of drug absorption, distribution, elimination, and pharmacologic response. Cooperative course taught by WSU, open to UI students (FST 510).
- 512 Topics in Pharmacology V 1-4 May be repeated for credit; cumulative maximum 12 hours. By interview only. Topics of current interest in pharmacology and closely related disciplines.
- 532 Metabolism of Drugs and Toxins 2 Prereq MBioS 513/514; Rec P/T 506. Pathways, enzymology and mechanisms of metabolism of drugs, environmental contaminants and other xenobiotics; pharmacological and toxicological impact of metabolism. Cooperative course taught by WSU, open to UI students (FST 532).
- 543 Scientific Writing 1 Prereq two semesters of graduate work in the biomedical sciences, with lab rotations. A highly personalized course designed to help graduate students develop writing skills for biomedical science careers.
- 555 General and Cellular Physiology 4 (3-3) Same as V Ph 555.
- 556 Insecticides: Toxicology and Mode of Action 1 Same as Entom 556.
- 557 Herbicides: Toxicology and Mode of Action 1 Same as Entom 557
- 558 Pesticide Topics 1 Same as Entom 558.
- 572 Fundamentals of Oncology Prereq MBioS 564. Thorough overview of cancer biology encompassing basic cellular and molecular mechanisms of carcinogenesis and tumor progression, treatment and prevention. Cooperative course taught by WSU, open to UI students (FST 572).
- 597 Pharmacology and Toxicology Seminar 1 May be repeated for credit; cumulative maximum 12 hours. S, F grading. Cooperative course taught by WSU, open to UI students (FST 597).
- 599 Critical Evaluation of Current Pharmacology/Toxicology Research 1 May be repeated for credit; cumulative maximum 6 hours. Prereq P/T 501. Individual study of recent research findings and critical evaluation of these data to instructor and other students.
- 600 Special Projects or Independent Study Variable credit. S, F grading.
- 700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.
- 800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.



## Department of Philosophy

<http://uidaho.wsu.edu/ma%2Dphilosophy>

<http://libarts.wsu.edu/philo>

Degree offered: **Master of Arts**

Faculty working with graduate students: **7**

Graduate students: **9**

Graduate students receiving assistantships or scholarships: **10%**

Tests required: **GRE; TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

### Degree Requirements

All students earning the M.A. in philosophy will be required to complete 30 credit hours, including twelve hours of core courses, twelve hours of elective courses, and six hours of master's thesis research. Up to six hours of coursework may be completed at the 400 level.

### Program Description

The cooperative M.A. program in philosophy, offered by Washington State University in Pullman, Washington, and the University of Idaho in Moscow, Idaho, leads to a general Master of Arts degree in philosophy. Students also have the option of concentrating in environmental philosophy or ethics. Students work with faculty members from both campus departments and thus are able to take advantage of a solid overall program with a wide variety of faculty research specializations. The two universities are eight miles apart, and free public transportation between them is available.

The program offers course work in the major areas of philosophy such as ethics, metaphysics, epistemology, philosophy of religion, philosophy of language, and history of philosophy, as well as in more newly developed areas such as environmental philosophy, feminist philosophy, and applied ethics.

### Contact Information

Dr. Joseph Keim Campbell  
Director of Graduate Studies  
Department of Philosophy  
Washington State University  
PO Box 645130  
Pullman, WA 99164-5130  
Telephone: 509-335-9106  
Fax: 509-335-8611  
E-mail: [josephc@wsu.edu](mailto:josephc@wsu.edu)

### Faculty Interests

**Mary Bloodsworth-Lugo:** Continental philosophy, feminist philosophy, philosophy of race and ethnicity. [bloodswo@wsu.edu](mailto:bloodswo@wsu.edu)

**Joseph Keim Campbell:** Metaphysics, epistemology, philosophy of science.

*josephc@wsu.edu*

**Abigail Gosselin:** Normative ethics, applied ethics, social and political philosophy.

**Daniel Holbrook:** Bioethics, environmental ethics, ethical theory. *holbrodm@wsu.edu*

**Michael Myers:** Philosophy of religion, Indian philosophy, comparative East-West philosophy.  
*myers@wsu.edu*

**Michael Neville:** History of philosophy, aesthetics. *neville@wsu.edu*

**David Shier:** Philosophy of language, philosophy of mind, history of analytic philosophy.  
*shier@wsu.edu*

**Harry Silverstein:** Ethics, logic, social and political philosophy. *silverst@wsu.edu*

### **University of Idaho faculty**

**Janice Capel Anderson:** Religious studies, feminism. *jcanders@uidaho.edu*

**Nicholas Gier,** emeritus: Philosophy of religion, Continental philosophy, Eastern philosophy.  
*ngier@uidaho.edu*

**Douglas Lind:** Philosophy of law, environmental philosophy, Wittgenstein.  
*dlind@uidaho.edu*

**Michael Nelson:** Environmental philosophy. *mpnelson@uidaho.edu*

**Michael O'Rourke:** Philosophy of language, logic, analytic philosophy. *morourke@uidaho.edu*

### **Philosophy**

501 Advanced Logic 3 Graduate-level counterpart of Phil 401; additional requirements. Credit not granted for both Phil 401 and 501. Cooperative course taught by WSU, open to UI students (Phil 501).

504 Special Topics in Philosophy 3 May be repeated for credit; cumulative maximum 12 hours. prereq graduate standing. Intensive study of a special topic not otherwise covered in depth in the curriculum. Cooperative course taught jointly by WSU and UI (Phil 504).

507 Seminar in Philosophy of Religion 3 Graduate-level counterpart of Phil 407; additional requirements. Credit not granted for both Phil 407 and 507.

510 Seminar in the History of Philosophy 3 Prereq graduate standing. May be repeated for credit; cumulative maximum 6 hours. Systematic exploration of the central works of an individual philosopher or philosophical movement. Cooperative course taught jointly by WSU and UI (Phil 510).

520 Seminar in Ethical Theory 3 Prereq graduate standing. The major issues, views, and figures of ethical theory from ancient Greece to the present. Cooperative course taught by WSU, open to UI students (Phil 520).

522 Seminar in Metaphysics 3 Prereq graduate standing. The nature of reality, through study of key concepts such as God, personhood, free will, causation, space, time, and identity. Cooperative course taught by WSU, open to UI students (Phil 522).

524 Seminar in Epistemology 3 Prereq graduate standing. Classical problems, questions, and theories involving the concept of knowledge. Cooperative course taught by WSU, open to UI students (Phil 524).

530 Bioethics 2 Prereq graduate standing. Professional ethics for scientists; ethical implications of new technologies; obligations to human and non-human research subjects. Cooperative course taught by WSU, open to UI students (Phil 530).

532 Seminar in Business Ethics 3 Prereq graduate standing. The major issues in business ethics, both domestic and international, from general principles to specific cases. Cooperative course taught by WSU, open to UI students (Phil 532).

535 Advanced Biomedical Ethics 3 Prereq graduate standing. Current ethical issues in medical practice, medical research and public policy relating to health issues. Cooperative course taught by WSU, open

to UI students (Phil 535).

551 Philosophy of Biology 3 Graduate-level counterpart of Phil 451; additional requirements.

Cooperative course taught jointly by WSU and UI (PHIL 517).

552 Environmental Philosophy 3 Prereq graduate standing. Philosophical examination of various ethical, metaphysical and legal issues concerning humans, nature and the environment. Cooperative course taught by UI (Phil 552), open to WSU students.

556 Religion and Environment 3 Concepts of the sacred, the human and nature and their interrelationships with religious traditions and how they relate to ecology and environmental ethics. Cooperative course taught by UI (Phil 556), open to WSU students.

571 Ecological Jurisprudence 3 Prereq graduate standing. Nature of law at the intersection of nature and culture including influences from the philosophy of pragmatism. Cooperative course taught by UI (Phil 571), open to WSU students.

600 Special Projects or Independent Study Variable credit. S, F grading.

700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.

## Department of Physics

[www.physics.wsu.edu](http://www.physics.wsu.edu)

Degrees offered: **M.S., Ph.D.**

Faculty working with graduate students: **20**

Graduate students: **60**

Graduate students receiving assistantships or scholarships: **97%**

Tests required: **GRE; TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

### Admission Requirements

For admission to the graduate programs, a bachelor's degree is required with a minimum GPA of 3.0 (on a 4.0 scale) in the last half of the undergraduate work completed. The GRE general test and subject test in physics are recommended for all applicants. No minimum acceptable scores are specified. Students from non-English speaking countries are recommended to demonstrate proficiency in English via the TOEFL exam. Minimum acceptable score for admission is 550 (paper based), 214 (computer based), or 80 Internet based (IBT).

### Program Description

The Department of Physics and Astronomy at Washington State University offers three graduate degrees: the doctorate, the thesis master's, and the non-thesis master's. They are designed to give every student a thorough background in the major areas of current research. The department emphasizes a friendly, informal atmosphere, where students can tailor their programs to specific needs, interests and scholarship.

### **Contact Information**

Sabreen Dodson, Assistant to Chair of Graduate Studies  
Department of Physics and Astronomy  
Washington State University  
PO Box 642814  
Pullman, WA 99164-2814  
Telephone: 509-335-9532  
Fax: 509-335-7816  
E-mail: physics@wsu.edu

### **Graduate Opportunities**

Government, private industries, oceanography, aerospace.

### **Positions Held by Recent Graduates**

Physics and biology faculty, department chairs at major universities; engineering at Boeing and Lockheed Corporations; senior computer scientist; science historian; staff scientist in applied research; meteorology; space industry; appointments at the Department of Energy, Office of Basic Energy Sciences, and NASA Jet Propulsion Laboratory; fiber optics.

### **Faculty Interests**

**Michael Allen:** Astronomy, astrophysics. *mlfa@mail.wsu.edu*

**James Asay:** Shock physics. *jasay@wsu.edu*

**John Blakeslee:** Astronomy, astrophysics. *jblakes@wsu.edu*

**Pamela Blakeslee:** Chemical physics. *plb@wsu.edu*

**Doerte Blume:** Theory: Atomic, molecular. *doerte@wsu.edu*

**Sukanta Bose:** Cosmology, gravitational waves. *sukanta@wsu.edu*

**Gary S. Collins:** Solids with atom scale resolution. *collins@wsu.edu*

**Susan Dexheimer:** Optical physics. *dexheimer@wsu.edu*

**J. Thomas Dickinson:** Surface science, optical physics. *jtd@wsu.edu*

**Peter Engels:** Experimental atomic gases. *engels@wsu.edu*

**Fred Gittes:** Statistical physics, optics. *gittes@wsu.edu*

**Yogendra Gupta:** Shock physics. *ymgupta@wsu.edu*

**Mark G. Kuzyk:** Optics. *kuz@wsu.edu*

**Kelvin Lynn:** Materials science. *kgl@wsu.edu*

**Philip Marston:** Physical acoustics and optics. *marston@wsu.edu*

**Matthew McCluskey:** High-pressure and semiconductor. *mattmcc@wsu.edu*

**Michael Miller:** Many body theory. *mdm@wsu.edu*

**Bradford Pate:** Solid state and surface physics. *pate@wsu.edu*

**Steven Tomsovic:** Theory: Chaos. *tomsovic@wsu.edu*

**Lai-Sheng Wang:** Clusters physics. *ls.wang@pnl.gov*

**Guy Worthey:** Astrophysics. *gworthey@wsu.edu*

## Physics

501 Graduate Seminar 1 Introduction to graduate and interdisciplinary research. S, F grading.

514 Optoelectronics Lab I 1 (0-3) to 3 (0-9) May be repeated for credit; cumulative maximum 3 hours. Prereq graduate standing. Experiments with optical systems: Imaging, interference, coherence, information storage/processing, gas and solid state lasers, optical fibers, and communications systems.

515 Optoelectronics Lab II V 1 (0-3) to 3 (0-9) May be repeated for credit; cumulative maximum 3 hours. Experiments in optical physics, physical properties of light, laser physics, waveguides, quantum confined semiconductor structures and ultrafast dynamics and nonlinear optics.

521 Classical Mechanics I 3 Prereq Phys 320; 571 or c//. Laws of motion as developed by Newton, d'Alembert, Lagrange, and Hamilton; dynamics of particles and rigid bodies. Cooperative course taught jointly by WSU and UI (Phys 521).

533 Thermal and Statistical Physics I 3 Prereq Phys 330; Math 440. Thermodynamic laws and potentials, kinetic theory, hydrodynamics and transport coefficients, introduction to statistical mechanics, ensembles, partition functions. Cooperative course taught jointly by WSU and UI (Phys 533).

534 Thermal and Statistical Physics II 3 Prereq Phys 533, 551 or Chem 531, 535. Phase transitions and critical phenomena, Ginzburg-Landau theory, Bose-Einstein condensation, superfluids, Fermi systems, low-temperature expansions. Cooperative course taught jointly by WSU and UI (Phys 531).

541 Electromagnetic Theory 3 Prereq Phys 342, 571 or c//. Special relativity and the classical electromagnetic field; emission, propagation, and absorption of electromagnetic waves. Cooperative course taught jointly by WSU and UI (Phys 541).

542 Electrodynamics 3 Prereq Phys 541. Interaction of matter and electromagnetic radiation; classical and quantum electrodynamics. Cooperative course taught jointly by WSU and UI (Phys 542).

545 Nonlinear Optics 3 Prereq Phys 534, 542, 551. Nonlinear wave propagation theory applied to several nonlinear-optical phenomena; experimental techniques that probe a material's nonlinearity.

546 Quantum Electronics 3 Prereq Phys 541, 551 or c//. The physics of lasers and of coherent optical radiation generation and propagation.

550 Quantum Theory I 3 Prereq Math 440, 441, Phys 450. Introduction to quantum theory; physical and mathematical foundations; application to atomic systems. Cooperative course taught jointly by WSU and UI (Phys 551).

551 Quantum Theory II 3 Prereq Phys 550, 571. Symmetry and invariance; angular momentum theory; approximation methods. Cooperative course taught jointly by WSU and UI (Phys 552)

552 Quantum Theory III 3 Prereq Phys 551. Scattering theory; relativistic wave mechanics; quantum field theory. Cooperative course taught jointly by WSU and UI (Phys 553).

561 Atomic and Molecular Physics 3 Prereq Phys 550. Physics of atoms and molecules using quantum theory. Cooperative course taught jointly by WSU and UI (Phys 561).

563 Physics of the Solid State 3 Prereq Phys 534, 551. Lattice vibrations and defects; ionic and electronic conductivities; band theory; magnetic properties; luminescence. Cooperative course taught jointly by WSU and UI (Phys 563).

566 Biological Physics 3 Graduate-level counterpart of Phys 466; additional requirements. Credit not granted for both Phys 466 and 566.

571 Methods of Theoretical Physics 3 Prereq Math 440, 441. Mathematical methods for theoretical physics; linear algebra, tensor analysis, complex variables, differential equations, integral equations, variational calculus, and group theory. Cooperative course taught jointly by WSU and UI (Phys 571).

- 573 Physical Applications of Group Theory 3 Prereq Phys 551. Introduction to group theory with application to atoms, molecules, solids, and elementary particles; no previous knowledge of group theory assumed. Cooperative course taught by UI (Phys 573), open to WSU students.
- 581 Advanced Topics 3 May be repeated for credit; cumulative maximum 12 hours. Topics of current interest in advanced physics. Cooperative course taught jointly by WSU and UI (Phys 581).
- 590 Seminar 1 May be repeated for credit. S, F grading.
- 592 Wave Propagation Seminar 2 Prereq Math 440, 441. May be repeated for credit; cumulative maximum 4 hours. Waves in the continuum; elastic, plastic, and hydrodynamic waves; shock waves. S, F grading.
- 594 Seminar in Solid-State Physics 1 May be repeated for credit; cumulative maximum 4 hours. Topics in the physics of solids; the experimental and theoretical study of the electronic and atomic structure of materials. S, F grading.
- 595 Seminar in Astronomy/Astrophysics 1 May be repeated for credit; cumulative maximum 4 hours. Prereq graduate standing. Current topics in theoretical and observational aspects of modern astrophysics. S, F grading.
- 596 Seminar in Optical Physics 1 May be repeated for credit; cumulative maximum 3 hours. Current topics in experimental and theoretical aspects of optical physics. S, F grading.
- 598 Teaching Undergraduate Physics Laboratories 1 May be repeated for credit; cumulative maximum 4 hours. Principles and practices of teaching, planning and management of undergraduate physics laboratories; choice and care of equipment. S, F grading.
- 600 Special Projects or Independent Study Variable credit. S, F grading.
- 700 Master's Research, Thesis and/or Examination Variable credit. S, F grading.
- 702 Master's Special Problems, Directed Study and/or Examination Variable credit. S, F grading.
- 800 Doctoral Research, Dissertation and/or Examination Variable credit. S, F grading

### **Astronomy**

- 501 Graduate Seminar 1 Same as Phys 501. S, F grading.
- 581 Advanced Topics in Modern Astrophysics 3 May be repeated for credit; cumulative maximum 9 hours. Same as Phys 581.
- 595 Seminar in Astronomy/Astrophysics 1 May be repeated for credit; cumulative maximum 4 hours. Same as Phys 595. S, F grading.
- 600 Special Projects or Independent Study Variable credit S, F grading.

## **Department of Plant Pathology**

<http://plantpath.wsu.edu>

Degrees offered: **M.S., Ph.D.**

Faculty working with graduate students: **33**

Graduate students: **28**

Students receiving assistantships or scholarships: **92%**

Tests required: **TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

## **Admission Requirements**

To apply, send an online application to WSU Graduate School <http://www.gradsch.wsu.edu/future-students/admission/apply.html>. Please also submit to the program: a statement of purpose including reasons why you'd like to study with us, and the names and contact information of your three references. If you apply online, please notify us at [plpathstudents@wsu.edu](mailto:plpathstudents@wsu.edu).

## **Program Description**

Graduate programs are available leading to both master's and doctoral degrees in plant pathology. A master's degree is required for admission to the doctoral program. Both programs include extensive research experience, as well as course work in plant pathology and related disciplines such as plant physiology, soil science, genetics, statistics, and biotechnology. Degree programs are flexible. The program of study is tailor-made for each student, taking into account previous academic preparation and career goals.

Key strengths of the Department of Plant Pathology include research in all of the major organismal groups (mycology, nematology, phytobacteriology, and virology) in the following areas: biological control, biology and systematics of pathogens, biotechnology, epidemiology, extension plant pathology, genetics of resistance, molecular biology of host-pathogen interactions, plant disease detection and diagnosis, and plant disease management.

## **Contact Information**

Mary Stormo  
Plant Pathology Department  
PO Box 646430  
Pullman, WA 99164-6430  
Telephone: 509-335-9542  
Fax: 509-335-9581  
E-mail: [plpathstudents@wsu.edu](mailto:plpathstudents@wsu.edu)

## **Graduate Opportunities**

Degrees in plant pathology qualify students for a wide range of careers. Alumni of the Department of Plant Pathology at Washington State University are employed throughout the world at universities and colleges, government laboratories and agencies, and many companies. Alumni are making important contributions as researchers, teachers, administrators, and managers. Many are directly involved in crop production, plant breeding, and plant protection.

## **Positions Held by Recent Graduates**

Some positions include: Assistant division officer in microbiology and other administrative leadership positions with the Naval Medical Center; forest pathologist, West Virginia Department of Agriculture; university professor (teaching and research); and research plant pathologist, U.S. Department of Agriculture. If you are interested in talking with any of our graduates concerning studies in the Plant Pathology Department, please contact us.

## Faculty Interests

**Lori M. Carris:** Mycology; biology and systematics of smut fungi, especially *Tilletiales*. Pullman campus. [carris@wsu.edu](mailto:carris@wsu.edu)

**Gary A. Chastagner:** Diseases of ornamental bulb crops and Christmas trees. Puyallup Research and Extension Center. [chastag@wsu.edu](mailto:chastag@wsu.edu)

**Weidong Chen:** Fungal diseases of grain legumes; ecology and epidemiology of grain legume diseases; genetics of host-pathogen interactions. USDA-ARS, adjunct faculty, Pullman campus. [w-chen@wsu.edu](mailto:w-chen@wsu.edu)

**Xianming Chen:** Rusts of cereal crops; epidemiology and control of rusts; disease resistance; host-pathogen interactions. USDA-ARS, adjunct faculty, Pullman campus. [xianming@wsu.edu](mailto:xianming@wsu.edu)

**Frank Dugan:** Ascomycetes and associated anamorphs; fungi endophytic in higher plants. USDA-ARS, adjunct faculty, Pullman Campus. [fdugan@wsu.edu](mailto:fdugan@wsu.edu)

**Lindsey J. du Toit:** Etiology, epidemiology, and management of diseases of small-seeded vegetable seed crops in the Pacific Northwest. WSU Mount Vernon NWREC (Northwestern Washington Research and Extension Center). [dutoit@wsu.edu](mailto:dutoit@wsu.edu)

**Ken C. Eastwell:** Management and detection of virus diseases, especially of perennial crops such as fruit trees and hops. Irrigated Agriculture Research and Extension Center, Prosser. [keastwell@wsu.edu](mailto:keastwell@wsu.edu)

**Dean A. Glawe:** Mycology; biology and taxonomy of Erysiphales, Pyrenomycetes, and Deuteromycetes; and taxonomic databases. Puyallup Research and Extension Center. [glawe@wsu.edu](mailto:glawe@wsu.edu)

**Gary G. Grove:** Epidemiology and forecasting of fungal diseases of cherries, peaches/nectarines, and grapes; epidemiology of powdery mildews; electronic information transfer. Irrigated Agriculture Research and Extension Center, Prosser. [grove@wsu.edu](mailto:grove@wsu.edu)

**Lee A. Hadwiger:** Genetic engineering of disease resistance in plants; gene activation in fungi and plants; signaling in host-parasite interactions. Pullman campus. [chitosan@wsu.edu](mailto:chitosan@wsu.edu)

**Debra A. Inglis:** Diseases of vegetable crops and their control. WSU Mount Vernon NWREC (Northwestern Washington Research & Extension Center). [dainglis@wsu.edu](mailto:dainglis@wsu.edu)

**Dennis A. Johnson:** Potato diseases, mint diseases, and extension pathology. Pullman campus. [dajohn@wsu.edu](mailto:dajohn@wsu.edu)

**Mee-Sook Kim:** Armillaria root rot disease; forest pathology; genetics of forest fungal pathogens and their hosts. USDA-Forest Service, adjunct faculty, Moscow, Idaho. [mkim@fs.fed.us](mailto:mkim@fs.fed.us)

**Ned Klopfenstein:** Molecular diagnostics of forest pathogens and microbes; genetic structure of host and pathogen populations across forest landscapes and environments. USDA-Forest Service, adjunct faculty, Moscow, Idaho. [nklopfenstein@fs.fed.us](mailto:nklopfenstein@fs.fed.us)

**Richard Larsen:** Virology of common bean and cool season legumes; resistance in alfalfa to soil-borne pathogens. USDA-ARS, adjunct faculty, Irrigated Agriculture Research and



Extension Center, Prosser. *rlarsen@tricity.wsu.edu*

**Mark Mazzola:** Soil-borne diseases of fruit trees, microbial ecology, molecular biology. USDA-ARS, adjunct faculty, Tree Fruit Research and Extension Center, Wenatchee  
*mazzola@tfrl.ars.usda.gov*

**Timothy D. Murray,** Chair: Small grain diseases (foot and root rots of wheat); ecology and epidemiology of soil-borne pathogens; genetics of disease resistance; chemical control. Pullman campus. *tim\_murray@wsu.edu*

**Roy Navarre:** The molecular basis of disease resistance mechanisms and inducible defenses, such as systemic acquired resistance, in potato. USDA-ARS, adjunct faculty, Irrigated Agriculture Research and Extension Center, Prosser. *rnavarre@pars.ars.usda.gov*

**Patricia Okubara:** Host genes governing plant-microbe interactions; molecular basis of disease resistance and biological control of cereal root pathogens. USDA-ARS, adjunct faculty, Pullman campus. *pokubara@wsu.edu*

**Hanu Pappu:** Plant virology; virus diagnostics; characterization and control of viral diseases of ornamentals, vegetables, and small grains; biotechnological approaches for disease management. Pullman campus. *hrp@wsu.edu*

**Tim Paulitz:** Soil-borne pathogens of cereals; mycology. USDA-ARS, adjunct faculty, Pullman campus. *paulitz@wsu.edu*

**Tobin L. Peever:** Molecular, population, and evolutionary genetics of plant pathogenic fungi; fungal mating systems; molecular systematics of fungi; fungal ecology and epidemiology; legume diseases. Pullman campus. *tpeever@wsu.edu*

**Naidu Rayapati:** Plant virology; genomics and proteomics of plant viruses; virus-vector interactions; virus diagnostics and management strategies; virus diseases of grapes and vegetables. Irrigated Agriculture Research and Extension Center, Prosser. *naidu@wsu.edu*

**Ekaterini Riga:** Physiology, ecology, and diagnostics of nematodes; chemical, biological, and natural plant products to control plant parasitic nematodes. Irrigated Agriculture Research and Extension Center, Prosser. *riga@wsu.edu*

**Jack D. Rogers:** Mycology, forest pathology, cytogenetics. Pullman campus.  
*rogers@wsu.edu*

**Brenda Schroeder:** Bacteriology. Microbiology, molecular and genomics of bacteria associated with plant diseases. Pullman campus. *bschroeder@wsu.edu*

**Linda Thomashow:** Biological control, wheat root diseases, molecular biology, microbiology. USDA-ARS, adjunct faculty, Pullman campus. *thomasho@wsu.edu*

**George Vandemark:** Legume germplasm; basic and applied investigations of problems associated with legume improvement. USDA-ARS, adjunct faculty, Irrigated Agriculture Research and Extension Center, Prosser. *gvandemark@pars.ars.usda.gov*

**David M. Weller:** Biological control; influence of bacteria on take-all of wheat; cereal diseases; bacteriology. USDA-ARS, adjunct faculty, Pullman campus. *wellerd@wsu.edu*

**Chang-Lin Xiao:** Fungal and bacterial diseases of tree fruits, postharvest pathology, disease epidemiology. Tree Fruit Research and Extension Center, Wenatchee. *clxiao@wsu.edu*

## **Plant Pathology**

- 503 Advanced Cropping Systems 3 Graduate level counterpart of PI P 403; additional requirements. Credit not granted for both PI P 403 and 503.
- 511 Viruses and Virus Diseases of Plants 3 (3-3) Prereq course in biochem, or adv genetics. Nature of plant viruses, vector-virus relationships and virus diseases of plants.
- 513 Nematodes and Nematode Diseases of Plants 2 (1-3) Prereq PI P 429. Anatomy, identity, and diseases caused by nematodes; techniques and control. (SS)
- 514 Phytobacteriology 4(3-3) Prereq MBioS 302 and 303. Isolation and characterization of bacteria having a saprophytic, symbiotic or pathogenic association with plants—molecular structure, function, and genetics. Cooperative course taught by WSU, open to UI students (PISc 514).
- 515 Seminar 1 May be repeated for credit.
- 521 General Mycology 4 (2-6) The structure, life histories, classification, and economic importance of the fungi. Graduate level counterpart of PI P 421; additional requirements. Credit not granted for both PI P 421 and 521.
- 525 Field Plant Pathology and Mycology 1(0-3) or 2(0-6) May be repeated for credit; cumulative maximum 4 hours. Prereq plant pathology and/or mycology course; by interview only. Field trips, forays, and demonstrations dealing with various aspects of plant pathology and mycology. (SS)
- 526 Advanced Fungal Biology 4 (2-4) Prereq PI P 421 or 521 or equivalent and graduate standing. Advanced topics in fungal biology, ecology, systematics, evolution and coevolution via discussions of literature and special laboratory projects. Cooperative course taught by WSU, open to UI students.
- 529 General Plant Pathology 3 (2-3) Classification, symptoms, causes, epidemiology, and control of plant diseases. Graduate level counterpart of PI P 429; additional requirements. Credit not granted for both PI P 429 and 529.
- 534 Fungal Genetics 4 (3-3) Prereq MBioS 301. Classical and molecular approaches to genetic analyses in fungi.
- 535 Molecular Genetics of Plant and Pathogen Interactions 2 Prereq MBioS 301, MBioS 303. Genetic and molecular biological aspects of host-pathogen interactions. Cooperative course taught by WSU, open to UI students (PISc 535).
- 551 Epidemiology and Management of Plant Diseases 3 (3-0) Prereq PI P 429 or 529. Principles of plant disease epidemiology, control, and ecology of pathogens. Cooperative course taught by WSU, open to UI students (PISc 506).
- 600 Special Projects or Independent Study Variable credit. S, F grading.
- 700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.
- 800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

Plant Physiology

(See Molecular Plant Sciences)

## **Department of Political Science**

[libarts.wsu.edu/polisci/graduate](http://libarts.wsu.edu/polisci/graduate)

Degrees offered: **Ph.D., M.A. (Global and Security Studies only)**

Faculty working with graduate students: **19**

Graduate students: **37**

Graduate students receiving assistantships or scholarships: **60%**

Tests required: **GRE, TOEFL or IELTS (international students only)**

Priority Deadline: **Fall — January 10**

**Spring - Case by case**

### **Admission Requirements**

Undergraduate GPA of 3.3 in political science or related social science field (sociology, psychology, anthropology, criminal justice, history, etc.).

Three letters of recommendation from academics/professors must accompany the application.

We require GRE scores, but put emphasis on evidence of scholarly potential.

### **Program Description**

All students must apply to and be admitted into the Ph.D. program. Students entering with the B.A. degree obtain an M.A. after completing the matriculation exam in the second year. The department does not offer a terminal M.A. in political science except for the M.A. certificate program in global justice and security studies. This program is practitioner based and is intended for students seeking employment within the intelligence or defense communities. It does not lead toward admission into the Ph.D. program.

The program embraces theoretical diversity, methodological pluralism, analytic rigor, and scholarly excellence. As a medium sized program, areas of faculty expertise cover all the traditional subfields of political science. Graduate seminars are fairly small, and allow for intensive interchange between faculty and students. We provide regular opportunities for close contact between faculty and students, including research symposia, guest speakers, collaborative research projects, and work on research grants.

Students in political science can draw upon the skills and expertise of the faculty in the criminal justice program, and may engage in cross-disciplinary research through some of the

preliminary examination fields. The intellectual environment is enhanced through the relationship the department maintains with the Thomas S. Foley Institute of Public Policy and Public Service (speakers, programs, scholarships, etc.), the Division of Governmental Studies and Services (applied research, survey methodology, program evaluation, etc.), and our faculty on the regional campuses.

### **Contact Information**

Sisouvanh Keopanapay  
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### **Graduate Opportunities**

University faculty; Research Analyst; Public policy agency; Local, state and federal government; International organizations

### **Positions Held by Recent Graduates**

University of Connecticut, Seton Hall, University of Arkansas, SUNY-Potsdam, Wabash College, New Mexico State University, Boise State University, Eastern Washington University, Niagara University, University of Nevada-Reno

### **Related Programs**

Criminal Justice  
Master of Public Administration (WSU Vancouver)

### **Faculty Interests**

**Andrew Appleton:** Comparative politics, political parties, post-industrial societies, political behavior. [appleton@wsu.edu](mailto:appleton@wsu.edu)

**Dana Baker:** Disability, health, and scientific policy; policies addressing neurological differences and neurodiversity. [bakerda@wsu.edu](mailto:bakerda@wsu.edu)

**Cornell Clayton:** Judicial politics; jurisprudence; American politics; and normative political theory. [cornell@mail.wsu.edu](mailto:cornell@mail.wsu.edu)

**Terrence Cook:** Normative and empirical theory; comparative politics; international relations. [tcook@wsu.edu](mailto:tcook@wsu.edu)

**Martha Cottam:** Political-psychological factors in decision-making; international politics; U.S.-Latin American relations; north-south conflict and cooperation. [cottam@wsu.edu](mailto:cottam@wsu.edu)

**Carolyn Long:** Public policy, American constitution, civil liberties, judicial process, legislative process. [long@vancouver.wsu.edu](mailto:long@vancouver.wsu.edu)

**Nicholas Lovrich:** Public administration; public policy analysis; public personnel administration; natural resource and environmental administration; media and politics; state and local government. [faclovri@wsu.edu](mailto:faclovri@wsu.edu)

**Otwin Marenin:** Crime control policies; police in society; comparative criminal justice; systems and policies; law, crime, and development; drugs, crime, and politics; ethics in criminal justice; politics of Africa; Third World politics. *otwin@mail.wsu.edu*

**Amy Mazur:** Gender and politics; comparative politics; feminist policy; comparative public administration. *mazur@mail.wsu.edu*

**Claire Metelits:** Comparative politics; international relations; non-state armed actors; state building; political economy of conflict; developing nations; Africa; Latin America; political violence. *cmelits@wsu.edu*

**David Nice:** The presidency and legislative behavior; American politics; state and local politics; public budgeting; research methods; political parties. *dnice@wsu.edu*

**Mitchell Pickerill:** Judicial politics; law and jurisprudence; American political institutions; normative theory. *mitchp@wsu.edu*

**Thomas Preston:** International relations, political psychology. *tpreston@wsu.edu*

**Travis Ridout:** Presidential nominations and campaign effects; political communication; political participation; political methodology. *tnridout@wsu.edu*

**Steven Stehr:** Public administration; public policy; natural disasters and public policy; American political institutions; criminal justice organizations; political stimulation. *stehr@wsu.edu*

**Mark Stephan:** American politics, political behavior, research methods, public policy, bureaucratic politics, democratic theory, environmental politics. *stephanm@vancouver.wsu.edu*

**Paul Thiers:** International relations, globalization. *thiers@vancouver.wsu.edu*

**Edward Weber:** Public administration; public policy; environmental politics and policy; administrative law and regulation. *edweber@mail.wsu.edu*

### Courses

501 The Scope of Political Science 3 Prereq 12 hours Pol S. Historical development and present status of the discipline; contemporary issues and future trends. Cooperative course taught by WSU, open to UI students (PolSc 530).

502 Seminar in Normative Theory 3 Elements of normative theory developments; examination of bases of controversies and approaches in the modern literature using historical sources.

503 Introduction to Political Science Research Methods 3 Prereq 12 hours Pol S; Soc 321 Social science research design topics including: measurement, sampling, data sources, experimental and quasi-experimental designs, field and historical designs and content analytic designs.

504 Quantitative Methods in Political Science and Criminal Justice 3 Applied statistical skills to enable understanding of substantive political and social questions.

505 Comparative Criminal Justice Systems 3 Same as Crm J 505. Comparative study of criminal justice systems in the U.S. and selected countries.

510 Seminar on American Institutions and Processes 3 Seminar required of all graduate students using this field as a major or a minor. It is a prerequisite of all other graduate seminars in the field.

- 511 Seminar in American Political Thought 3 May be repeated for credit; cumulative maximum 6 hours. The genesis and development of political thought in the United States.
- 512 Seminar in American Institutions 3 May be repeated for credit; cumulative maximum 6 hours. Origin, development, and contemporary issues in political organization and structure in the United States.
- 513 Seminar in Political Behavior 3 May be repeated for credit; cumulative maximum 6 hours. Theoretical approaches to, and empirical analysis of, mass political behavior in the US.
- 514 Seminar in Public Policy 3 Examination of central questions in public policy including what is the nature of public policy, what is policy analysis, why does government intervene in society?
- 516 Seminar on Law, Courts, and Judicial Politics 3 Prereq graduate standing. Seminar on law, courts, and judicial politics.
- 530 Seminar in Theoretical Approaches to International Relations 3 Group dynamics, systems analysis, decision making, communications models, game theory, simulations, and rationality models. Cooperative course taught by WSU, open to UI students (PoSc 501).
- 531 Seminar in International Security 3 International security and arms control politics, negotiations, agreements. Cooperative course taught by WSU, open to UI students (PoSc 561).
- 532 Seminar in International Political Economy 3 Institutions, politics, and decision making processes in managing international economic relations.
- 533 Topics in Political Psychology 3 May be repeated for credit; cumulative maximum 6 hours. Psychological influences on political decision making, bargaining, conflict and conflict resolution options.
- 534 Seminar in Comparative Politics 3 May be repeated for credit; cumulative maximum 6 hours. Cooperative course taught jointly by WSU and UI (PoSc 595).
- 535 Advanced Issues in Comparative Politics 3 Advanced issues seminar in international and comparative politics.
- 536 Special Topics in Comparative Politics 3 May be repeated for credit, cumulative maximum 6 hours. Advanced issues seminar in international and comparative politics.
- 537 Concepts and Methods in Comparative Politics 3 Selected concepts (state, political participation), and methods (cross-national analysis, case stud approaches) in comparative politics.
- 538 International Development and Human Resources 3 Same as Anth 519.
- 539 The Political Science Profession 1 Methods, problems, and purposes of teaching, research, and vocation in political science. S, F grading.
- 540 Proseminar in Public Administration 3 Basic theories of administrative organization, relationships, and behavior.
- 541 Seminar in Research Evaluation 3 Interrelationships of ideological data, policy development, and policy implementation in public policy analysis.

- 542 Proseminar in Administration, Justice and Applied Policy Studies 3 May be repeated for credit; cumulative maximum of 12 hours. Prereq Pol S 540. Analytical perspectives and theoretical issues in administration, justice and applied policy studies. Cooperative course taught jointly by WSU and UI (PolSc 592).
- 543 Topics in Public Administration and Policy 3 May be repeated for credit; cumulative maximum 6 hours. Prereq graduate standing. Examination of the literature on the politics of the American public policy process.
- 544 The Politics of Policy Process 3 American political process; policy making under the constraints of a democratic system; relationship to the (non) achievement of the public interest.
- 547 Seminar in Public Administration 3 Cooperative course taught by WSU, open to UI students (PolSc 501).
- 552 Administrative Law and Regulation 3 Rule-making, adjudication, and other modes of regulation of administrative agencies; judicial review and Congressional oversight of administrative acts. Cooperative course taught by UI (PolSc 552), open to WSU students.
- 592 Same as Crm J 592.
- 597 Graduate Internship V 2-12 May be repeated for credit; cumulative maximum 12 hours. Prereq graduate student. On/off campus internship in federal, state, or local government institutions; nonprofit or public organizations; written assignments and readings will be required. S, F grading.
- 599 Research Practicum Variable 1-3 May be repeated for credit, cumulative maximum 6 hours. S, F grading.
- 600 Special Projects or Independent Study Variable credit. S, F grading.
- 702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.
- 800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

## **Department of Psychology**

### **Clinical Psychology Emphasis**

[www.wsu.edu/psychology](http://www.wsu.edu/psychology)

Degree Offered: **Ph.D.**

Faculty working with graduate students: **10**

Graduate students: **28**

Students receiving assistantships or scholarships: **100%**

Tests required: **GRE; TOEFL or IELTS (International students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

## **Admission Requirements**

Admission to the Clinical program is competitively based on wide-ranging criteria including: undergraduate GPA (3.0 minimum), graduate GPA (if applicable), verbal and quantitative GRE scores, research experiences, clinical experiences, and letters of recommendation.

Applicants should have completed at least 18 hours of psychology, including a class in statistics. Submit application, three letters of recommendation, official transcripts, and Departmental applicant summary data form. Materials are available online.

## **Program Description**

The Graduate Program in Clinical Psychology is based on the scientist-practitioner model of training. The clinical faculty are committed to integrating theory, research, and clinical practice in educating students. Our goal is to train highly competent clinical psychologists who will obtain high quality, APA-approved internships and upon graduation, make positive contributions to the field of clinical psychology.

Such contributions occur in academic, research, medical, clinical, or community settings depending upon a student's own interests and goals. Hence, we provide broad, general clinical training for students during their 4 years at WSU. Areas of both research and clinical emphasis within our program include: adult psychopathology; behavioral medicine; clinical child and family psychology; and neuropsychology.

*Our program is fully accredited by the American Psychological Association.*

## **Contact Information**

Amber Youmans  
Department of Psychology  
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## Graduate Opportunities

Academia; Practicing psychologist; Neuropsychologist; Health psychologist

## Positions Held by Recent Graduates

Postdoctoral positions at medical/Veterans' Administration schools (e.g., SeattleVeterans' Administration); Positions at academic/medical settings (e.g., University of California–Davis, Center for Neuroscience)

## Faculty Interests

**Leonard Burns:** Construct validity of ADHD, oppositional defiant disorder, conduct disorder, and treatment of reading disorder. *glburns@mail.wsu.edu*

**Dennis Dyck:** Clinical psychology, health psychology, and serious and persistent mental illness. *dyck@wsu.edu*

**J.P. Garofalo:** Clinical health psychology, personality and symptom reporting, and psychological and neurocognitive sequelae of cancer therapies. *garofalo@vancouver.wsu.edu*

**Masha Gartstein:** Developmental psychopathology, temperament, parenting, and cross-cultural differences. *gartstma@wsu.edu*

**Heidi Hamann:** Psychological and behavioral issues in genetic testing and interpersonal responses to cancer diagnosis and treatment. *hamann@wsu.edu*

**Michiyo Hirai:** Anxiety disorders, adult psychopathology, cognitive-behavioral treatment, and cross-cultural issues. *hiraim@wsu.edu*

**Paul Kwon,** Director of Clinical Training: Etiology of depression, integration of cognitive and psychodynamic perspectives, hope and adjustment, and cross-cultural issues. *kwonp@wsu.edu*

**Leslie Robison,** Psychology Clinic Director. *robisonl@mail.wsu.edu*

**John Ruiz:** Personality, interpersonal relationships, cardiovascular disease, marriage, Hispanic paradox, optimism, hostility, neuroticism, and vigilance. *ruizjx@wsu.edu*

**Maureen Schmitter-Edgecombe:** Adult clinical and cognitive neuropsychology, automaticity, implicit learning, memory, speeded processing, attention, skills learning, and remediation issues in older adults and neurologically impaired populations. *schmitter-e@wsu.edu*

**Elizabeth Soliday:** Physical and psychosocial health of children and families, foster care, and professional issues. *soliday@vancouver.wsu.edu*

**Paul Strand:** Childhood conduct disorders, parent-child coordination, and development and communication within families. *pstrand@tricity.wsu.edu*

**Bruce Wright:** General psychiatry, behavioral medicine, psychosocial factors in cardiovascular disease, and psychopharmacology. *wrightbr@wsu.edu*

## Experimental Psychology Emphasis

[www.wsu.edu/psychology](http://www.wsu.edu/psychology)

Degree offered: **Ph.D.**

Graduate students: **12**

Faculty working with graduate students: **26**

Students receiving financial aid: **88%**

Tests required: **GRE; TOEFL or IELTS (International students only)**

Priority deadline: **Fall – December 1**

Campuses—**Pullman, Vancouver**

### **Admission Requirements**

Three letters of reference; Departmental Applicant Summary Data Form; at least 18 credits of study in psychology; at least one course in statistics and research methodology, official transcripts; and a minimum 3.00 cumulative undergraduate GPA (on a 4.00 scale) or a master's degree in psychology.

### **Program Description**

The Experimental program offers training in four emphasis areas: cognition; biological; sensation and perception; and social/organizational.

### **Specific areas of expertise include:**

Memory processes and problems; Analgesic effects of opioid drugs; Cooperative interpersonal behavior; Alcohol and drug abuse; Sex differences in drug effects; Visual and auditory perception; Workplace harassment and discrimination; Job stress, job insecurity, worker safety.

Our faculty hold editorial positions with several scientific journals and are consultants to most of the elite journals in our areas of emphasis. We employ a mentoring model under which the student works closely with one particular faculty member of his/her choosing, although the student may also work in other labs. Our program is designed to train students for research positions in academia or research organizations, though our graduates have also had success winning teaching and consultant jobs.

### **Contact information:**

Rebecca M. Craft, Ph.D.  
Professor & Director of Experimental Training  
Department of Psychology  
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Pullman, WA 99164-4820  
Phone: 509-335-5040  
Fax: 509-335-5043  
Email: craft@wsu.edu

### **Positions Held by Recent Graduates**

Assistant professor, University of Alaska  
Assistant professor, Ohio University  
Assistant professor, Oregon Technological University  
Assistant professor, University of the Pacific  
Postdoctoral research associate, Cornell University Medical School  
Postdoctoral research associate, Vanderbilt University  
Postdoctoral research associate, University of Texas Medical School  
Postdoctoral research associate, University of Arkansas Medical School

## Faculty Interests

**Thomas Brigham:** Self-management theory and procedures. Research is focused on using these procedures to reduce the personal and societal costs of common self-control problems such as over-consumption of alcohol, high-risk sexual behavior, over-eating, and anger difficulties.

*brigham@mail.wsu.edu*

**Rebecca Craft:** Research is currently focused on sex differences in the effects of psychoactive drugs—primarily opioids. Our primary research goal is to determine how neurobiological differences between males and females may explain differential sensitivity to opioids and to other psychoactive drugs.

*craft@wsu.edu*

**Armando Estrada, WSU-Vancouver:** Culture and gender influences on workplace harassment, prejudice, and discrimination; models of sexual prejudice across cultures; role of individual differences in predicting sexual prejudice. *estrada@vancouver.wsu.edu*

**Lisa Fournier:** Current research includes the role of attention in object perception and recognition; processing of unattended stimuli; ignoring task-irrelevant information; activation and inhibition of motor responses that affect perception of stimuli that are associated with these motor responses; attention modulation and the perception of 3-D motion in depth; and estrogen replacement therapy and diet on cognitive function. *fournier@wsunix.wsu.edu*

**John Hinson:** Current research focuses on the relation between working memory processes and decision making, especially in populations that appear to have intrinsic working memory problems, such as Parkinson's disease patients, and people with impulsivity and self-control difficulties, such as those with substance abuse problems. Our working memory group is most interested in identifying component processes that provide working memory functions, determining neural circuits that are responsible for those functions, analyzing patterns of deficits that arise from changes in working memory components, and discovering ways of overcoming working memory limitations.

*hinson@mail.wsu.edu*

**Jeffrey Joireman:** Current research interests include decision-making in social dilemmas, as well as individual differences in universal values, social value orientation, empathy, aggression, and the consideration of future consequences. *joireman@wsu.edu*

**Randall Kleinhesselink:** Research interests include perception of environmental risks, cross-cultural research, and mental health courts. *kleinhes@vancouver.wsu.edu*

**Stephen Lakatos:** Perception and mental representation of complex non-speech sounds; perception of bodily space. *lakatos@vancouver.wsu.edu*

**Frances McSweeney:** Matching law, behavioral contrast, and the participation of women in psychology. Current research examines systematic changes in the ability of reinforcers to support responding. Sensitization-habituation may eventually provide the key to understanding the termination of many behaviors that are currently attributed to different mechanisms.

*fkms@mail.wsu.edu*

**Michael Morgan:** Current research is focused on understanding the role of the PAG and RVM in pain modulation and the contributions of these structures to tolerance, to the pain inhibitory effects of morphine, morphine tolerance, and identifying the specific PAG neurons that contribute to opioid tolerance. *morgan@vancouver.wsu.edu*

**Craig Parks:** Understanding the internal, individual-level factors that influence a person's frequency of cooperative responses in an interdependent group setting including mixed-motive situations, and decision-making groups. The focus is on two factors, stable individual difference characteristics and actions of others as a stimulus for own choice. Recent work includes investigating more cognitively based factors like retrospection, mood, misperception of others' actions, and attributions for others'

noncooperative behavior.  
*parkscd@mail.wsu.edu*

**Robert Patterson:** Research investigates the ability of humans to use vision as a means for interacting with their environment and how depth and motion information are processed by the visual system. This research is motivated by the desire to understand the functioning of the brain mechanisms that process depth and motion information as well as to inform the engineering community about design criteria for developing synthetic vision displays and artificial reality systems. *rpatter@wsu.edu*

**Tahira Probst:** Job stress, work attitudes, job withdrawal (turnover intentions), work withdrawal, and organizational commitment; individual and organizational outcomes of employee job insecurity; development of optimal organizational transition procedures, cross-cultural effectiveness of human resource practices, and applications of item response theory to psychological measurement.  
*probst@vancouver.wsu.edu*

**Paul Whitney:** Research centers on working memory processes in language comprehension and decision making. Much of this work takes an individual differences approach in which we examine how working memory deficits impact other cognitive processes. Collaborative work with clinical psychologists and neurologists in order to examine working memory processes in older adults, people with Parkinson's disease, and people with schizophrenia.  
*pwhitney@mail.wsu.edu*

**John Wright:** Research interests include Alzheimer's disease, neurochemistry of memory, consolidation, habituation, stroke, and hypertension. *wrightjw@wsu.edu*

## Psychology

502 Research Design V 1 (0-3)-3 (0-9) May be repeated for credit; cumulative maximum 16 hours. Research design, equipment, data collection, data analysis, and report writing. S, F grading.

504 History of Psychology: Theoretical and Scientific Foundations 3 Roots of scientific explanation in psychology traced through various philosophical schools and psychological movements.

505 Teaching Introductory Psychology V 1-3 May be repeated for credit; cumulative maximum 4 hours. Prereq graduate standing. Problems and techniques related to teaching introductory psychology. S, F grading.

506 Current Research in Psychology 1 Current research being conducted by psychology faculty and members of associated departments.

507 Topics in Psychology 3 May be repeated for credit.

508 Special Topics in Psychology V 1-3 May be repeated for credit.

509 Affective Neuroscience 3 Prereq graduate standing. Same as Neuro 509.

511 Analysis of Variance and Experimental Design 4 Prereq Psych 311. Parametric, nonparametric, repeated-measures, and multivariate ANOVA; planned comparisons; confidence intervals and power analysis; experimental design and variants.

512 Correlation, Regression, and Quasi-Experimental Design 3 Prereq Psych 511. Simple and multiple correlation and regression; time-series analysis; factor analysis; field research and quasi-experimental design.

513 Seminar in Quantitative Methods and Research Design 3 May be repeated for credit. Prereq Psych 512. Advanced topics in specialized quantitative procedures and in design of research in psychology.

514 Psychometrics 3 Prereq Psych 512. Scientific construction of behavioral assessment instruments, including validation and reliability; types of scales and responses; statistical scaling; test theory issues.

515 Multilevel and Synthesized Data 3 Prereq Psych 512. Structural equation modeling, hierarchical

- linear modeling and meta-analysis and the software used to conduct these analyses.
- 516 Applied Structural Equation Modeling with Current Software 3 Prereq Psych 511; Psych 512; Psych 514; Psych 515. Confirmatory factor analysis with current software.
- 519 Industrial/Organizational Psychology 3 Application of psychological principles to the study of work behavior, includes topics such as personnel selection, performance appraisal, training, work motivation, teams, leadership, and job attitudes. Cooperative course taught by UI, Open to WSU students (PSYC 516).
- 520 Empirical Approaches to Psychotherapy 3 Major therapy systems, research on process and outcome of therapy.
- 521 Behavior Modification 3 (2-3) Prereq Psych 390, 520. Learning principles applied to modifying behavior of children and adults in institutions, clinics, and schools.
- 522 Applied Behavioral Research 3 Research theory and methodology on development of applied programs.
- 530 Professional Ethical and Legal Issues 3 Application of professional, ethical, and legal issues in clinical psychology to such topics as confidentiality, dual-relationships, research, assessment, and intervention.
- 533 Adult Psychopathology 3 Prereq by interview only. Theoretical and empirical approaches to diagnosis, etiology and treatment of mental disorders. Cooperative course taught by WSU, open to UI students (Psych 575).
- 534 Clinical Psychopharmacology 3 Prereq Psych 533, 574. Classification, clinical application, and mechanisms of psychotherapeutic drugs used in the treatment of mental disorders.
- 535 Clinical Assessment and Diagnosis 3 Diagnostic interviewing, conceptualization of clinical problems, case presentations, and treatment planning..
- 536 Measurement Theory and Personality Assessment 3 Prereq Psych 530, 539; admission to clinical psychology Ph.D. program. Psychometric theory, theories of personality, objective and projective methods of assessing personality, development of testing and interpretive skills.
- 537 Psychology Clinic Assessment Practicum 3 May be repeated for credit; cumulative maximum 18 hours. Prereq Psych 539 or by interview only. Supervised practice in psychological assessment in the Psychology Clinic. S, F, grading.
- 538 Child Therapy Practicum 3 May be repeated for credit; cumulative maximum 18 hours. Prereq Psych 520, 530, 533, 535, 536, 539, 543, or by interview only. Supervised practice in the clinical application of psychology with children and families. S, F grading.
- 539 Measurement Theory and Intellectual Assessment 3 Prereq by interview only. Psychometric theory theories of intelligence, methods of appraising intelligence in children and adults, and development of testing and interpretive skills.
- 541 Social Psychology in the Workplace 3 Overview of the general theory and methods of organizational psychology; focus on how individual or group behavior is affected by the organizational environment; includes topics such as work motivation, leadership, teams, culture/climate, and job attitudes. Cooperative class taught by UI, open to WSU students (PSYCH 541).
- 542 Community Psychology 3 Examination of community and its effects on health and behavior; organization of community based mental health services.
- 543 Child Clinical Psychology: Empirical Approaches to Assessment and Therapy 3 Research on developmental psychopathology, child assessment, and child therapy.
- 544 Medical Psychology: Psychological and Pharmacological Interventions 3 Psychological factors and their influence upon the causes and/or course of medical illnesses as well as relevant clinical interventions. Cooperative course taught by WSU, open to UI students (Psych 544).
- 545 Psychology Clinic Adult Therapy Practicum 3 (0-9) May be repeated for credit; cumulative

maximum 18 hours. Prereq Psych 520, 530, 535, 536, 539, or c//. By interview only. Supervised practice in the clinical application of psychology with adults in the Psychology Clinic. S, F grading.

546 Counseling Service Practicum V 1-3 May be repeated for credit; cumulative maximum 12 hours. Prereq Psych 545 or c//. By interview only. Supervised practice in the clinical application of psychology; at the WSU Counseling Service. S, F grading..

547 Medical Psychology Practicum 3 Prereq by interview only. May be repeated for credit; cumulative maximum 18 hours. Supervised practice in the clinical application of psychology at the WSU University Health Service. S, F grading.

548 Clinical Externship V 1-3 May be repeated for credit; cumulative maximum 18 hours. Prereq by interview only. Supervised practice in the clinical application of psychology at the Sacred Heart Medical Center and St. Luke's Rehabilitation Center. S, F grading.

550 Attitudes and Social Cognition 3 Attitude structure, function, and change. Social cognition and motivation, and attributions. Cooperative course taught by WSU, open to UI students (Psych 520).

551 Group and Interpersonal Processes 3 Theories and research in interpersonal dynamics; cognitive, learning, equity, and attributional concepts. Group performance and interpersonal interaction, social influence, distributive and procedural justice, helping, and attraction.

552 Diversity Issues in Psychology 3 Research, theories, and controversies regarding the role of human diversity in psychotherapy, psychological assessment, and clinical research.

553 Theories of Personality 3 Classical (e.g., psychoanalytic, ego psychology) and contemporary (e.g., object relations social learning, psychological behaviorism) views of personality development.

555 Personnel Psychology 3 Review of theory and methods related to personnel issues; includes topics such as individual differences, selection, psychometrics, compensation, training programs and performance appraisal. Cooperative course taught by UI, open to WSU students (PSYC 535).

561 Human-Computer interaction 3 Overview of human-computer interaction (HCI) topics, including user models, dialog, display design, usability, software development, groupware and multimedia. Cooperative course taught by UI, open to WSU students (PSYC 561)

562 Advanced Human Factors 3 Review of topics and theories germane to human factors such as performance measurement systems, design specifications, research issues, controls and displays, human reliability and illumination. Cooperative course taught by UI, open to WSU students (PSYC 562)

574 Physiological Psychology 3 Neuroanatomical, neurochemical, and other biological cases of human and animal behavior. Cooperative course taught by WSU, open to UI students (PSYCH 565).

575 Foundations of Neuropsychology 3 Foundations in brain/behavior relationships and neuropathological syndromes; preparation for advanced training in neuropsychological assessment. Cooperative course taught by WSU, open to UI students (PSYC 575)

576 Neuropsychological Assessment 3 Prereq Psych 574 and Psych 575. Brain-behavior relationships in humans and the evaluation of cognitive, behavioral, and emotional changes accompanying a variety of neuropsychiatric syndromes.

577 Behavioral Pharmacology 3 Prereq Psych 574. Survey of drugs which affect brain function with emphasis on animal models and clinical applications. Cooperative course taught by WSU, open to UI students (PSYC 566)

579 Behavioral Neuroscience 3 Prereq Psych 574. Advanced topics in neurochemistry, neurophysiology and neuroanatomy. Cooperative course taught by WSU, open to UI students (PSYC 567)

584 Sensory Bases of Behavior 3 Prereq Psych 384. Sensory and physiological aspects of vision, audition, and other senses. Cooperative course taught by WSU, open to UI students (568)

591 Models of Learning 3 Historical and current theory and research in learning and cognition.

592 Cognition and Memory 3 Experimental approaches to human information processing, memory, and cognition.

- 593 Experimental Analysis of Behavior 3 Operant conditioning in relation to the experimental evidence currently available; examination of research strategies.
- 595 Clinical Internship in Psychology V 2-16 May be repeated for credit; cumulative maximum 16 hours. Prereq passing of prelims and completion of course work for PhD. Clinical training in an internship approved by American Psychological Association or by WSU. S, F grading.
- 600 Special Projects or Independent Study Variable credit. S, F grading.
- 700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.
- 702 Master's Special Problems, Directed Study and/or Examination Variable credit. S, F grading.
- 800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

## **Rural, Land Use and Regional Planning**

(See Environmental Science and Regional Planning)

### **Department of Sociology**

[libarts.wsu.edu/soc/graduate/ProspGradStud.html](http://libarts.wsu.edu/soc/graduate/ProspGradStud.html)

Degrees offered: **M.A., Ph.D.**

Faculty working with graduate students: **23**

Graduate students: **46**

Students receiving assistantships or scholarships: **Most**

Tests required: **GRE; TOEFL or IELTS (international students only)**

Priority Deadline: **Fall -- January 10**

#### **Admission Requirements**

In order to apply for admission to the graduate program in sociology, you must apply for admission to the Graduate School at Washington State University. In addition to the materials required by the Graduate School, the department also requires GRE scores, 3 letters of recommendation, a writing sample, and a brief statement of your professional interests and goals, all of which are also to be submitted to the Graduate School.

#### **Program Description**

The department supports a wide range of student interests, and provides a foundation in theory, methods, and statistics. We offer six general areas of research specialization:

crime and deviance, social control and social justice (criminal justice system, micro and macro studies of criminality and delinquency, social norms);

environment, technology and community, (risk, rural and urban communities, global environmental impacts, environmental justice);

work, organizations, and labor markets (work and family, social networks, labor market inequality, transition to work);

comparative political and social change (social movements, global political economy, the state);

social inequality (gender, race/ethnicity, class);

and families, population, and life course (union formation, transition to parenthood, transition to adulthood, identity).

Substantial faculty interests also exist in other areas of the discipline. We encourage students to nurture broad intellectual sensibilities. The department maintains seminars and colloquia that expose students to a full range of research and debate.

### **Contact Information**

Monica Kirkpatrick Johnson, Ph.D.  
Department of Sociology  
Washington State University  
PO Box 644020  
Pullman, WA 99164-4020  
Telephone: 509-335-8773  
Fax: 509-335-6419  
E-mail: [monicakj@wsu.edu](mailto:monicakj@wsu.edu)

### **Graduate Opportunities**

Prestigious postdoctoral positions; Academic positions; Federal government; Local and state government; Statistical consulting organizations

### **Positions Held by Recent Graduates**

Postdoctoral positions at the University of Chicago, Harvard University, and Rice University.  
Tenure track faculty positions at Iowa State University, Michigan State University, University of Oregon, Ohio University, Oklahoma State University, University of Florida, University of Idaho, University of New Mexico, University of Nevada–Las Vegas, University of Montana.  
Non-academic positions at several Washington state agencies, the Federal Bureau of Investigation and several other federal agencies, and statistical consulting organizations.

### **Faculty Interests**

Michael Allen: Processes of cultural production and cultural consecration.  
[allenm@wsu.edu](mailto:allenm@wsu.edu)

Irene R. Beattie: Education, gender and racial/ethnic inequality, adolescence, and the law.  
[ibeattie@wsu.edu](mailto:ibeattie@wsu.edu)

Lisa Catanzarite: Social stratification, especially labor market segregation and wage inequality by gender, race/ethnicity, and immigration. [lcatanzarite@wsu.edu](mailto:lcatanzarite@wsu.edu).

Don Dillman: Survey methodology with a focus on how visual layout and design influences respondent answers and the ramifications for designing mixed-mode surveys; community sociology with an emphasis on information technology impacts on community behaviors.  
[dillman@wsu.edu](mailto:dillman@wsu.edu)

Elizabeth Fussell: International migration, young adult life course.  
[fussell@wsu.edu](mailto:fussell@wsu.edu)

Scott Frickel: Politics of knowledge, environment, social movements, state theory, academic culture,



science and technology. *frickel@wsu.edu*

Louis N. Gray, emeritus: Choice and social influence from a behavioral perspective.  
*grayln@wsu.edu*

Gregory Hooks: Political sociology and social inequality, specifically the economic and political importance of the U.S. defense program; the darker side of militarism, including environmental damage and human rights abuses. *ghooks@wsu.edu*

Christine Horne: Social norms: their emergence, enforcement, and relation to the legal system.  
*chorne@wsu.edu*

Monica Kirkpatrick Johnson: Education, work, and family during adolescence and the transition to adulthood. *monicakj@wsu.edu*

Julie Kmec: Work organizations and the inequalities of race and sex in the labor market.  
*jkmec@wsu.edu*

Kim M. Lloyd: The impact of race and ethnicity on family formation and educational outcomes in the United States. *kimlloyd@wsu.edu*

Alair MacLean: Social inequality, focusing on the lives of people who have served in the armed forces. *maclean@vancouver.wsu.edu*

Lisa McIntyre: The relationship between law and society, particularly how law constrains some actions and how some people use it as a resource to achieve what they want; the dynamics of college teaching. *ljmcint@wsu.edu*

Clayton Mosher: The sources and consequences of inequality, with a particular focus on the criminal justice system. *mosher@vancouver.wsu.edu*

Hiromi Oro: Conducts research on unions (e.g., marriage and cohabitation) with emphases on gender and race/ethnicity. *ono@wsu.edu*

Eugene Rosa: How human impacts on the environment affect the survival of societies (macro and micro approaches). *rosa@wsu.edu*

Thomas Rotolo: Volunteering, voluntary associations, and social networks.  
*rotolo@wsu.edu*

Jennifer Schwartz: The relationship of gender and race-ethnicity to crime; communities and crime; effects of social change on trends in crime. *schwartzj@wsu.edu*

Jim Short, emeritus: Street gangs, violence, and risk analysis. *short@wsu.edu*

Nella Van Dyke: Social movements, hate crime, gender and sexuality.  
*nvandyke@wsu.edu*

Amy S. Wharton: Work-family policies, gender inequality, and work.  
*wharton@vancouver.wsu.edu*

## Sociology

510 Development of Social Theory 3 Examination of the foundations of sociological theory.

511 Theories of Social Organization 3 Major theories of social organization in historical perspective.

512 Theory Construction and Formalization 3 Testing; formalization of theoretical systems; adaptation of general models to specific problems.

517 Seminar in Contemporary Sociological Theory 3 Recent developments in sociological theory, analysis, application and appraisal of specific theoretical systems.

519 International Development and Human Resources 3 Same as Anth 519.

520 Research Methods in Sociology 3 Methodology of social research at the professional level.

521 Regression Models 3 Prereq Soc 421. Simple and multiple regression, structural equation models, non-linear applications, applications for discrete dependent variables.

522 Advanced Sociological Methods 3 May be repeated for credit; cumulative maximum 12 hours. Prereq Soc 521. Scaling theory, sampling theory, experimental design, measurement of association, multivariate analysis, current methods and techniques.

523 Qualitative Methods Practicum 3 Prereq graduate standing. Introduction to qualitative research methods as used in social sciences; epistemological underpinnings and empirical techniques.

524 Sociology and Public Policy 3 Sociological theories used to consider the rationale for public policy; development of tools for policy analysis.

525 Practicum in Survey Research 3 Prereq Soc 520. Practical experience in design and implementation of telephone and mail surveys; participation in all aspects of conducting a survey.

530 Demography 3 Population studies; causes, effects, and measurement of changes in fertility, mortality, and migration; population estimation and projection.

531 Human Ecology 3 Ecosystem context of human life; change viewed ecologically; sociological use and misuse of ecological concepts; issues in theory and research.

532 Environmental Sociology 3 Societal-environmental interactions; impacts of human societies on the physical environment; environmental impacts on human behavior and social organization.

533 Social Impact Assessment 3 Sociology's contribution to environmental impact assessments; methods, contents, and contexts of assessing social impacts of proposed developments. Cooperative course taught by WSU, open to UI students (RRT 504).

534 Energy and Society 3 Energy and societal evolution; energy consumption patterns and quality of life; social impacts of energy shortages and alternative energy systems.

535 Technology and Society 3 Prereq graduate standing. Analysis of sociotechnical systems; effects of technology on society; the social shaping of technologies and their environmental impacts.

536 Special Topics in Environmental Sociology V 1-3 May be repeated for credit; cumulative maximum 9 hours. Special Topics in Environmental Sociology.

542 Social Stratification: Class, Race and Gender Inequalities 3 Theoretical and empirical research in both classic stratification literature and recent scholarship on class, race/ethnicity and gender.

544 Sociology of Religion 3 Role of religion in social structure, process and change; analysis of religious behavior.

545 Sociology of Community 3 Community stability and change: interaction processes; decision-making; societal linkages; effects on well-being.

546 Medical Sociology 3 Social influence on the perceptions of health and illness; construction of health professionals; analysis of the health care system and current policy proposals.

548 Political Sociology 3 Systematic survey of theories and the major research literature in political sociology.

550 Survey of Social Psychology 3 Survey of theories, findings, and methods; self and identities, interaction processes, socialization, emotions, gender relations, group processes and network relations.

553 Social Organization and the Family 3 The family as a social institution; principles of social organization applied to family relationships; macro-level analyses of family structure.

554 Social Psychology of the Family 3 The family as an interacting group; social psychological theories and research applied to family relationships; effects of families on individuals.

555 Sociology of Gender 3 Sociological theory and research on gender and gender inequality in American society.

556 Sociology of Aging and the Life Course 3 Theory and research on the changes individuals undergo over the life course; influences of history, social structure, agency and social relations on lives. Cooperative course taught jointly by WSU and UI (Soc 431).

- 560 Problems of Deviance Theory 3 Development of theories of deviant behavior; new issues in the study of deviance.
- 561 Sociology of Law 3 Social factors affecting the development and maintenance of legal structures and the process of administration of justice.
- 567 Seminar in Crime and Delinquency 3 Contemporary theory and research in crime and delinquency.
- 568 Adolescent Deviance 3 Contemporary sociological theory and research in adolescent deviance; action programs, and emerging issues.
- 572 Socialization 3 Theories of childhood and adult socialization; personality development; symbolic interaction; learning; agents of socialization.
- 573 Group Processes 3 Sociological theory and research dealing with overt behavior in human interaction settings and its cognitive antecedents.
- 580 Sociology of Race Relations 3 Analysis of race/ethnic relations; historical and current theoretical explanations of race/ethnic relations.
- 590 Special Topics in Sociology 3 May be repeated for credit; cumulative maximum 9 hours.
- 591 The Sociology Profession 1 May be repeated for credit; cumulative maximum 2 hours. Requirements, operations, problems, and possibilities of the sociology profession. S, F grading.
- 592 Special Topics in Sociology 3 May be repeated for credit; cumulative maximum 9 hours.
- 593 Special Topics in Sociology V 1-3 May be repeated for credit; cumulative maximum 6 hours. Special topics in sociology.
- 600 Special Projects or Independent Study Variable credit. S, F grading.
- 700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.
- 702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.
- 800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

## Soils

(See Crop and Soil Sciences)

## Department of Speech and Hearing Sciences

[www.speech-hrg.spokane.wsu.edu](http://www.speech-hrg.spokane.wsu.edu)

Degrees offered: **M.A.**

Faculty working with graduate students: **10**

Graduate students: **46**

Degree offered: **Spokane**

Tests required: **GRE; TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

## Admission Requirements

Applicants who do not have a major in speech and hearing sciences will be required to complete undergraduate prerequisite coursework before taking graduate classes. A minimum

3.0 (on a 4.0 scale) cumulative GPA for the last 60 semester credit hours or 90 quarter hours is required.

To apply, please submit: a graduate application; Letter of intent/introduction stating qualifications, personal goals, and objectives of graduate study; Official GRE scores; Official TOEFL or IELTS scores (international students only); Official copies of all college transcripts; three letters of recommendation.

### **Program Description**

The focus of this program is on speech-language pathologists who are capable of working in varied settings with various types of disorders and clients of all ages. Students have the opportunity to work with nationally prominent researchers and clinical educators.

Students gain practical experience working with those who have hearing, speech, language, or swallowing impairments in the campus hearing and speech clinic, public schools, birth-to-five preschool programs, hospitals, and skilled nursing facilities. Clients range from infants, toddlers, and preschoolers through adulthood.

The speech-language pathology program is accredited nationally by the Council on Academic Accreditation (CAA) and certified by the Washington State Board of Education.

### **Contact Information**

Douglas Stephens  
Washington State University Spokane  
PO Box 1495  
Spokane, WA 99210-1495  
Telephone: 509-358-7602  
Fax: 509-358-7600  
E-mail: [stephend@wsu.edu](mailto:stephend@wsu.edu)

### **Positions Held by Recent Graduates**

School districts in California, Washington, Idaho, Montana, Alaska, and Nevada; speech and hearing clinics in Washington; medical centers in California, Iowa, Canada, and Washington; rehabilitation clinics and hospitals in California, Oregon, Washington, and Arizona; Canadian Hearing Care; Center for Development and Disabilities at the University of Iowa Hospital, Iowa City, IA; Child Development Centre, Whitehorse, Yukon, Canada; Communicative Medical, Inc., Spokane, WA; Ear, Nose & Throat Associates of Spokane, WA; Mosaic Children's Clinic in Bellevue, WA; Muckleshoot Indian Tribe's birth to three program and early childhood services in Auburn, WA; National Center for Rehabilitation Audiology Research at the Veteran's Administration; NovaCare in Seattle, WA; Professional Speech & Counseling Services in San Diego, CA.

### **Faculty Interests**

**Sandy Bassett**, Speech-Language Pathology Coordinator and Clinical Supervisor: Infant and pediatric swallowing disorders, development dyspraxia, cleft lip and palate, and autism.

[sbassett@wsu.edu](mailto:sbassett@wsu.edu)

**Gail Chermak**, Chair, Fellow of the American Speech-Language-Hearing Association: Auditory processing disorders. [chermak@wsu.edu](mailto:chermak@wsu.edu)

**Jon Hasbrouck:** The evaluation of children and adults with auditory processing disorders, behavioral treatment programs for people with fluency disorders, and improving audiological outcomes for patients in short-term rehabilitation settings. *hasbrouck@wsu.edu*

**Ella Inglebret:** School-age and adolescent language science and disorders in multicultural populations; a member of the Augmentative and Alternative Communication (AAC) Research Group, using a multicultural perspective in investigating the factors leading to long-term success vs. inappropriate abandonment of AAC systems (no-tech, low-tech, and high-tech); Native American education issues. *einglebret@wsu.edu*

**Jeanne Johnson:** Augmentative and Alternative Communication (AAC) Research Group currently investigating the factors leading to long-term success vs. inappropriate abandonment of AAC systems (no-tech, low-tech, and high-tech) using a multicultural perspective; a general interest in child language development and disorders. *johnsjm@wsu.edu*

**Charles Madison:** Phonology and articulation, voice disorders, cleft palate, diagnostics, and professional issues; analysis of published research; shortage of doctoral level faculty in speech-language pathology and audiology; development of a Spanish version of the Kindergarten Language Screening Test (KLST); and a manual for management of and empowerment of children with cleft lip and palate. *madisonc@wsu.edu*

**Jeff Nye,** Audiology Coordinator and Clinical Supervisor: Advanced hearing aid technology, audiological assessment, and the supervision process. *nye@wsu.edu*

**Leslie Power,** Off-Campus Practicum Coordinator: Aphasia, dysphagia, and language learning disabilities. *power@wsu.edu*

**Mimi Salamat:** The role of auditory evoked potentials, especially event related potentials (P300) and psychophysical correlate measures, in the assessment of individuals with neurological, psychological, and cognitive disorders that involve the central auditory nervous system. *salamat@wsu.edu*

### **Speech and Hearing Sciences**

501 Research Methods I 3 Philosophy of research, types of literature; experimental and descriptive designs; application of statistics; analysis of statistical results.

503 Research Methods II 2 Experimental and descriptive designs, application of statistics, analysis of statistical results.

504 Advanced Anatomy, Neurology and Physiology of the Auditory and Vestibular Systems 3 Cochlear mechanics; auditory neuroscience; vestibular anatomy and neurophysiology; central nervous system interactions.

506 Instrumentation and Basic Electronics 3 Electricity; Ohm's Law; magnetism; circuits, impedance matching; transducers; amplifiers; oscillators; microprocessors; digital signal processing; instrumentation.

508 Pharmacology for Audiology and Other Health and Rehabilitation Sciences 3 Effects of medications on the peripheral and central auditory system and vestibular end organs; ototoxic and vestibulotoxic medications.

540 Special Topics in Speech and Hearing Sciences V 1-3 May be repeated for credit; cumulative maximum 9 hours. Advanced study of specialized topics in speech and hearing sciences.

542 Infant and Toddler Communication and Language 3 Prereq SHS 371. Typical development of communication and language in the birth to 5 year-old population; impairments affecting development; disorders; assessment; intervention.

543 School Age and Adolescent Language 3 Language development in typically developing and language impaired school age and adolescent students; disorder types; implications for assessment and intervention.

- 550 Special Topics in Speech and Hearing Sciences V 1-3 May be repeated for credit; cumulative maximum 9 hours. Study of specialized topics in speech and hearing sciences.
- 552 Advanced Audiological Rehabilitation 3 Prereq SHS 477. Practices and research in communication strategies training; speech and listening technology; exploration of current issues.
- 553 Counseling in Audiology and Other Health and Rehabilitation Sciences 3 Counseling theories, processes and skills; effective interviewing.
- 554 Advanced Rehabilitative Technology 3 Advanced technologies in aural rehabilitation; cochlear implants, vibrotactile aids, implantable hearing aids, FM systems and tinnitus maskers.
- 556 Problems in Stuttering 2. Historical and current literature; problem-solving strategies applied to theoretical and clinical problems in stuttering.
- 557 (573) Cleft Palate and Craniofacial Disorders 2 Prereq SHS 377. Speech and voice problems associated with clefts of the lip and palate.
- 560 Special Topics in Speech and Hearing Sciences V 1-3 May be repeated for credit; cumulative maximum 9 hours. Advanced study of specialized topics in speech and hearing sciences.
- 562 Motor Speech Disorders 2 Prereq SHS 377. Underlying processes of neuromuscular control and feedback; results of damage and disease on neuromotor system.
- 563 Dysphagia 3 Prereq SHS 377. Anatomy and physiology of swallowing; evaluation and treatment of swallowing disorders.
- 564 Language of Children with Hearing Impairment 3 Prereq SHS 371, 477. Speech production and speech perception abilities and language development and intervention strategies with the hearing impaired.
- 565 Augmentative Communication 3 Prereq SHS 478, 482. Augmentative communication theory; implementation, training strategies, ongoing adjustments, and evaluating effectiveness.
- 566 Off-Campus Clinical Practice V 2 (0-6)-6 (0-18) May be repeated for credit; cumulative maximum 15 hours. Prereq SHS 575. By interview only. Advanced clinical practice in off-campus setting; evaluation and treatment of speech, language, and hearing disorders.
- 567 Issues in Public School Service Delivery 3 Prereq c// in SHS 575. Clinical operations, policies, procedures; legal, ethical, and professional in schools.
- 570 Advanced Internship in Speech-Language Pathology and Audiology V 1-18 May be repeated for credit. Prereq SHS 471 or 525; 566 or 575. By interview only. Advanced practicum in diagnosis of and therapy for communication disorders. S, F grading.
- 571 Seminar in Speech Pathology and Audiology 3 May be repeated for credit; cumulative maximum 9 hours. Exploration of ideas derived from current writings and research in speech pathology and audiology.
- 572 Hearing Aids 3 Prereq SHS 472, 477. Hearing aid technology, evaluation and fitting; programmable hearing aids; probe microphone measurement; prescriptive techniques.
- 573 Hearing Aids II 3 Prereq SHS 572. Hearing aid evaluation, fitting and verification, prescriptive and probe microphone measurements, advanced/digital technology.
- 574 Neuropathologies of Language 3 prereq SHS 377, 478. Advanced study of language disorders resulting from brain insult after birth; emphasis on aphasia and related disorders.
- 575 Advanced Clinical Practice V 2 (0-6) to 6 (0-18) Prereq by interview only. May be repeated for credit; cumulative maximum 15 hours. Advanced clinical practice in evaluation and treatment of speech, language, and hearing disorders.
- 576 Voice Disorders 2 Prereq SHS 377. Functional and organic voice disorders resulting from various etiologies.
- 577 Auditory Perception 3 Prereq SHS 472, 477. Psychoacoustic and psychophysiologic bases of auditory perception relationship between language and auditory processing.
- 578 Professional Issues in Speech-Language Pathology and Audiology 3 May be repeated for

credit; cumulative maximum 9 hours. Contemporary philosophical and professional issues in the field of communication science and disorders.

580 Special Topics in Speech and Hearing Sciences V 1-3 May be repeated for credit; cumulative maximum 9 hours. Advanced study of specialized topics in speech and hearing sciences.

582 Clinical Perspectives 3 Theory and clinical experience designed to assist students in integrating course work into a clinical perspective.

584 Advanced Audiometric Procedures 3 Prereq SHS 472. Behavioral and physiological principles and procedures in audiology for the differential diagnosis of auditory pathologies.

585 Hearing Conservation in Industry and Society 3 Prereq SHS 472. Prevention and management of noise-induced hearing loss; interactions between noise and other ototraumatic agents and physical characteristics of the individual.

586 Pediatric Audiology 3 Prereq SHS 472. Developmental anatomy and physiology of the human auditory system; auditory behavior and pathologies in children; assessment of infants and children.

587 Speech-Language Pathology in the Medical Setting 2 Prereq SHS 574 and by interview only. Report writing and charting, collaborating with the medical team, establishing prognosis and assessing efficacy of treatment, and third-party reimbursement.

588 Phonological Acquisition and Behavior 3 Prereq SHS 376. Current literature in articulatory development and deviancy; diagnosis and therapy.

589 Advanced Audiometric Procedures II 3 Prereq SHS 584. Calibration, advanced masking, immittance measures, central auditory processing tests, speech recognition and tonal testing with special populations, sound-field considerations.

590 Special Topics in Speech and Hearing Sciences V 1-3 May be repeated for credit; cumulative maximum 9 hours. By interview only. Advanced study of specialized topics in speech and hearing sciences.

592 Vestibular Evaluation Management 3 Administration, interpretation and reporting of vestibular function tests; vestibular rehabilitation.

594 Medical Audiology 3 Otoaudiologic and neurologic considerations in differential diagnosis of auditory and vestibular disorders; audiologic test battery interpretation; medical intervention options.

596 Electrophysiological Procedures 3 Prereq SHS 472. Principles, protocols, and clinical applications of auditory evoked potentials.

597 Advanced Electrophysiology of the Auditory System 3 Principles, protocols and clinical applications of advanced evoked potentials and intraoperative monitoring.

600 Special Projects or Independent Study Variable credit. S, F grading.

700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.

702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.

800 Doctoral Research, Dissertation, and/or Examination Variable credit. S, F grading.

## Department of Statistics

[www.stat.wsu.edu](http://www.stat.wsu.edu)

Degree offered: **M.S.**

Faculty working with students: **12**

Graduate students: **27**

Students receiving assistantships or scholarships: **30%**

Tests required: **GRE; TOEFL or IELTS (international students only)**

Deadlines: **Fall — Jan 10**

## Spring — July 1

### Admission Requirements

Submit a letter of application stating qualifications, personal goals, and objectives of graduate study; three letters of reference; application for admission to the Graduate School; official GRE scores (official TOEFL or IELTS scores for international students); and official copies of all college transcripts.

Specific prerequisites include the following courses, or equivalent: Math 171, 172, and 273 (calculus I, II, and III); Math 220 (linear algebra); at least one 3-credit course in computer programming; and at least one undergraduate 3-credit course in statistical methods. We recommend that students take Math 401, 402 (analysis I and II), and Math 420 (linear algebra II), or equivalent.

### Program Description

Statistics is the science that deals with the collection, analysis, display, and interpretation of data. Graduate training in this degree program emphasizes the connection of statistics to its many fields of application, as well as the traditional connection to mathematics. Courses taken by degree candidates provide training in the application of statistical methods to the biological, physical, and social sciences, the theory of statistical methods, probability, and statistical computing. Many disciplines and sub-disciplines require extensive advanced training in statistics to do graduate research work. Students in agricultural economics, economics, decision sciences, and mathematics who want to receive advanced statistical training at the master's level, (which will better prepare them to do research in their primary doctoral degree-granting field), can simultaneously be enrolled in the statistics program and the program of their primary doctoral degree-granting unit. Opportunities for individuals trained in statistics abound in business, industry, government, and academia.

### Contact Information

Graduate Admissions Committee  
Department of Statistics  
413 Neill Hall, PO Box 643144  
Pullman, WA 99164-3144  
Telephone: 509-335-8645  
Fax: 509-335-8369  
E-mail: [statistics@wsu.edu](mailto:statistics@wsu.edu)

### Graduate Opportunities

State and federal government agencies; Community colleges; University faculty positions; Businesses and companies involved in pharmaceuticals, manufacturing, insurance, finance, consulting, service, and much more.

### Positions Held by Recent Graduates

Data analyst, Economic Forecasting Department, State of Washington; Associate professor, Washington State University; Instructor, Central Oregon Community College; Data analyst, U.S. Bank; Vice president, J.P. Morgan; Project director, American Express



## Faculty Interests

**Sung K. Ahn**, Department of Management Operations. Time series, econometrics, multivariate analysis, linear and nonlinear regression, and statistical computing.  
*ahn@wsu.edu*

**J. Richard Alldredge**, Department of Statistics. Environmental statistics, methods of resource selection analysis, statistics education, and biometry. *alldredg@wsu.edu*

**Robert B. Bendel**, ICN Spokane. Regression analysis, biostatistics, and data analysis.  
*bendel@wsu.edu*

**N. Scott Cardell**, School of Economic Sciences. Discrete choice/quantal response models, non-parametric methods, survival models, and selection bias models. *cardell@wsu.edu*

**Nairanjana Dasgupta**, Department of Statistics. Multiple comparisons, logistic regression, optimal designs, computational statistics, and resource allocation analysis.  
*dasgupta@wsu.edu*

**Marc A. Evans**, Department of Statistics. Theory and methods for analysis of discrete multivariate data, computer intensive methods, and statistical methods for ecology and wildlife management.  
*marcevan@wsu.edu*

**Stergios B. Fotopoulos**, Department of Management Operations. Theoretical and applied stochastic processes, applied probability and limit results for probability, and statistics under dependence structures. *fotopo@wsu.edu*

**Michael A. Jacroux**, Department of Statistics. Experimental design, optimal estimation in linear and nonlinear models, spatial data analysis, and quality control.  
*jacroux@wsu.edu*

**Venkata Krishna Jandhyala**, Department of Statistics. Change-point problems for statistical models and their applications, quality control, environmental monitoring, econometrics, and finance.  
*jandhyala@wsu.edu*

**Harry (Dean) Johnson**, Department of Statistics. Program evaluation, statistical consulting, and statistics education. *dean\_johnson@wsu.edu*

**Haijun Li**, Department of Mathematics. Reliability theory, queuing theory, stochastic comparison methods, stochastic processes, and multivariate distribution theory and stochastic dependence.  
*liklu@wsu.edu*

**Ron C. Mittelhammer**, School of Economic Sciences. Theoretical and applied econometrics, moment-based estimation and inference methods, and semiparametrics.  
*mittelha@wsu.edu*

**Jave Pascual**, Department of Mathematics. Statistical methods for analyzing reliability data, experimental design in life testing, and model-robust experimental designs.  
*jpascual@math.wsu.edu*

**David A. Sclar**, WSU Spokane Health Sciences. Applied econometrics, controlled clinical trials, epidemiology, and quality-of-life assessment. *dsclar@wsu.edu*

**Robert A. Short**, WSU Spokane Health Sciences. Measurement issues, time series, and longitudinal and hierarchical random regression modeling. *rshort@wsu.edu*

**R. Kirk Steinhorst**, Division of Statistics—University of Idaho. Linear models, multivariate analysis, and biometry. *K\_steinhorst@wsu.edu*

**Min-Chiang Wang**, Department of Management Operations. Statistical process control, total quality management, production inventory control, classification procedures, and time series.

*mcwang@wsu.edu*

**Hao Zhang**, Department of Statistics. Geostatistics, spatial data analysis, generalized linear models, statistical computing, Markov chain Monte Carlo methods, and limit theorems.

*zhanghao@wsu.edu*

## **Statistics**

### **Stat**

504 Special Topics 3 Prereq Stat 456. Cooperative course taught by UI (Stat 504), open to WSU students.

507 Experimental Design 3 Prereq Stat 512. Methods of constructing and analyzing designs for experimental investigations; analysis of designs with unequal subclass numbers; concepts of blocking randomization and replication; confounding in factorial experiments; incomplete block designs; response surface methodology. Cooperative course taught by UI (Stat 507), open to WSU students.

510 Topics in Probability and Statistics 3 Graduate-level counterpart of Stat 410; additional requirements. Credit not granted for both Stat 410 and 510.

511 Statistics for Economics Same as EconS 510.

512 Analysis of Variance of Designed Experiments 3 (2-2) Prereq Math 360 or Stat 412 or equivalent. Principles of experimental design and analysis and interpretation of data.

513 Advanced Econometric Application 3 Same as EconS 590.

514 Nonparametric Statistics 3 Prereq Stat 512. Conceptual development of basic nonparametric tests including their power and efficiency. Cooperative course taught by UI (Stat 514), open to WSU students.

516 Time Series 3 Same as DecS 516. Cooperative course taught by WSU, open to UI students (Stat 539).

518 Techniques in Sampling 3 Same as DecS 518.

519 Applied Multivariate Analysis 3 Same as DecS 519. Cooperative course taught jointly by WSU and UI (Stat 519).

520 Statistical Analysis of Qualitative Data 3 Prereq Math 140, 172 or 202; statistics course. Binomial, Poisson, multinomial distribution; contingency tables. Fisher's test, loglinear models; ordinal data; applications in biology, business, psychology and sociology. Credit not granted for both Stat 420 and 520. Cooperative course taught by WSU, open to UI students (Stat 520).

522 Biostatistics and Statistical Epidemiology 3 Prereq Math 171 or 220; Stat 412. Rigorous approach to biostatistical and epidemiological methods including relative risk, odds ratio, cross-over designs, survival analysis and generalized linear models. Cooperative course taught by WSU; open to UI students (Stat 522).

523 Statistical Methods for Engineers and Scientists 3 Prereq graduate standing. Graduate level counterpart of Stat 423; additional requirements. Credit not granted for both Stat 423 and 523.

530 Applied Linear Models 3 (2-2) Prereq Math 360 or Stat 412 or equivalent. The design and analysis of experiments by linear models.

531 Econometrics 3 Same as EconS 511. Cooperative course taught by WSU, open to UI students (Stat 531).

533 Theory of Linear Model 3 Prereq Stat 430 or 444; Math 420. Theoretical basis of linear regression and analysis of variance models; a unified approach based upon the generalized inverse. Cooperative course taught jointly by WSU and UI (Stat 575).

- 534 Analyses of Mixed Linear Models 3 Prereq Stat 430. Theory and applications of generalized linear mixed models, nonlinear mixed effects models and meta-analysis. Cooperative course taught by WSU; open to UI students (Stat 534).
- 535 Regression Analysis 3 Prereq Stat 444 or 430. Conceptual development of regression; estimation, prediction, tests of hypotheses, variable selection, diagnostics, model validation, correlation and nonlinear regression. Cooperative course taught jointly by WSU and UI (Stat 550)
- 536 Statistical Computing 3 (2-3) Prereq Stat 443 and 530, or Stat 523, or with instructor's permission. Generation of random variables, monte carlo simulation, bootstrap and jackknife methods, EM algorithm, markov chain monte carlo methods. Cooperative course taught jointly by WSU and UI (Stat 565).
- 542 Applied Stochastic Models 3 Same as DecS 542.
- 544 Applied Stochastic Processes 3 Prereq Stat 430 or 443. Poisson and Markov processes; queuing theory; auto-covariance; stationarity; power spectra; harmonic analysis; linear mean-square predictions. Cooperative course taught jointly by WSU and UI (Stat 544).
- 548 Statistical Theory I 3 Prereq Math 273; Stat 430 or 443. Probability spaces, combinatorics, multidimensional random variables, characteristic function, special distributions, limit theorems, stochastic processes, order statistics. Cooperative course taught by WSU, open to UI students (Stat 548).
- 549 Statistical Theory II 3 Prereq Stat 548. Continuation of Stat 548. Statistical inferences; estimation and testing hypotheses; regression analysis; sequential analysis and nonparametric methods. Cooperative course taught by WSU, open to UI students (Stat 549).
- 552 Advanced Econometrics 3 Same as AgEc 512.
- 553 Econometrics III 3 Prereq EconS 502; EconS 503; EconS 512. Same as EconS 513.
- 554 Econometrics IV 3 Prereq EconS 502; EconS 503; EconS 513. Same as EconS 514.
- 555 Statistical Ecology 3 Prereq Stat 443. Ecological stochastic models, population dynamics and genetics, sampling, spatial analysis, discrete/continuous distributions, birth-death processes, diffusion processes. (a/y) Cooperative course taught by UI (Stat and WLF 555), open to WSU students.
- 556 Introduction to Statistical Theory 3 Prereq graduate standing. Graduate level counterpart of Stat 456; additional requirements. Credit not granted for both Stat 456 and 556.
- 565 Analyzing Microarray and Other Genomic Data 3 Prereq Math 220; Stat 412 or 423. Statistical issues from pre-processing (transforming, normalizing) and analyzing genomic data (differential expression, pattern discovery and predictions). Cooperative course taught by WSU; open to UI students (Stat 560).
- 572 Quality Control 3 Prereq Stat/Math 360 or 443. Simple quality assurance tools; process monitoring; Shewhart control charts; process characterization and capability; sampling inspection; factorial experiments.
- 573 Reliability 3 Prereq Stat 443. Probabilistic modeling and inference; product-limit estimator; probability plotting; maximum likelihood estimation with censored data; regression models for accelerated life testing. Cooperative course taught jointly by WSU and UI (Stat 571).
- 586 Applied Multiple Time Series Analysis 3 Same as DecS 586.
- 590 Statistical Consulting Practicum 1 or 2 Prereq three courses in statistics, including one methods course or by interview only. Theory and practice of statistical consulting; participation in consulting sessions.
- 600 Special Projects or Independent Study. Variable credit. S, F grading.
- 700 Master's Research, Thesis, and/or Examination Variable credit. S, F grading.
- 702 Master's Special Problems, Directed Study, and/or Examination Variable credit. S, F grading.

## Teaching and Learning

(See Education)

## Theatre Arts and Drama

(See Music and Theatre Arts)

## College of Veterinary Medicine Department of Veterinary Clinical Sciences

[www.vetmed.wsu.edu/depts-vcs/](http://www.vetmed.wsu.edu/depts-vcs/)

Degree offered: **M.S., Ph.D. in Veterinary Science; residency training in clinical veterinary sciences and non-resident graduate program**

Faculty working with students: **48**

Students: **23**

Students receiving assistantships or scholarships: **100%**

Priority deadline: **Fall-January 10**

**Spring-July 1**

Tests required: **GRE; TOEFL or IELTS (international students only)**

### Admission Requirements

Applicants for admission to the Veterinary Clinical Sciences programs must have a minimum grade point average of 3.0 (on a 4.0 scale). Graduate programs are usually combined with clinical training programs. Internship and residency training programs are filled through the Veterinary Intern and Residency Matching Program of the American Association of Veterinary Clinicians. A Non-resident (DVM) graduate program is available with department approval.

### Program Description

The Department of Veterinary Clinical Sciences has a graduate program leading to an M.S. and Ph.D. degrees with emphasis in several areas: anesthesia, radiology, small animal surgery, small animal internal medicine, small animal neurology, cardiology, oncology, equine surgery, equine medicine, clinical pathology, theriogenology, and agricultural animal.

The Residency/Master of Science is a 3-year program including clinical training to satisfy various specialty board requirements. Ph.D. may be completed in 3 years, but a 5-year study plan is the recommended program. This program will meet the requirements of most specialty boards.

Non-Resident (DVM) Graduate Students may follow a program with the same objectives as the Resident, or a more research-oriented plan. These options are subject to the student's graduate committee approval. The successful candidate should be expert in a specialized area of veterinary clinical science. A portion of the requirements for specialty boards may be included in the program.

Students who are not Residents, but rather are interested in pursuing graduate studies leading to the master's or doctoral degree, must apply to the Graduate School at the University for the degree to which they intend to pursue. A faculty advisor or sponsor must be included in the student's

application. Following admission, the student must register with the Resident and Graduate Student Training Committee.

### **Contact Information**

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Veterinary Clinical Sciences  
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Fax: 509-335-0880  
E-mail: [tpfaff@vetmed.wsu.edu](mailto:tpfaff@vetmed.wsu.edu)

## **Department of Veterinary and Comparative Anatomy, Pharmacology, and Physiology (VCAPP) Neuroscience**

[www.vetmed.wsu.edu/depts-vcapp/graduate](http://www.vetmed.wsu.edu/depts-vcapp/graduate)

Degree offered **M.S., Ph.D. in Neuroscience or Veterinary Science**

Faculty working with students: **27**

Students: **27**

Students receiving assistantships or scholarships: **100%**

Priority deadline: **Fall - December 31**

Test required: **GRE; TOEFL or IELTS (international students only)**

### **Admission Requirements**

Applicants for admission to the neuroscience program must have a minimum grade point average (GPA) of 3.0 (on a 4.0 scale), either on the basis of the last 60 graded semester or 90 graded quarter hours of undergraduate study, or on the basic science portion (first 60 credit hours) of a professional curriculum.

Applicants generally will be expected to have completed courses in organic chemistry, calculus, physics, and a minimum of three courses in different areas of the biological sciences.

Applicants are advised to have a basic statistics course prior to entering the neuroscience or veterinary science programs.

Deficiencies in any of these areas must be cleared during the period of graduate study before the preliminary exam.

### **Program Description**

Innovation by WSU scientists advances the world's understanding of how nerve cells in the brain produce our feelings and behaviors and how disturbances in the delicate organization of the brain lead to poor health. These neuroscientists seek answers to questions that touch on every aspect of life, including feeling, eating, sleeping, remembering, sensing, and maintaining health. The brain's intricate web of billions of cells is flexibly inter-linked. This plasticity allows connections to be changed in response to the environment; in some brain areas fifty percent of the connections change daily. This

complex dynamic network generates emotion, motivation, sleep, and memory. How these parts of our selves emerge from the flexible interactions among brain areas is one of the most intriguing, fundamental questions of life. Better understanding of this complexity is the key to reducing the societal impact of obesity, memory loss, mental illness, and drug addiction, and to enhancing performance and health.

The M.S. program is designed to provide broad training in the specific aspects of neuroscience and related disciplines to prepare students for careers in teaching, research, and service.

The objectives for the Ph.D. level training are to prepare the candidate for a career as an independent investigator (i.e., competition for NIH, NSF and private foundation grants as the principal investigator).

### **Contact Information**

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McCoy Hall 110  
PO Box 646520  
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Telephone: 509-335-7675  
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E-mail: grad.neuro@wsu.edu

## **Veterinary and Comparative Anatomy, Pharmacology, and Physiology**

[www.vetmed.wsu.edu/depts-vcapp/](http://www.vetmed.wsu.edu/depts-vcapp/)

Degree offered **M.S., Ph.D. in Veterinary Science Anatomy and Physiology**

Faculty working with students: **27**

Students: **3**

Students receiving assistantships or scholarships: **100%**

Priority deadline: **Fall - December 31**

Tests required: **GRE; TOEFL or IELTS (international students only)**

### **Admission Requirements**

Applicants for admission to the veterinary science program must have a minimum grade point average of 3.0 (on a 4.0 scale), either on the basis of the last 60 graded semester or 90 graded quarter hours of undergraduate study, or on the basic science portion (first 60 credit hours) of a masters degree program or professional degree curriculum.

Applicants generally will be expected to have completed courses in organic chemistry and biochemistry, calculus, physics, and a minimum of three courses in different areas of the biological sciences.

Applicants are advised to have a basic statistics course prior to entering the veterinary science program.

Deficiencies in any of these areas must be cleared during the period of graduate study before the preliminary exam or by the fifth semester in the program.

## **Program Description**

The MS and PhD programs are designed to provide broad training in the specific aspects of veterinary science and related disciplines to prepare students for careers in teaching, research, and service. The degree is a research oriented program emphasizing the acquisition of theoretical understanding of veterinary science and research skills in preparation for a career in teaching and research. The veterinary science degree allows for maximum flexibility within the curriculum. Students design their degree in consultation with a faculty mentor, emphasizing the specialty fields of anatomy, pharmacology or physiology.

The objectives for the Ph.D. level training are to prepare the candidate for a career as an independent investigator (i.e., can compete for federal funds such as NIH and NSF and private foundation grants as the principal investigator).

## **Contact Information**

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## **Department of Veterinary Microbiology and Pathology**

### **Veterinary Microbiology and Pathology (Immunology and Pathology) (Immunology and Infectious Disease)**

[www.vetmed.wsu.edu/depts-vmp](http://www.vetmed.wsu.edu/depts-vmp)

Degree Offered: **M.S. and Ph.D.**

Faculty working with students: **38**

Students: **42**

Students receiving assistantships or scholarships: **75%**

Priority deadline: **Fall – January 10**

**Spring – July 1**

Tests required: **TOEFL or IELTS (international students only)**

## **Admission Requirements**

Applications must include, graduate school forms, official transcripts of all college work, a statement describing career goals and research interests, and three letters of recommendation.

## **Program Description**

The Department of Veterinary Microbiology and Pathology has a strong and rigorous graduate program leading to MS and PhD degrees with emphasis on infectious diseases in the disciplines of microbiology, pathology, immunology, virology, bacteriology, and parasitology. Our graduate program is constructed utilizing an integrated approach which produces independent investigators who are highly competitive in their chosen fields of biomedical research.

The first component involves course work designed to provide students an in-depth knowledge of mechanisms of disease, immunology, biochemistry and molecular biology, disease agent biology, and most importantly, a solid framework from which to perform hypothesis-directed research. The second component is the research proposal and project. We do not use the conventional comprehensive written and oral preliminary examinations. PhD students develop a research proposal under the direction of a faculty advisor and committee. A preliminary oral examination tests each student on the rationale and specifics of their research proposal. The final exam is an oral defense of the dissertation.

### **Contact Information**

Douglas R. Call, Ph.D. & Guy H. Palmer, DVM, Ph.D.  
Veterinary Microbiology and Pathology  
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Pullman, WA 99164-7040  
e-mail: [infectious.diseases@wsu.edu](mailto:infectious.diseases@wsu.edu)

## **Veterinary Microbiology and Pathology (Anatomic Pathology)**

[www.vetmed.wsu.edu/depts-vmv](http://www.vetmed.wsu.edu/depts-vmv)

Degree offered: **Ph.D. with residency training in anatomic pathology leading to eligibility for ACVP certification**

Faculty working with students: **8 (pathology); 20 (research)**

Students: **14**

Students receiving assistantships or scholarships: **80%**

Priority deadline: **Rolling Application Process**

Tests required: **TOEFL or IELTS (international students only)**

### **Admission Requirements**

Applicants must hold the DVM or equivalent and must be U.S. citizens or permanent residents (green card status). Application should include veterinary college transcripts, curriculum vitae, statement of professional goals and names of three references.

### **Program Description**

The Department's research and training programs are focused in the immunology, epidemiology and host-pathogen interactions at the molecular level of bacterial, parasitic, and viral infections of animals and humans. Trainees develop a strong background through coursework in biochemistry, bioinformatics, cell biology, disease pathogenesis, immunology, molecular genetics, and statistics. Dissertation research is carried out under the direction of a highly collaborative research faculty internationally recognized for infectious disease research and who are experienced in mentoring trainees within state-of-the-art laboratories funded by NIH, USDA, Grayson Foundation, Morris Animal Foundation, The Wellcome Trust, and additional international, federal, state, regional, and private institutions, individuals, and organizations. This academic research environment is enriched by integration with the Washington State University Animal Health Research Center, the USDA-ARS Animal Disease Research Unit, and the WSU Center for Integrated Biotechnology.



The residency training occurs within the Washington Animal Disease Diagnostic Laboratory (WADDL), which has 3 primary facilities: a primary full service laboratory in Pullman, an Aquatic Health laboratory in Pullman and an Avian Health and Food Safety Laboratory branch in Puyallup. WADDL is one of 12 founding members of the National Animal Health Laboratory Network and one of the 9 veterinary diagnostic laboratories that serve as a reference lab in the Laboratory Response Network for Bioterrorism (funded through the Centers for Disease Control). Residents develop a strong background in all aspects of laboratory medicine, including detection and diagnosis of emerging and zoonotic pathogens.

### **Contact Information**

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### **Veterinary Microbiology and Pathology (Clinical)**

[www.vetmed.wsu.edu/depts-vmp](http://www.vetmed.wsu.edu/depts-vmp)

Degree offered: **M.S., Ph.D.; residency training in clinical microbiology**

Faculty working with students: **5 (clinical microbiology); 23(research)**

Students: **16**

Students receiving assistantships or scholarships: **80%**

Priority deadline: **Rolling Application Process**

Tests required: **TOEFL or IELTS (international students only)**

### **Admission Requirements**

Applicants must hold the DVM or equivalent and must be U.S. citizens or permanent residents (green card status). Application should include veterinary college transcripts, curriculum vitae, statement of professional goals and names of three references.

### **Program Description**

The Department's research and training programs are focused in the immunology, epidemiology and host-pathogen interactions at the molecular level of bacterial, parasitic, and viral infections of animals and humans. Trainees develop a strong background through coursework in biochemistry, bioinformatics, cell biology, disease pathogenesis, immunology, molecular genetics, and statistics. Dissertation research is carried out under the direction of a highly collaborative research faculty internationally recognized for infectious disease research and who are experienced in mentoring trainees within state-of-the-art laboratories funded by NIH, USDA, Grayson Foundation, Morris Animal Foundation, The Wellcome Trust, and additional international, federal, state, regional, private institutions, individuals, and organizations. This academic research environment is enriched by integration with the Washington State University Animal Health Research Center, the USDA-ARS Animal Disease Research Unit, and the WSU Center for Integrated Biotechnology.

The residency training occurs within the Washington Animal Disease Diagnostic Laboratory (WADDL), which has 3 primary facilities, a primary full service laboratory in Pullman, an Aquatic Health laboratory in Pullman and an Avian Health and Food Safety Laboratory branch in Puyallup. WADDL is one of 22 founding members of the National Animal Health Laboratory Network and one of the 9 veterinary diagnostic laboratories that serve as a reference lab in the Laboratory Response Network for Bioterrorism. Specialized sections in aquaculture, bacteriology, molecular diagnostics, parasitology, serology, and virology ensures that residents develop a strong background in all aspects of clinical microbiology, including detection and diagnosis of emerging and zoonotic pathogens.

#### **Contact Information**

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#### **Degrees Granted: Master of Science in Veterinary Science; Doctor of Philosophy**

Veterinary science is the field of graduate study offered by the College of Veterinary Medicine. Graduate programs leading to the degree Master of Science and Doctor of Philosophy are available. Students may elect to specialize in areas of anatomy, physiology, pharmacology, toxicology, microbiology, pathology, immunology, and clinical medicine. Combinations of these areas can be developed. The Master of Science program is designed to provide broad training in the specific aspects of the veterinary sciences and related disciplines in order to prepare students for careers in teaching, research, and service. A supporting area outside of veterinary medicine may be selected.

The master's thesis program must consist of not less than 30 hours of credit including a master's research thesis and/or examination and a minimum of 21 hours of course work, including seminars numbered 500 or above which are graded other than P/F or S/F. A minimum of 11 hours of 400- and 500-level courses must be included in the program. All courses utilized must have been approved for graduate credit.

Programs leading to the degree of Doctor of Philosophy are designed to provide intensive study toward a career in biomedical research, research on animal diseases, or research and teaching in these areas. One or more minor fields may be selected outside the area of veterinary medicine. Considerable specialization in some field of veterinary science is encouraged.

The minimum number of credits required in the PhD research, thesis and/or examination, special projects and problems, allowed transfer credit and supporting courses. The number of 300-series courses which may be included in the additional studies is limited to 12 hours.

The College of Veterinary Medicine has facilities for rearing, maintenance and experimental manipulation of a variety of animal species. These include diseased animals from the field or animals reared within breeding colonies maintained by the College. Students may be exposed to a variety of diagnostic, research or teaching experiences. The varied activities available include basic and applied research, case exposure and diagnostic problems, formal course work in various disciplines, ongoing seminars, and guest speaker programs. The physical facilities and equipment available encompass a

large scope of diverse activities found in most biomedical complexes. Post-DVM students may select training for board certification in conjunction with formal degree program.

The College of Veterinary Medicine houses a branch library with subscriptions to more than 600 journals. Major journals in associated fields can be found in the University Library.

Students who contemplate graduate study in veterinary science at Washington State University must meet the entrance requirements of the Graduate School and have the degree of Doctor of Veterinary Medicine or the Bachelor of Arts or the Bachelor of Science in allied fields. For students without the degree of Doctor of Veterinary Medicine, graduate study is available only in the preclinical fields. Each applicant for admission is required to submit a statement of goals and objectives; the Graduate Record Examination is required of those applicants who are not graduates of AVMA-accredited Colleges of Veterinary Medicine.

The undergraduate preparation must include two semesters of organic chemistry or one semester of organic and one semester of physiological chemistry; one year of general physics or one semester of physics and one semester of college algebra; one semester of comprehensive and vertebrate anatomy and one semester of general or comparative physiology. Graduation from an accredited veterinary college with sufficiently high grades meets the minimal requirements of Post-DVM's. Admission to graduate work in the College depends upon the applicant's previous scholastic record, availability of graduate student positions, the needs of the individual applicant, and the ability of the College to supply the type of training desired. Special program requirements have been established which may require the student to participate in teaching and seminars in addition to specific course requirements. A first level examination may be required also. All of the recent graduates have either continued their graduate training or are employed in industry, government, research, or teaching.

### **Veterinary Medicine**

V M

520 Veterinary Physiology 5 Prereq V M 519. Physiology of domestic animals. Cooperative course taught by WSU, open to UI students (VS 518).

521 Mammalian Neuroscience 3 (2-3) V M 510 Neuroanatomical and neurophysiological bases of veterinary neurology, emphasizing central and peripheral sensory and motor systems.

534 Veterinary Immunology 3 (2-3) Prereq major in Vet Med or graduate student in Vet S. Immunology for the professional veterinary student. S. F. grading.

535 Veterinary Virology 3 Prereq major in Vet Med or graduate student in Vet S. Virology for the professional veterinary student.

545 Pathology I 3 (2-3) Prereq V M 520. Structural and functional alterations in disease; elementary oncology designed for veterinary students who need the writing in the major requirement for the BS degree. Cooperative course taught by WSU, open to UI students (VS 445).

546 Pathology II 6 (5-3) Prereq V M 545. Principles of system and organ response to injury, and the effects of injury/disease on the animal host.

586 Analytic Epidemiology 2 (1-3) Prereq statistics course. Problem-solving methods related to health events and other occurrence phenomena.

## **Department of Veterinary and Comparative Anatomy, Pharmacology, and Physiology**

*Professor and Chair, B. Slinker; Professor and Associate Chair, S. Simasko; Professors, K. Campbell, H. Granzier, J. Harding, J. Krueger, K. M. Ratzlaff, R. Ritter, W. Ritter, S. Simasko, B. Sorg, C. Zamora; Associate Professors, G. Burns, Newberry, C. Ulibarri; Assistant Professors, M. Chandra, H. Jansen, D. Lin, D. Rector, D. Schneider, L. Sprunger, M. Varnum, A. Vasavada; Clinical Assistant Professors, B. Gillespie, S. Lampa, P. Wilson.*

### **Veterinary Anatomy**

V An

513 Advanced Neuroanatomy 4 Prereq anatomy or physiology course that includes neuroanatomy. Advanced gross and microscopic anatomy of the mammalian central nervous system. Cooperative course taught by WSU, open to UI students (Zool 513).

592 Seminar 1 May be repeated for credit. Cooperative course taught by WSU, open to UI students (VS 592).

600 Special Projects or Independent Study Variable credit. S, F grading.

700 Master's Research, Thesis, and/or Examination Variable credit. (For MS in veterinary science only.) S, F grading.

800 Doctoral Research, Dissertation, and/or Examination Variable credit. ( For PhD in veterinary science only.) S, F grading.

### **Veterinary Physiology and Pharmacology**

V Ph

505 Design and Analysis of Biomedical Experiments 4 Prereq Math 107, statistics course. Design of experiments with application to clinical and basic biomedical research; choosing, applying, and evaluating appropriate data analysis methods.

529 Integrative Neuroscience 3 Prereq biochemistry course. Same as Neuro 529.

531 Neuroscience Laboratory Rotation 1 (0-3) Prereq graduate standing. Same as Neuro 531. S/F grading.

542 Biochemistry 3 Prereq Chem 342. Intermediate biochemistry; introduction to metabolism and the chemical and physical properties of biomolecules. Cooperative course taught by UI (MMBB 542), open to WSU students.

555 General and Cellular Physiology 4 (3-3) Prereq cell physiology or genetics course. Physiochemical mechanisms of cellular functions.

557 Advanced Mammalian Physiology 4 Prereq V Ph 555. Function and control of mammalian organ systems.

590 Seminar 1 Same as Neuro 590. S/F grading.

592 Research Seminar 2 Same as Neuro 592.600 Special Projects or Independent Study Variable credit. S, F grading.

700 Master's Research, Thesis, and/or Examination Variable credit. (For MS in veterinary science only.) S, F grading.

800 Doctoral Research, Dissertation, and/or Examination Variable credit. (For PhD in veterinary science only.) S, F grading.

## **Department of Veterinary Clinical Sciences**

*Professor and Chair, R. DeBowes; Professors, R. Bagley, W. Bayly, J. F. Evermann, L. Fox, P. Gavin, D. Hancock, S. Parish, R. Schneider, D. C. Sellon, E. Stauber; Associate Professors, D. Barbee, C. Dhein, J. Gay, S. Greene, M. Hines, R. Keegan, J. Lincoln, S. Martinez, K. Mealey, M. Memon, C. Ragle, H. Rogers, R. Sellon, A. Tibary, R. Tucker, K. Wardrop; Assistant Professors, G. Barrington, A. Bohn, B. Campbell, J. Fidel, K. Farnsworth, L. Martin, M. Mickas, O. Nelson, P. Pryor; Clinical Assistant Professors, M. McEwen; Instructors, R. Farnsworth, N. Finch, B. Fransson, T. Schneider, T. Swor.*

## **Veterinary Clinical Medicine and Surgery**

### **V MS**

574 Cardiology Special Topics 1 May be repeated for credit; cumulative maximum 6 hours. Prereq DVM or graduate standing. Clinical cardiology topics and special problems; current medical or interventional information.

575 Equine House Officer Rounds 1 May be repeated for credit; cumulative maximum 6 hours. Prereq DVM or graduate standing. Weekly small group discussion of problems in equine medicine, surgery or reproductive medicine using current or recent case material from the Veterinary Teaching Hospital.

576 Introduction to Veterinary Clinical Research 2 Prereq DVM or graduate standing. Designing, executing, analyzing and reporting clinical research fundamental to practicing evidence-based medicine.

577 Applied Veterinary Physiology I 2 Prereq DVM. Review of physiology as it relates to clinical veterinary medicine and specific diseases of animals through analysis of recent medical literature.

578 Applied Veterinary Physiology II 2 Prereq V MS 577; DVM. Continuation of V MS 577.

579 Oncology Rounds Seminar 1 Prereq DVM degree. Presentation and discussion of veterinary oncology cases include imaging, pathology, clinical pathology, appropriate diagnostic steps, therapy options and potential outcomes. S/F grading.

580 Advanced Clinical Pathology 1 May be repeated for credit; cumulative maximum 6 hours. Prereq DVM or graduate standing. Weekly small group discussion of laboratory and cytologic abnormalities in recent cases from the Veterinary Teaching Hospital.

582 Seminar in Clinical Medicine 1 May be repeated for credit.

583 Advanced Anesthesiology 2 Prereq DVM degree. Advanced veterinary anesthesiology as applied to clinical practice.

584 Comparative Theriogenology 1 Prereq DVM degree. Lectures from WSU College of Veterinary Medicine and Department of Animal Sciences and from UI Department of Animal and Veterinary Science.

585 Selected Topics in Advanced Clinical Neurology 1 or 2 Prereq DVM degree. May be repeated for credit; cumulative maximum 10 hours. Advanced veterinary neurology as applied to clinical practice.

- 586 Diagnostic Ultrasound 2 Prereq DMV or graduate standing. Diagnostic ultrasound and its application to clinical medicine in large and small animals.
- 587 Hospital Rotation 3 (0-9) May be repeated for credit; cumulative maximum 6 hours. Prereq DVM degree. Supervised practical experience in all service areas of the veterinary hospital. Cooperative course taught by WSU, open to UI students (VS 587).
- 589 Advanced Clinical Veterinary Medicine V 1-3 May be repeated for credit; cumulative maximum 6 hours. Prereq DVM degree. Special topics.
- 590 Special Topics in Equine Medicine 1 May be repeated for credit; cumulative maximum 6 hours. Prereq DVM or graduate standing. Weekly small group discussion of problems in equine medicine, surgery or reproductive medicine using current or recent case material from the Veterinary Teaching Hospital.
- 591 Advanced Clinical Diagnosis V 1-3 May be repeated for credit; cumulative maximum 6 hours. Prereq DVM degree. Advanced course in systems clinical and laboratory examination.
- 592 Seminar 1 May be repeated for credit. Cooperative course taught by WSU, open to UI students (VS 592). S, F grading.
- 593 Anesthesia Seminar 1 Prereq DMV degree or equivalent. Critical review of current topics in veterinary anesthesia.
- 594 Advanced Small Animal Surgery 3 (2-3) May be repeated for credit; cumulative maximum 6 hours. Prereq DVM Degree. Clinical experimental techniques.
- 595 Advanced Laboratory Diagnosis V 1-3 May be repeated for credit; cumulative maximum 6 hours. Prereq DVM degree. Advanced clinical laboratory diagnosis and interpretation.
- 596 Advanced Radiology 2 (1-3) Prereq DVM degree. Advanced study in the field of veterinary radiology and radiation treatment.
- 597 Diagnosis and Treatment of Surgically Correctable Soft Tissue Diseases in Small Animals V 1-2 May be repeated for credit; cumulative maximum 6 hours. Prereq DVM or equivalent or preapproval. Review of recent advances in diagnosis and treatment of diseases in the field of small animal surgery.
- 598 Surgery Residents Seminar 1 Prereq DVM degree. May be repeated for credit. Surgery residents' and interns' presentations of case reports, literature reviews and research. S, F grading.
- 600 Special Projects or Independent Study Variable credit. S, F grading.
- 700 Master's Research, Thesis, and/or Examination Variable credit. (For MS in veterinary science only.) S, F grading.
- 800 Doctoral Research, Dissertation, and/or Examination Variable credit. (For PhD in veterinary science only.) S, F grading.

## **Veterinary Microbiology and Pathology**

[www.vetmed.wsu.edu/depts-vmp/vmp.htm](http://www.vetmed.wsu.edu/depts-vmp/vmp.htm)

Degrees offered: **M.S. and Ph.D.**

Faculty working with graduate students: **26**

Graduate students: **24**

Students receiving assistantships or scholarships: **90%**

Tests required: **TOEFL or IELTS (international students only)**

Deadline: **Fall—January 10**

**Spring—July 1**

## **Requirements**

Applications must include graduate school forms, official transcripts of all college work, a statement describing career goals and research interests, and three letters of recommendation.

## **Program Description**

The Department of Veterinary Microbiology and Pathology has a graduate program leading to M.S. and Ph.D. degrees with emphasis in microbiology, pathology, immunology, virology, bacteriology, and parasitology. Our graduate program involves an integrated approach which produces independent investigators who are highly competitive in their respective fields of biomedical research. The first component involves course work designed to provide students an in-depth knowledge of mechanisms of disease, immunology, biochemistry and molecular biology, disease agent biology, and most importantly, a solid framework from which to perform hypothesis-directed research. The second component is the research proposal. We do not use conventional comprehensive written and oral preliminary examinations. Ph.D. students develop a research proposal under the direction of a faculty advisor and committee. A preliminary oral examination tests students on the rationale and specifics of the research proposal. The final exam is an oral defense of the dissertation.

## **Collaborative Units**

Faculty hold dual appointments in the Center for Integrated Biotechnology and in the Center for Reproductive Biology. The USDA-ARS-Animal Disease Research Unit and the Washington Animal Disease Diagnostic Laboratory are co-housed with the department and fully collaborative.

## **Graduate Opportunities**

Graduates of the Department of Veterinary Microbiology and Pathology program are prepared for careers in teaching, research, or public service. Employers of program graduates include colleges and universities, private industry, and governmental agencies. Graduates are active in clinical and laboratory research and in teaching professional and graduate students in health sciences.

### **Positions Held by Recent Graduates**

Principal scientist, Pfizer Global Research and Development; scientist, Genentech, San Francisco, CA; faculty position in Department of Pathobiology at University of Florida; veterinary pathologist, Battelle Laboratories; veterinary pathologist, Veterinary Diagnostic Laboratory, Albuquerque, NM

## **Contact Information**

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## Faculty Interests

**Timothy V. Baszler:** Immunology of neosporosis; improved diagnosis of infectious diseases in domestic animals; disease mechanisms of transmissible spongiform encephalopathies.

*baszlert@vetmed.wsu.edu*

**Thomas E. Besser:** Food safety microbiology; E. coli O157:H7; neonatal enteric disease.

*tbesser@vetmed.wsu.edu*

**Kelly A. Brayton:** Microbial genomics and mechanisms of antigenic variation of vector-borne pathogens. *kbrayton@vetmed.wsu.edu*

**Shira L. Broschat:** Analysis of microarrays; biofilm; gene expression modeling; foodborne bacteria.

*shira@eecs.wsu.edu*

**Wendy C. Brown:** Cellular and molecular mechanisms of immunity to infectious diseases; strategies to develop vaccines that induce protective T-cell dependent immunity; comparative analysis of cellular immune responses and immunomodulatory cytokines of domestic animals.

*wbrown@vetmed.wsu.edu*

**Douglas R. Call:** Evolutionary ecology of antibiotic resistance, detection and characterization of food-borne pathogens; and development and application of microarrays for genotyping and expression analyses. *drcall@vetmed.wsu.edu*

**Susan Carpenter:** Virology, lentivirus interactions with their hosts.

**Chris Davies:** Structure and function of the major histocompatibility complex; genetic basis of disease susceptibility; reproductive immunology. *cdavies@vetmed.wsu.edu*

**William C. Davis:** Comparative analysis of the immune systems in food and companion animals; the role of cytokines in regulation of the immune response to pathogens and derived subunit vaccines; genetic basis of disease susceptibility. *davisw@vetmed.wsu.edu*

**A. Singh Dhillon:** Salmonella; infectious laryngotracheitis virus, Newcastle disease virus.

*asdhillon@vetmed.wsu.edu*

**William J. Foreyt:** Veterinary and wildlife parasitology; epizootiology; parasitic and disease interactions among domestic livestock, wildlife, and humans. *wforeyt@vetmed.wsu.edu*

**Stephen A. Hines:** Neonatal and pulmonary immunology; equine infectious disease and immunology; *Rhodococcus equi* infection. *shines@vetmed.wsu.edu*

**Douglas P. Jasmer:** Molecular parasitology, host-parasite interactions; nematode parasites.

*djasmer@vetmed.wsu.edu*

**Donald P. Knowles:** Virology; immunology and host-parasite interactions.

*dknowles@vetmed.wsu.edu*

**Charles W. Leathers:** Laboratory animal pathology, diagnostic applications of electron microscopy.

*leathers@vetmed.wsu.edu*

**Hong Li:** Virology, epidemiology, pathogenesis and immunologic control of ruminant gammaherpesviruses, the causative agents of malignant catarrhal fever in cattle, bison, and wild ruminants. *hli@vetmed.wsu.edu*

**Terry F. McElwain:** Molecular basis of host-parasite interaction and development of protective immunity in vector-borne diseases. *tfm@vetmed.wsu.edu*

**Robert M. Mealey:** Equine infectious disease and immunology, mechanisms of immune control of lentiviruses, vaccine strategies to induce protective T lymphocyte responses in horses.

*rhm@vetmed.wsu.edu*



**J. Lindsay Oaks:** Pathogenesis of viral infections and mechanisms of viral persistence; subclinical equine infectious anemia virus infection and the in vivo and cellular mechanisms that down regulate viral replication and allow avoidance of immunologic detection; infectious diseases of raptors.  
*loaks@vetmed.wsu.edu*

**Guy H. Palmer:** Molecular basis of transmission and development of protective immunity in vector-borne diseases. *gpalmer@vetmed.wsu.edu*

**Kathleen A. Potter:** Eosinophil biology and function, bovine Marfan syndrome.  
*kpotter@vetmed.wsu.edu*

**David J. Prieur,** Chair: Animal models of human genetic diseases; inherited diseases of animals.  
*dprieur@vetmed.wsu.edu*

**Fred R. Rurangirwa:** Molecular basis of immunity; diagnosis and vaccine development against infectious diseases of domestic ruminants; rickettsia-vector interaction. *ruvuna@vetmed.wsu.edu*

**Kevin R. Snekvik:** Comparison of pathogen induced immune responses in aquatic animals to those within mammalian species; disease pathogenesis in fish and other aquatic animals.  
*ksnek@vetmed.wsu.edu*

**Sri Srikumaran,** Rocky Crate-FNAWS Endowed Chair: Molecular basis of disease resistance and susceptibility in wild sheep.  
*ssrikumaran@vetmed.wsu.edu*

**Diana M. Stone:** Immunology of intracellular pathogens; molecular approaches to prevention with a special interest in neonatal vaccination strategies.  
*dstone@vetmed.wsu.edu*

### **Veterinary Microbiology**

#### V Mic

535 Advanced Readings in Veterinary Microbiology 1 (0-3) May be repeated for credit. Prereq senior in Vet Med or graduate student in Vet S. Supervised reading program which peruses publications of intermediate technical difficulty and advanced textbooks.

536 Diagnostic Microbiologic Conference 1 (0-3) May be repeated for credit. Prereq graduate student in Vet S. Identification of animal pathogens in clinical material.

541 Advanced Diagnostic Microbiology 1 (0-3) May be repeated for credit; Prereq V M 534P, 535P, 536P. Microbiology laboratory for performing and interpreting virologic, serologic, and related tests for the diagnosis of animal diseases.

562 Molecular Diagnostic Microbiology 1 (0-3) May be repeated for credit; cumulative maximum 3 hours. Prereq V Mic 541 or c//. Discussion and molecular laboratory for detection and identification of infectious agents for the diagnosis of animal diseases.

572 Advanced Topics in Microbiology, Parasitology, or Immunology V 1-3 May be repeated for credit; cumulative maximum 4 hours. Advanced topics in microbiology, parasitology, or immunology presented in short-course, or workshop, format.

591 Seminar in Diagnostic Microbiology 1 May be repeated for credit. Seminar in diagnostic veterinary microbiology.

592 Advances in Immunobiology 1

May be repeated for credit. Cooperative course taught by WSU, open to UI students (VS 592).

600 Special Projects or Independent Study Variable credit. S, F grading.

700 Master's Research, Thesis and/or Examination Variable credit. (For MS in veterinary science only.) S, F grading.

800 Doctoral Research, Dissertation, and/or Examination Variable credit. (For PhD in veterinary science only.) S, F grading.

## **Veterinary Pathology**

V Pa

501 Case-based Learning in Veterinary Pathology 1 (0-3) to 3 (0-9) Prereq second year veterinary medicine or DVM . Principles of pathophysiology, infectious disease, laboratory diagnosis, zoonoses, and food safety learned through the development of multistep teaching cases. S, F grading.

525 Introductory Readings in Veterinary Pathology 1 (0-3) May be repeated for credit; cumulative maximum 2 hours. Supervised introductory readings of publications, books, and research proposals.

542 Advanced Diagnostic Pathology V 1 (0-3)-4 (0-12) May be repeated for credit; cumulative maximum 8 hours. Prereq V M 546P. Necropsy laboratory for techniques and skills in performing and interpreting necropsy material.

544 Immunopathology 4 Prereq V M 545P, V Mic 531. The role of immune processes in the pathogenesis of disease.

545 Mechanisms of Disease 4 Prereq V M 545P, 537P or Micro 412. Biochemical and immunological mechanisms involved in disease processes from the comparative standpoint.

548 Introduction to Research 1 Introduction to research.

555 Research in Progress Seminar 1 May be repeated for credit. Cumulative maximum 8 hours. Presentation of on-going student research project results.

569 Research Proposal 1 (0-3) May be repeated for credit; cumulative maximum 2 hours. Written preparation and oral presentation of a research proposal.

571 Advanced Topics in Pathology V 1-3 May be repeated for credit; cumulative maximum 4 hours. Advanced topics in pathology presented in short-course, or workshop, format.

592 Anatomic Pathology Seminar 1 May be repeated for credit. Histopathologic description and diagnosis.

600 Special Projects or Independent Study Variable credit. S, F grading.

700 Master's Research, Thesis, and/or Examination Variable Credit. (For MS in veterinary science only.) S, F grading.

800 Doctoral Research, Dissertation, and/or Examination Variable credit. ( For PhD in veterinary science only.