College of Arts and Sciences – Select Departments

[**Biology**](https://biology.uoregon.edu/)

The Department of Biology offers expertise and research opportunities in a wide range of disciplines including neuroscience, genetics, cell and developmental biology, evolution, ecology, and marine biology. UO supports interdepartmental connections among Biology, Chemistry, Physics, Psychology, and Human Physiology. The department has 47 research-active faculty who are connected to several research institutes. External funding comes from a variety of sources reflecting the broad areas of research in the unit and institutes. Top funders include the NIH, NSF, and State of Oregon’s commissions on marine environments.

Faculty in the department are affiliated with one of the following research centers or institutes:

* [Institute of Ecology and Evolution](http://ie2.uoregon.edu/). The more than 20 researchers who are members of IEE work in molecular evolution, evolutionary genetics, evolution of development, and microbial, population, community, and ecosystems ecology. They conduct both field and lab work to answer fundamental and applied questions about the organization and history of life on earth, with focus on broad themes of: microbial ecology; functional evolutionary and ecological genetics; evolution, development and genomics; and conservation biology and global change.
* [Institute of Molecular Biology](http://molbio.uoregon.edu/) is made up of researchers from biology, chemistry, and physics with expertise in genomics, cell biology, biochemistry/biophysics, systems biology, microbiology, and evolutionary biology. The teams work together to dissect the molecular underpinnings of living organisms, using a huge variety of model organisms, techniques, and tools to understand and explain the properties of life.
* [Oregon Institute of Marine Biology](https://oimb.uoregon.edu/) offers research and education opportunities to both graduate and undergraduate students, as well as visiting scientists. The institute is located on the southern Oregon coast in Charleston, and has residences, classrooms, and laboratory space. High quality natural seawater flows through all of the teaching and research labs, enabling scientists to maintain a wide assortment of marine animals, such as the giant Pacific octopus shown here, for experimentation and observation.
* [Institute of Neuroscience](https://ion.uoregon.edu/content/institute-neuroscience) is made up of biologists, psychologists, and human physiologists with expertise in genetics, development, electrophysiology, optogenetics, and functional MRI. Some research foci are: studying the properties of individual neurons and the synaptic interactions between neurons contribute to neural computations that ultimately generate animal behavior; understanding mechanisms by which collections of excitable cells produce behavior and perception; analyzing animal and human genetics, studies of action, attention, memory and neuroplasticity; and using zebrafish as a model to study the mechanisms underlying vertebrate development, and other models that allow researchers to study patterning of neurons, genetic regulation of development, synaptic development and many other developmental biology areas.

Facilities affiliated with the biology department includes:

* [Center for Advanced Materials Characterization in Oregon](http://camcor.uoregon.edu/) hosts capital-intensive equipment for microanalysis, surface analysis, electron microscopy, semiconductor device fabrication and traditional chemical characterization, and run by directors who are highly trained and experienced in their fields.
* [Transgenic Mouse Facility](http://uoneuro.uoregon.edu/ionmain/TMF/test/TMF/index.html) provides a technology resource to the local and regional research community to support the generation and maintenance of genetically modified mouse lines.
* [Zebrafish Facility](http://fish.uoregon.edu/)
* [Zebrafish Information Network](http://zfin.org/)
* [Culture Collection of Microbes from Extreme Environments](http://uoregon.technologypublisher.com/technology/2486)

[**Chemistry and Biochemistry**](https://chemistry.uoregon.edu/)

The Department of Chemistry and Biochemistry at UO is home to 31 research faculty who pursue research in seven main areas: Biochemistry-Molecular Biology, Bioorganic-Medicinal Chemistry, Biophysics, Environmental Chemistry, Inorganic-Organometallic Chemistry, Materials Chemistry, Optics and Spectroscopy, Organic Synthesis, Physical Chemistry, Polymer Chemistry, Solid State Chemistry, Statistical Mechanics of Liquids and Complex Fluids, Surface and Interfacial Chemistry, and Theoretical Chemical Physics. External research funding for the chemistry and biochemistry department comes from the National Science Foundation.

 All faculty in this department are affiliated with centers and institutes across UO including:

* [Institute of Molecular Biology](http://molbio.uoregon.edu/) is made up of researchers from biology, chemistry, and physics with expertise in genomics, cell biology, biochemistry/biophysics, systems biology, microbiology, and evolutionary biology. The teams work together to dissect the molecular underpinnings of living organisms, using a huge variety of model organisms, techniques, and tools to understand and explain the properties of life.
* [Institute for Fundamental Science](https://ifs.uoregon.edu/) focuses on research whose primary aim is to understand, explore, and extend the fundamental laws of nature, with an emphasis on the consequences for observable phenomena. The institute brings together the UO's investigations in experimental and theoretical high energy particle physics, astrophysics and astronomy, and is complemented by a variety of inquiries into other foundational topics.
* [Materials Science Institute](https://materialscience.uoregon.edu/) faculty study the structure and properties of materials, to educate in the sciences of materials, and to serve Oregon as a resource in these sciences. Since 1985, the institute has more than tripled the size of its research program, developed four new graduate programs in materials, and contributed to the state’s prosperity through collaboration with more than 25 Oregon companies.
* [Oregon Center for Optical, Molecular, and Quantum Science](https://oco.uoregon.edu/) encompasses research in basic and applied aspects of optics in physics and physical chemistry. Members of the center are instructors in physics and chemistry; associate members are from these departments as well as from institutions outside the university; students—undergraduate, master’s, and doctoral—are involved in all aspects of research at the center.

[**Earth Sciences**](https://earthsciences.uoregon.edu/)

The UO department of Earth Sciences is composed of 28 research active faculty, representing geology, oceanography, paleontology and geophysics. Faculty study the Earth’s core to its surface, investigating the underlying process that shape the planet including erosion, mantle convection, hydrothermal reactions, earthquakes and volcanic eruptions. Their work is funded by the National Science Foundation, NASA and the U.S. Geological Survey.

Research in Earth Sciences is focused into 4 clusters. The Volcanology-Petrology-Geochemistry clusterfocuses on active volcanic, magmatic, hydrothermal, and geomicrobial systems and fine-scale, process-oriented investigations. Current investigations include research on the natural arsenic contamination in groundwater of the Willamette Basin and abnormal redox chemistry in Upper Klamath Lake, both in Oregon. Another involves understanding volcanic systems stable compositions of phenocrysts and glasses in erupted products.

The Geophysics-Geomechanics cluster investigates problems in solid earth geophysics, including mantle upwelling, convection, lithospheric structure, regional tectonics, earthquake mechanics, crustal formation, ice physics and geomechanics. Current investigations include the relationship between fire and landslides in the Columbia River Gorge scenic area and the physics relating to glacier movement and friction. Team members in this cluster are key members in the U.S. Geological Survey-led [ShakeAlert](https://ohaz.uoregon.edu/shakealert/) program, designed to provide early detection of earthquakes.

The Stratigraphy-Structure-Surfaces process cluster seeks to understand the complex interactions among tectonic and climatic processes that drive landscape evolution, earthquake histories, basin filling and deformation of the crust. Recent structural geology studies examine deformation in the Basin and Range province and coastal region of Oregon, active tectonics of the San Andreas Fault system, Cenozoic extension in Death Valley, and seismic risk along the Pacific margin of the U.S. and in central Asia. Sedimentary basins study projects focus on Neogene basis in southern California, northwestern Mexico, and the Mesozoic tectonics of eastern Oregon.

The Paleontology clusterpursues fieldwork to find the fossils of small mammals and artiodactyls and fossil plants and soils in Oregon, Nevada, California, Antarctica, Argentina and Australia. A recent investigation uncovered a rare Oregon dinosaur fossil dating back 103 million years.

The work of our Earth Sciences faculty is supported by the several internal resources, including a department computing facility and access to the [Talapas](https://hpcf.uoregon.edu/content/talapas) and NSF-funded [ACISS](https://aciss-computing.uoregon.edu/) supercomputers. The [Experimental Petrology Lab](https://earthsciences.uoregon.edu/research/facilities/experimental_petrology_lab/) is home to two piston cylinder apparatii, two atmosphere gas-mixing vertical quench furnaces, and rapid-quench cold-seal apparatii with computer-controlled pressure and temperature cycling. UO’s [CAMCOR Microanalytical Facility](http://camcor.uoregon.edu/labs/microanalytical-facility/) provides resources for sample preparation and materials analysis by Electron Probe Microanalysis and Environmental Scanning Electronic Microscopy. The [Stable Isotope lab](https://pages.uoregon.edu/bindeman/Site_Labo/structure%201.html) equipped with gas source mass spectrometer, laser fluorination line, and equipment allowing for continuous flow applications. Finally, the [Condon Collection](https://earthsciences.uoregon.edu/research/facilities/uo-condon-collection/) is the only professionally curated university museum fossil collection in Oregon, ranking twelfth in the nation in the number of specimens of fossil vertebrates.

[**Human Physiology**](https://physiology.uoregon.edu/)

The Human Physiology department offers undergraduate and graduate training, and boasts 15 research laboratories, 2 dedicated research facilities, and 18 primary faculty. Faculty labs cover a wide range of research topics, from research on vascular disease, to movement disorders, to the influence of maternal nutrition and metabolic state on their children’s later mental health and behavioral regulation. External funding for research comes from a mixture of federal funds (primarily NIH), foundations, and private companies. Below is a full list of the research laboratories of Human Physiology at UO.

* Action Control
* Aging and Vascular Physiology
* Cardiopulmonary & Respiratory Physiology
* Developmental Behavioral Neuroscience
* Exercise & Environmental Physiology
* Human Cardiovascular Control
* Motor Neuroscience of Health and Disease
* Motor Skill Lab
* Muscle Cellular Biology
* Muscle Physiology
* Neuromechanics
* Obesity & Metabolism
* Orthopaedic Biomechanics
* Respiratory Neurophysiology and Plasticity
* Regenerative Medicine

Human physiology research facilities include:

* The [*Bowerman Sports Science Clinic*](https://bssc.uoregon.edu/) is a regional outreach and research facility that aims to improve the health, fitness, and well-being of individuals in and around Eugene. The team of faculty and students that run the facility have both a scientific and clinical background, and make assessments for injury prevention and performance optimization. Current research at the clinic includes: a study of stress fracture risk in student-athlete distance runners; dissertation work exploring the utility of OpenSim biomechanical gait simulations for designing foot-ankle prostheses; and research studying the fusion of different machine learning methodologies to implement into the control systems of assistive devices.
* The [*Evonuk Environmental Physiology Core*](https://eepcore.uoregon.edu/) is a flagship research and instructional facility within the department and is used by researchers investigating the human response to environmental stresses. The facility has a custom-built environmental chamber with a sophisticated heating and cooling system that allows researchers to expose humans to different environmental conditions to study how the physiology responds and adapts when people are exposed to heat stress, cold stress, changes in humidity, and changes in altitude. The facility also has biospecimen handling area that is used to process blood and other samples to measure stress hormones, metabolites, and other chemicals. Instrumentation includes a centrifuge and microcentrifuge, blood analyzers for glucose, lactate, osmolarity, hemoglobin, and hematocrit, a spectrophotometer and fluorometer, and a microplate shaker, washer, and reader for Enzyme-Linked Immunosorbent Assays (ELISA), and High Performance Liquid Chromatography (HPLC).

[**Linguistics**](https://linguistics.uoregon.edu/)

The Linguistics department provides education at the undergraduate and graduate level and has active research faculty committed to empirically grounded research with a fundamental interest in the nature of language. Faculty researchers look at how language is used and how this use impacts language learning, processing, and structure over historical and developmental time, and examine the practical and interdisciplinary aspects of language and its use (i.e., teaching, maintenance, revitalization, normal and disordered acquisition, loss, its social impact, and inter-relation with social structures and institutions). The bulk of external research funding comes from the NSF.

Specific areas of research:

* phonetics and psycholinguistics
* speech perception and speech production
* first and second language acquisition
* cognitive linguistics
* language teaching and learning
* corpus linguistics
* language data management and processing
* linguistic fieldwork and language documentation
* language maintenance and revitalization
* historical phonology and morphosyntax
* typological linguistics

Linguistics faculty member Julie Sykes directs the [Center for Applied Second Language Studies](https://casls.uoregon.edu/). The Center for Applied Second Language Studies (CASLS) fosters innovation in world language teaching and learning by providing research-based solutions to materials creation, program implementation, and evaluation and assessment. CASLS is one of sixteen [National Foreign Language Resource Centers](http://www.nflrc.org/) that work to increase the nation’s capacity for language teaching and learning. CASLS staff expertise has helped the center become nationally recognized in the intersection of technology and language learning, program development, professional development, and assessment.

Linguistics related facilities:

* The [Spoken Language Research laboratories](https://blogs.uoregon.edu/slrl/) provides space and resources for linguistics faculty. The facilities include ten sound-attenuated run rooms equipped with computers for behavioral studies, including spoken language production and perception. The space also has two sound booths with recording equipment, eye tracker equipment, child-focused room for first language acquisition, dedicated space for experiments investigating naturalistic conversation, as well as computer and collaborating space. lab features computer-based resources (including a number of corpora – such as the British National Corpus, Switchboard, and TIMIT), a meeting area, space for perception and production experiments, and a sound-attenuated recording booth.

[**Physics**](https://physics.uoregon.edu/)

The Department of physics at UO is home to 42 research faculty who pursue research in 14 main areas: Astrophysics and Astronomy, Biophysics, Condensed Matter Physics, Elementary Particle Physics, Geophysics, Optical Physics and Quantum Information Science, and Physics Education Research. The primary sources of external research funding for physics come from the US Department of Energy and the National Science Foundation.

All faculty in this department are affiliated with centers and institutes across UO including the following:

* [Institute for Fundamental Science](https://ifs.uoregon.edu/) focuses on research whose primary aim is to understand, explore, and extend the fundamental laws of nature, with an emphasis on the consequences for observable phenomena. The institute brings together the UO's investigations in experimental and theoretical high energy particle physics, astrophysics and astronomy, and is complemented by a variety of inquiries into other foundational topics.
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* [Oregon Center for Optical, Molecular, and Quantum Science](https://oco.uoregon.edu/) encompasses research and education in the sciences wherever optics, spectroscopy, quantum science and the physical investigation of atomic and molecular processes are involved — in either fundamental aspects or technological applications. Members of the center are instructors in physics and chemistry; associate members are from these departments as well as from institutions outside the university; students—undergraduate, master’s, and doctoral—are involved in all aspects of research at the center. It provides administrative support and facilities to assist in carrying out scientific research, promotes scientific interactions amongst members and with the wider academic and industrial research and development communities. OMQ fosters a collegial and stimulating intellectual environment that promotes the advancement, dissemination and application of scientific knowledge.
* [Pine Mountain Observatory](https://pmo.uoregon.edu/), 30 miles east of Bend, Oregon, is perched atop a mountain at an elevation of 6,300 feet. The observatory’s location is well placed to make the most of the dark skies that the Central Oregon high desert provides. The observatory is operated by the University of Oregon Department of Physics under a special use permit from the Deschutes National Forest. The observatory’s primary function is undergraduate research and other astronomical observations, however, outreach to the public and providing educational programs at all levels are also important functions and objectives of the observatory.

[**Psychology**](https://psychology.uoregon.edu/)

The Department of Psychology has educational, research, and clinical components, with a history of innovation: the first course ever offered in personality psychology was taught in the department, and formative research in the fields of cognitive neuroscience and developmental psychopathology was conducted here. The department has 31 faculty members, 3 of whom are members of the National Academy of Sciences. Research is organized into several broad areas: [clinical](https://psychology.uoregon.edu/research/research-areas/clinical/); [cognitive neuroscience](http://blogs.uoregon.edu/psychology/research/research-areas/cognitive-neuroscience/); [developmental](http://blogs.uoregon.edu/psychology/research/research-areas/developmental/); [social-personality](https://psychology.uoregon.edu/research/research-areas/social-personality/), and [systems neuroscience](https://psychology.uoregon.edu/research/research-areas/systems-neuroscience/) (which spans the psychology and biology departments), with primary external funding coming from the National Institutes of Health and National Science Foundation, as well as a variety of foundations. UO has the [Lewis Center for Neuroimaging](https://lcni.uoregon.edu/) on campus, which provides researcher the resources (staff and equipment) to conduct MRI research.

The department has several centers and institutes:

* [Center for Translational Neuroscience](https://ctn.uoregon.edu/research/) works to improve well-being, promote resilience, and mitigate the effects of early adverse experiences on physical and emotional health by translating discoveries in basic neuroscience, psychology, and related disciplines. CTN houses research projects, science communication initiatives, professional development, and intervention program development, implementation, and evaluation activities. Primary faculty study areas include: adolescent development and psychopathology; motivational and cognitive factors that contribute to success and failure at health goals such as cigarette smoking cessation and dieting; neurocognitive mechanisms by which homeostatic stressors contribute to depression and other forms of psychopathology; developing and evaluating early childhood interventions in socially and economically marginalized communities, and using data for use in social policy development; and mechanisms of self-regulation, how it is associated with health behaviors, and how that process is learned from parents in early childhood.
* [Center on Brain Injury in Research and Training](https://cbirt.org/) conducts research and training to improve the lives of children and adults with traumatic brain injury (TBI). The center’s research focuses on developing interventions to improve outcomes related to education, employability, and quality of life. **Our research interests include: (1)** hospital-to-school re-entry process, (2) educational outcomes of students following TBI, (3) school services for students post-TBI, (4) interventions to improve social relationships for students with TBI, (5) transition of youth with TBI from school to adult roles, and (6) systematic instruction in assistive technology to improve outcomes and quality of life for adults with TBI. Training activities promote the use of best practices among educators and other professionals who serve individuals with TBI. Partners in these endeavors include individuals with TBI, family members, educators and other professionals who serve individuals with TBI, hospitals, and research colleagues throughout the United States and beyond.
* [Center for Digital Mental Health](https://www.c4dmh.net/) conducts research and build digital tools to enhance mental health (especially amongst underserved groups and young people) and faculty work focuses on using mobile and wearable devices, and social media, to unobtrusively track and analyze behavior. Data is used to detect mental health needs and provide adaptive, personalized interventions. Their approaches leverage the latest developments in technology, quantitative analysis, and behavior change techniques to empower innovative, timely interventions and place them into the hands of the people who need them.
* [Institute of Neuroscience](https://ion.uoregon.edu/content/institute-neuroscience) is made up of biologists, psychologists, and human physiologists with expertise in genetics, development, electrophysiology, optogenetics, and functional MRI. Some research foci are: studying the properties of individual neurons and the synaptic interactions between neurons contribute to neural computations that ultimately generate animal behavior; understanding mechanisms by which collections of excitable cells produce behavior and perception; analyzing animal and human genetics, studies of action, attention, memory and neuroplasticity; and using zebrafish as a model to study the mechanisms underlying vertebrate development, and other models that allow researchers to study patterning of neurons, genetic regulation of development, synaptic development and many other developmental biology areas.