

Interdepartmental Program in Toxicology

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Degrees offered: Master of Science (MS) and Doctor of Philosophy (PhD) in Toxicology

Graduate Programs

Established in 1962, USU's Interdepartmental Graduate Program in Toxicology is one of the first degree-granting graduate toxicology programs in the country. More than 140 students have received MS and PhD degrees through this research-intensive interdisciplinary program. Students affiliate with the program through one of several departments: Animal, Dairy and Veterinary Sciences (ADVS); Biology; Chemistry and Biochemistry; Civil and Environmental Engineering (CEE); or Plants, Soils, and Biometeorology (PSB). The USDA Poisonous Plants Laboratory also provides facilities and research projects for study.

Admission Requirements

Students with a degree in life sciences, physical science, medical science, or engineering and with adequate preparation in chemistry, biology, physics, and/or mathematics are encouraged to apply. Admission to the program requires compliance with the general admission requirements of the School of Graduate Studies, a faculty sponsor, and acceptance into the sponsoring professor's home department. Applicants should have a minimum GPA of 3.0 from completed degree programs. International students must receive a minimum TOEFL score of 250 (computer-based) or 600 (paper-based).

Major Research Areas

Molecular and Biochemical Toxicology

Modern molecular biological techniques are used to determine the mechanisms of toxicity and carcinogenesis by examining how various natural and synthetic compounds interact with the cellular genome. Resultant mutations in oncogenes and tumor suppressor genes are being investigated. The mechanisms of free-radical toxicity, specifically by iron and other transition elements, are also important research topics. Other ongoing studies examine the mechanisms of cancer chemoprevention, chemical metabolism, effects of toxicants on macromolecular syntheses, and metabolic intermediates. The toxicity of poisonous plants is another program emphasis.

Environmental Toxicology

Utah State University has a comprehensive research program in several aspects of environmental toxicology. Specifically, Utah State University faculty pioneered the use of white-rot fungi for the biodegradation of environmental contaminants. Models are developed and tested for dealing with the migration of chemicals in the environment, especially those with potential routes for human exposure. Basic biological, chemical, and physical methods are explored for hazardous waste management programs.

Course Requirements

Students in the **MS program** are required to complete the following core courses: ADVS 6350, 6400, 6600 (taught alternate fall semesters), 6810; CHEM 5700, 5710; STAT 5200.

Students in the **PhD program** are required to complete the following core courses: ADVS 6350, 6400, 6600 (taught alternate fall semesters), 6810; BIOL 5600 or 5620; CHEM 5700, 5710; STAT 5200.

Additional coursework may be required, at the discretion of the student's advisory committee.

Financial Assistance

Graduate students are eligible for competitive fellowships, teaching assistantships, and research assistantships. Out-of-state fees are waived, and in many cases, in-state fees are also waived. Hourly employment, which often permits waiver of out-of-state fees, is also available.

The Toxicology Graduate Program participates in the WICHE Western Regional Graduate Degree Program (WRGP). Residents of participating states may enroll in this program without paying nonresident tuition. To facilitate this process, applicants should inform the Toxicology Program of their WRGP status upon application.

Toxicology Program Faculty

Professors

Anne J. Anderson, plant toxicology (Biology)

Ann E. Aust, metal-induced carcinogenesis (Chemistry and Biochemistry)

Steven D. Aust, biochemical toxicology and bioremediation (Chemistry and Biochemistry)

Roger A. Coulombe, Jr., molecular toxicology, cancer chemoprevention, natural product toxicology (ADVS)

Howard M. Deer, pesticides and occupational health (ADVS)

William J. Doucette, fate of environmental chemicals, phytoremediation (CEE)

R. Ryan Dupont, biological waste treatment (CEE)

William J. Popendorf, occupational toxicology and industrial hygiene (Biology)

Ronald C. Sims, environmental engineering (CEE)

Research Professor

Darwin L. Sorensen, aquatic toxicology (CEE)

Associate Professors

Paul R. Grossl, soil chemistry and phytoremediation (PSB)

Jeffery O. Hall, veterinary toxicology (ADVS)

Collaborators at USDA Poisonous Plants Laboratory

Dale R. Gardner, natural product chemistry

Kip E. Panter, poisonous plants

James A. Pfister, behavioral toxicology

Bryan L. Stegelmeier, veterinary pathology