

## Interdepartmental Program in *Toxicology*

**Director: Professor Roger A. Coulombe, Jr.**, molecular toxicology, cancer chemoprevention, natural product toxicology (ADVS)  
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**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); *William A. Brindley*, insecticide toxicology (Biology); *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. Popenorf*, occupational toxicology and industrial hygiene (Biology); *Ronald C. Sims*, environmental engineering (CEE); **Research Professor** *Darwin L. Sorensen*, aquatic toxicology (CEE); **Associate Professor** *Paul R. Grossl*, soil chemistry and phytoremediation (PSB); **Assistant Professor** *Jeffery O. Hall*, veterinary toxicology (ADVS). **Collaborators at USDA Poisonous Plants Laboratory** *Dale R. Gardner*, natural product chemistry; *Kip E. Panter*, poisonous plants (USDA); *James A. Pfister*, behavioral toxicology; *Bryan L. Stegelmeier*, veterinary pathology.

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

**Specialization:** Molecular Biology

### *Graduate Programs*

Established in 1963, USU's Interdepartmental Graduate Program in Toxicology is one of the first degree-granting graduate toxicology programs in the country. More than 130 students have received MS and PhD degrees in a research-intensive interdisciplinary environment. 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 Utah Water Research Laboratory and the USDA Poisonous Plants Laboratory also provide facilities and research projects for study. A specialization in toxicology/molecular biology is available.

#### *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 eligible. Admission to the program requires compliance with the general admission requirements of the University, a faculty sponsor, and acceptance into the sponsoring professor's home department. Applicants should have a GPA of 3.5 or higher from completed degree programs. The GRE exam is required, and a score above the 55th percentile for the verbal, quantitative, and analytical sections is desirable. International students must receive a score of 600 or higher on the TOEFL exam.

#### *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 DNA. 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\*, 6810; Chem 5700, 5710; Stat 5200.

Students in the **PhD program** are required to complete the following core courses: ADVS 6350, 6400, 6600\*, 6810; Biol 5620; Chem 5700, 5710; Stat 5200.

Additional coursework is determined by the supervisory committee, and depends on the area of emphasis. Approximately one-third of the MS and one-half of the PhD work consists of research necessary to complete a thesis or dissertation.

### ***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). Students who are not Utah residents, but who are from the WICHE region, except California, qualify for registration at the Utah resident tuition rate. (WICHE participant states include Alaska, Arizona, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, and Wyoming.) To facilitate this process, applicants should inform the Toxicology Program of their WRGP status upon application.

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\*This course is taught alternate fall semesters.