

Toxicology, MS, PhD

Department: Animal, Dairy, and Veterinary Sciences Department; Biology Department; Chemistry and Biochemistry Department; Civil and Environmental Engineering Department; Plants, Soils, and Climate Department
College: College of Agriculture and Applied Sciences; College of Science; College of Science; College of Engineering; College of Agriculture and Applied Sciences

Overview

About This Degree

Toxicology is the scientific understanding of the harmful effects of natural and synthetic chemicals at all levels – whether large-scale environmental pollutants or small-scale carcinogens – that have an incremental effect over time.

Students can focus their research on a wide variety of areas within the discipline of toxicology, but USU's program is particularly strong in the following areas:

- **Molecular and biomedical toxicology:** This area deals with how external agents affect the genetic structure of cells. Toxicologists at USU are developing research on the genomics of disease, cancer prevention, the mechanisms of air pollution, and more.
- **Environmental toxicology:** Scientists working in this area are focused on toxins that affect the environment. Their research aims to restore ecosystems, remove toxic waste, and reduce human and animal exposure to environmental toxins. Additionally, USU scientists were among the first to use a naturally occurring fungus to digest and detoxify chemical waste.

Toxicology is an interdepartmental degree where students affiliate with the program through one of several departments. While students are housed in the same department as their major professor, their committees are comprised of faculty from a minimum of two to three departments, giving them multiple perspectives on their research.

Established in 1961, USU's interdepartmental graduate program in toxicology is one of the first degree-granting graduate toxicology programs in the country. USU faculty helped establish the toxicology program at the University of Hong Kong, which is ranked by the *Times of London* in the top 20 universities in the world. Every professor in the program collaborates with about 10 other universities across the country and the world, giving students the opportunity to make connections and work with individuals around the globe to solve problems that affect populations and environments worldwide.

The toxicology degree is designated as a Western Regional Graduate Program, which means students from participating western states qualify for in-state tuition. For more information, visit <http://wrgp.wiche.edu>.

Career Options

Students who graduate in toxicology can pursue the following careers:

- Pharmaceutical research (often working for government regulatory agencies like the Environmental Protection Agency)
- Public health (industrial hygienists working to reduce workplace exposure)
- Mining industries (reducing environmental impacts of mine waste)
- Environmental remediation (stabilizing polluted sites)
- Professor, academia

Graduates with a PhD are more likely to work in these areas as research project leaders than those who receive the MS.

What it takes

Admissions Requirements

Students can be accepted from various undergraduate backgrounds. Those lacking in chemistry, biology, and mathematics coursework may have to complete prerequisite courses before beginning their graduate work in toxicology. These courses will be decided upon by the faculty in the toxicology program.

To be accepted to the program, it is recommended that applicants first contact a specific faculty member with

whom they are interested in working. If the faculty member is accepting graduate students and agrees to work with the student, the student can then apply by completing the following application requirements:

Application Requirements:

- Complete the [online application](#)
- Pay the \$55 application fee
- Score at or above the 40th percentile on the GRE
- Have a 3.0 or higher GPA on your last 60 semester or 90 quarter credits
- Provide transcripts of all college/university credits
- Provide three contacts for letters of recommendation

International students have [additional admissions requirements](#).

Admissions Deadlines

Students are housed in the same department as their major professor and follow the deadlines and requirements of that department. The home departments have the following deadlines:

Animal, Dairy, and Veterinary Science:

- Fall semester – March 15
- Applications are accepted after this deadline, but students are less likely to be considered for financial assistance.

Biology:

- The Department of Biology considers applications on a year-round basis. Applications received for fall semester by February 15 will be considered for all financial awards available. Applications received after that date will be considered for the limited amount of financial awards available at the time.

Chemistry and Biochemistry:

- Due to the nature of graduate course sequences, it is highly recommended that students enter the graduate program in the fall semester. Although there are no application deadlines, submission of all application materials by April 15 is strongly encouraged.

Civil and Environmental Engineering:

- Fall semester – June 15
- Spring semester – October 15
- Summer semester – March 15 (This date also serves as first review of applications for available financial assistance.)

Plants, Soils, and Climate:

- Applications for graduate programs are accepted year-round. However, chances for acceptance are best if students apply between October and January of each academic year. It is also encouraged that students begin in the fall if possible.

Master's Degree Plan Options

Students can receive the MS by pursuing the following option:

- In the **Plan A** option, students complete graduate-level coursework and must write a thesis.

Financial Assistance

The toxicology program provides funding for most of its graduate students through research [assistantships](#), available through professors having contracts, grants, or other awards.

All PhD students are supported at a minimum with tuition awards, subsidized [health insurance](#), and a monthly stipend for work performed as research assistants in research groups.

A variety of additional funding opportunities are available, including [fellowships](#), [scholarships](#), [tuition awards](#), and [travel support](#). Additionally, master's students may be eligible for subsidized [health insurance](#) through qualifying assistantships.

Program Requirements

[Click here](#) to see course requirements for the **Master of Science**.

[Click here](#) to see course requirements for the **Doctor of Philosophy**.

PhD Qualifying Exams:

PhD students must pass a comprehensive exam after completing their coursework and before submitting their dissertation. The exam will have a written portion with questions set by the student's committee and an oral component based on the student's area of research.

Contact

Advisor(s)

Roger Coulombe

Professor

Office: ANSC 213

Phone: (435) 797-1598

Email: roger@usu.edu

Faculty

Anne Anderson, PhD, University of Leicester

Professor

Area: Plant-microbial interactions, phytotoxic mechanisms

Office: BNR 325

Phone: (435) 797-3407

Email: anderson@biology.usu.edu

Roger Coulombe, PhD, Oregon State University

Professor

Area: Veterinary toxicology, molecular biology

Office: ANSC 213

Phone: (435) 797-1598

Email: roger@usu.edu

Howard Deer, PhD, University of Minnesota

Professor

Area: Pesticides, environmental toxicology

Office: ANSC 205

Phone: (435) 797-1602

Email: howard.deer@usu.edu

William Doucette, PhD, University of Wisconsin

Professor

Area: Environmental analytical chemistry

Office: ENGR 218

Phone: (435) 797-3178

Email: william.doucette@usu.edu

Ryan Dupont, PhD, University of Kansas

Professor

Area: Biological waste treatment

Office: ENGR 216

Phone: (435) 797-3227

Email: ryan.dupont@usu.edu

Paul Grossl, PhD, Montana State University
Associate Professor
Area: Soil chemistry, biogeochemistry
Office: AGSC 348
Phone: (435) 797-0411
Email: paul.grossl@usu.edu

Jeffery Hall, DVM, Oklahoma State University
Professor
Area: Veterinary toxicology
Office: VDL 105
Phone: (435) 797-0238
Email: jeffery.hall@usu.edu

Ronald Sims, PhD, North Carolina State University
Professor
Area: Biochemical engineering
Office: ENGR 402 G
Phone: (435) 797-2785
Email: ron.sims@usu.edu

Get Involved

Professional Organizations, Honor Societies, and Clubs

Society of Toxicology: SOT is a professional and scholarly organization of scientists from academic institutions, government, and industry representing the great variety of scientists who practice toxicology in the United States and abroad.

Under the broad discipline of toxicology, there are many professional organizations specific to different areas of research. Students are encouraged to become members of organizations that are relevant to their area of study.

Labs, Centers, Research

Center for Integrated BioSystems: The CIB leads a progressive, interdisciplinary effort in research, core services, and education serving agriculture and life sciences. The CIB is where the first hybrid animal, a mule, was cloned, and was named one of “30 Awesome College Labs” by Popular Science magazine. The CIB has a research program with several active projects in diverse areas of life science that encompass plant, animal, and microbe functional genomics.

USDA ARS Poisonous Plant Research Laboratory: The Poisonous Plant Research Laboratory identifies toxic plants, and its interdisciplinary teams of chemists, geneticists, pathologists, physiologists, plant and range scientists, toxicologists and veterinarians provide an interdisciplinary approach of applied and basic research to develop solutions to intoxication.

Utah Veterinary Diagnostic Laboratory: The UVDL is a cooperative effort by USU and Utah Department of Agriculture and Food. The laboratory provides timely, in-depth, cost-efficient, veterinary diagnostic services to safeguard animal health, protect the agricultural economy, and shield the public against diseases transmissible from animals to humans.

Veterinary Diagnostics and Infectious Disease Research Group: VDID draws on the strength of USU’s College of Agriculture to tackle a \$1-billion-a-year market in the United States for animal disease screening and diagnostics.