

## Society of Toxicology Resources Relevant to Undergraduate Faculty

- [Toxicology Course Framework](#)—provides main learning concepts for toxicology and would provide insight for an instructor determining how toxicology might fit into the concepts they teach in various courses. The final category in the framework provide links to specific teaching resources for that concept.

Webinar: [Adopting the Undergraduate Toxicology Learning Framework](#)

- [SOT Curriculum Materials](#)—some examples:
  - Introduction to Toxicology Debate: This is an activity that can be used in an introductory toxicology course. It allows the students to go into more detail about particular topics and also enables them to become more comfortable working in groups. Sample debate topics have been provided.
  - Policy Papers: After being introduced to various environmental issues in seminar, students write papers in which they analyze information from the primary literature regarding the effects of the chemical(s) in question on biological systems and use this information to decide whether or not current regulatory limits (if they exist) on exposure are appropriate.
  - Use of Behavioral Assay to Determine the Chronic Effects of Chlorpyrifos on Developing Zebrafish: The goal of this short-term lab experiment is to demonstrate the behavioral effects of a prototypic insecticide and acetylcholinesterase inhibitor, chlorpyrifos, on developing zebrafish.
  - A Toxicological Study Using Zebrafish (*Danio rerio*) as a Model: Multi-week toxicological lab using zebrafish
  - Molecular Biology Lab Class as a Vehicle for Teaching Environmental Toxicology: Relatively few undergraduate life sciences programs offer classes in toxicology. In the molecular biology lab course at Kenyon College, I compensate by drawing from my research expertise in molecular toxicology to construct a course with significant toxicology content. This poster describes the approach and methods.
  - Opioid Active Learning Exercise: This active learning exercise focused on receptor signaling was used at NESOT as a think-pair-share exercise.
- [Eminent Toxicologist Lectures](#): The Eminent Toxicologist Lectures are historically relevant, high-quality presentations appropriate for senior undergraduate students, graduate students, or the scientifically oriented general public. Each lecture is accompanied by learning resources, including lecture notes and learning objectives.
  - Yves Alarie, QSARs to Commemorate the Fiftieth Anniversary of the RD<sub>50</sub>
  - Melvin Andersen, 45 Years Modeling Dose-Response Relationships: An Unanticipated Career
  - William H. Benson, Environmental Toxicology: Interconnections Between Human Health and Ecological Integrity
  - Samuel M. Cohen, Chemical Carcinogenesis
  - Jack H. Dean, Immunotoxicology: A Historical Perspective
  - John Doull, How Toxicology Became an Academic Discipline
  - Marion Ehrich, Pesticide Neurotoxicity More or Less

- Michael A. Gallo, From Murder to Mechanisms: 7000 Years of Toxicology's Evolution
  - Alan M. Goldberg, Humane Science in Risk Assessment and Beyond
  - Ernest Hodgson, We Are Not Rodents: Environmental Toxicants and the Role of Human Studies
  - Curtis D. Klaassen, How Do We Adapt to Chemicals?
  - Nancy A. Monteiro-Riviere, Frontiers in Nanotoxicology of the Skin
  - Kenneth Ramos, Reprogramming of the Human Genome by Toxic Injury
  - Ruth A. Roberts, Regulatory (Pharmaceutical) Toxicology
  - Cheryl Lyn Walker, Environmental Epigenomics: The Developmental Origins of Health and Disease
- [Introduction to Toxicology Slides](#)
    - [General Introduction to Toxicology](#) (10 slides)
    - [Toxicology as a Discipline](#) (14 slides)
    - [Toxicology Concepts](#) (25 slides)
    - [Careers in Toxicology](#) (17 slides)
    - [SOT Information and Summary](#) (6 slides)
- [Undergraduate Educator Network Webinars](#): Some focus on teaching techniques or background information but several feature specific curriculum or lab activities.
    - Don't Sweat It . . . Three Dry Labs for Undergraduate Toxicology Programs
    - Using Non-Vertebrate Model Organisms to Illustrate Toxicology Principles in Undergraduate Lab Classes
    - Using Fish to Illustrate Toxicology Principles in Undergraduate Lab Classes
    - Using Open Source Biological Pathway Databases for Education and Discovery
    - Academic Service Learning in an Undergraduate Pharmacology Course
    - The Use of Technology to Teach Toxicology and Related Disciplines
- [In Vitro Toxicology Lectures](#): Short presentations that provide the background for case studies that can be used in formal courses. Some examples:
    - Patient-Based Cellular Model Systems to Assess Individual Risk to Neurotoxicants--Dr. Bowman examined the benefits of using iPSC technology to personalize human risk assessment for suspected and known neurotoxicants. Induced pluripotent stem cells (iPSCs) can be generated from individual human subjects or representative vulnerable populations. These cells can be used to differentiate cells along all three embryonic germ lines, including the brain and neurovascular unit. Examples from the recent literature illustrated opportunities and challenges to the field.
    - The activity focuses on opportunities and challenges of using iPSC technology and considers application to a real-world situation to personalize human risk assessment for suspected and known toxicants, guided by these [questions](#). [Dr. Bowman's presentation](#)
    - Searching for Reliable Replacement Models in Topical Toxicology—Focus on Skin and Eye Toxicity: A case study includes role playing as a member of an [advocacy group](#), a [government regulator](#), or a [basic research scientist](#),

reviewing data for a replacement test and making a case for the validity of the new model. [Dr. Kandarova's Presentation](#)

- Multicellular Model Systems for *In Vitro* Toxicity Testing—Strengths and Challenges—The strengths and challenges in the use of *in vitro* multicellular model systems was investigated, with [Questions](#) discussed regarding data interpretation and the limitations of such systems [Dr. Kaminski's Presentation](#)
- Numerous SOT [Annual Meeting session recordings](#) and [webinars](#)
- SOT [Statements](#): Toxicology Impact Statements, Issue Statements, Express Statements
- [Domestic ToxScholar Program](#): Toxicologists visit primarily-undergraduate campuses (in-person or virtually) to present toxicology content relevant to chemistry, biology, and environmental science courses; in addition the speaker often meets informally to discuss career paths in the biomedical sciences
- SOT Undergraduate Affiliates (undergraduates can register for this status at no cost) can request access to the SOT continuing education library [CEdTox](#).
- Additional Toxicology Resources  
[ToxMSDT e-Modules](#)  
[NLM ToxTutor](#)

For more information, contact [Betty Eidemiller](#), Faculty United for Toxicology Undergraduate Recruitment and Education, Society of Toxicology.



[www.toxicology.org](http://www.toxicology.org)