Undergraduate Educator Network Webinars

Publishing Teaching Resources for the Toxicology Professor: From Service to Scholarship

Sponsored by FUTURE
(Faculty United for Toxicology Undergraduate Recruitment and Education) Committee

February 23, 2021
12:00 Noon (ET)

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Welcome

Jamie DeWitt, PhD
Moderator
East Carolina University
Overall Objectives

- To encourage the utilization, creation, and submission of teaching materials to SOT-endorsed online repositories.
- To learn key differences between the LifeSciTRC and CourseSource online repositories.
- To inspire the use of the Undergraduate Toxicology Learning Framework in undergraduate toxicology courses throughout the US.
- To spread toxicology to other disciplines through collaboration.
Speakers

**Wade Powell**, Life Sciences Teaching Resource Collection (LifeSciTRC)

**Joshua Gray**, Using the Undergraduate Toxicology Learning Framework with *CourseSource*

**Erin Vinson**, *CourseSource*: Evidence-Based Teaching Resources for Undergraduate Biology Education
Life Sciences Teaching Resource Collection (LifeSciTRC)

Wade Powell, PhD
Kenyon College
SOT’s Undergraduate Educators Have a Long History of Service in Sharing Teaching Resources
SOT’s Undergraduate Educators Have a Long History of Service in Sharing Teaching Resources

Before 2020

- **Platform:** SOT web site
  (https://www.toxicology.org/education/edu/educators.asp)
- **Sources:** Resources submitted by SOT members
- **Target audience:** SOT’s undergraduate educators teaching undergraduate toxicology courses
- **Marketing and promotion:** Primarily word of mouth and collective knowledge among SOT members
SOT’s FUTURE Committee Seeks to Revitalize the Collection and Its Mode of Dissemination

LifeSciTRC

- A partnership of life sciences societies
- Toxicology resources reviewed by SOT members and approved by SOT “partner managers” Josh Gray and Wade Powell
- Collection includes items of all sizes
- Available to all LifeSciTRC users
# SOT's LifeSciTRC Collection Is Growing!

<table>
<thead>
<tr>
<th>Title/Author/Resource Type/Format</th>
<th>Rating</th>
<th>Level(s)</th>
<th>Partner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eminent Toxicologist Lecture and Notes - Dr. Michael Gale presents 'From Murder to Mechanisms: 2000 Years of Toxicology's Evolution'</td>
<td>U C</td>
<td>U C</td>
<td>SOT</td>
</tr>
<tr>
<td>Eminent Toxicologist Lecture and Notes - Ruth Roberts presents 'Regulatory (Pharmaceutical) Toxicology'</td>
<td>U C</td>
<td>U C</td>
<td>SOT</td>
</tr>
<tr>
<td>In Vitro Toxicology Lecture and Luncheon: More Than Skin Deep: When Alternative Approaches are the Answer</td>
<td>U C</td>
<td>U C</td>
<td>SOT</td>
</tr>
<tr>
<td>In Vitro Toxicology Lecture and Luncheon: Patient-Based Cellular Models System to Assess Individual Risk to Non-Indicators</td>
<td>U C</td>
<td>U C</td>
<td>SOT</td>
</tr>
<tr>
<td>Toxicology Syllabus: human health focus</td>
<td>U C</td>
<td>U C</td>
<td>SOT</td>
</tr>
</tbody>
</table>

- Lecture notes
- Videos
- Lab and classroom activities.
- Syllabi

Not for Tox courses only!

Many resources are useful as examples in a wide range of courses from intro to advanced levels.
Be a Part of SOT’s LifeSciTRC User Cohort

- Register as a LifeSciTRC user at LifeSciTRC.org
- Browse SOT partner resources
- Search for materials by key word or other criteria
- Use shared curriculum resources in your life sciences courses
- No cost to users
Be a SOT LifeSciTRC Contributor

Submit a Teaching Resource

The first step in the submission process is to choose which Partner you wish to submit this teaching resource to. Click on any of the partners below to start the process.

How do I choose? What are submission criteria?

- **American Physiological Society**
  APS is currently accepting external submissions of teaching and learning resources at all educational levels. For more information [click here](#).

- **Society for Developmental Biology**
  SDB is currently accepting external submissions of teaching and learning resources that focus on developmental biology or similar topics at all education levels. For more information [click here](#).

- **The Physiological Society**
  PhysSo is currently accepting submissions of educational materials from its members. For more information [click here](#).

- **American Society for Plant Biologists**
  Currently accepting external submissions. For more information [click here](#).

- **Society of Toxicology**
  SOT is currently accepting submissions of toxicology-related educational materials. For more information [click here](#).
Be a SOT LifeSciTRC Reviewer

- Register as a LifeSciTRC user at LifeSciTRC.org
- SOT’s partner managers can find your registration and add you to the toxicology reviewer pool
- Respond YES! to LifeSciTRC review requests
- Very small time commitment
  - Most resources are small in scope
  - Review criteria are easy to interpret and implement
  - Impact >>> effort

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Curriculum Resource Sharing Is Important for the Future of Toxicology and the SOT

LifeSciTRC is the easiest way for educators to:

- Assist new toxicology instructors in course development
- Innovate your own teaching with new materials and activities
- Promote and implement best practices in toxicology teaching
  - *Vision and Change*
  - SOT’s Undergraduate Toxicology Learning Framework
  - Evidence-based pedagogy
- Raise the profile of toxicology and the SOT among life scientists in other disciplines and instructors in diverse courses
Questions and Comments

- Please participate.
- Send to “All Panelists” via the Q&A panel in the lower right.
Using the Undergraduate Toxicology Learning Framework with CourseSource

Joshua Gray, PhD
US Coast Guard Academy
CourseSource Toxicology Course Editor
CourseSource

- An open-access journal of peer-reviewed teaching resources for biological science courses
- Articles align with scientific professional society-developed learning goals and objectives
- Learning goals and objectives are aligned with Vision and Change

Courses

- Anatomy-Physiology
- Biochemistry and Molecular Biology
- BioInformatics
- Cell Biology
- Developmental Biology
- Ecology
- Evolution
- Genetics
- Immunology
- Introductory Biology
- Microbiology
- Neurobiology
- Plant Biology
- Professional Development and Career Planning
- Science Process Skills
- Toxicology

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CourseSource—Vision and Change

- Vision and Change is at the foundation of the learning goals and objectives
  - Integrate Core Concepts and Competencies throughout the curriculum
  - Focus on student-centered learning
  - Promote a campus-wide commitment to change
  - Engage the biology community in the implementation of change
CourseSource—Engaging the Biology Community through Professional Societies

- Undergraduate Biology is the first framework
- Professional societies were engaged to produce Vision and Change-aligned learning frameworks in their disciplines
- Frameworks now exist for many undergraduate courses
CourseSource–Integrating Core Concepts

- Vision and Change is at the foundation of the learning goals and objectives
  - Integrate Core Concepts and Competencies throughout the Curriculum
  - Focus on student-centered learning
  - Promote a campus-wide commitment to change
  - Engage the biology community in the implementation of change

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FORUM

Society of Toxicology Develops Learning Framework for Undergraduate Toxicology Courses Following the Vision and Change Core Concepts Model

Joshua P. Gray,*,† Christine P. Curran,† Vanessa A. Fitsanakis,‡ Sidhartha D. Ray,§ Karen E. Stine,¶ and Betty J. Edemiller||

doi:10.1093/toxsci/kfx090
https://www.toxicology.org/education/edu/educators.asp

Adopting the Undergraduate Toxicology Learning Framework – April 29, 2019 Webinar
Table 1. Comparison of Core Concepts for Undergraduate Biology, Foundational Concepts for Biochemistry & Molecular Biology, and Core Concepts for Undergraduate Toxicology

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Evolution: The diversity of life evolved over time by processes of mutation, selection, and genetic change</td>
<td>&quot;Energy&quot; is required and transformed in biological systems</td>
<td>Evolution: Evolution drives the interplay between toxicants/toxins and xenobiotic defense mechanisms and justifies the use of model organisms</td>
</tr>
<tr>
<td>Structure and Function: Basic units of structure define the function of all living things</td>
<td>&quot;Macromolecular structure” determines function and regulation</td>
<td>Biological Information: Differences in genomes and environmental exposure drive differences in susceptibility and responses to toxicants</td>
</tr>
<tr>
<td>Information Flow, Exchange, and Storage: The growth and behavior of organisms are activated through the expression of genetic information in context</td>
<td>Information storage and flow” are dynamic and interactive</td>
<td>Risk Assessment and Risk Management: Epidemiology and historical events together with science drive regulatory responses to risk to individuals and the environment</td>
</tr>
<tr>
<td>Pathways and Transformations of Energy and Matter: Biological systems grow and change by processes based upon chemical transformation pathways and are governed by the laws of thermodynamics</td>
<td>&quot;Discovery&quot; requires objective measurement, quantitative analysis, and clear communication</td>
<td>Systems Toxicology: Toxicants affect cellular, organ, individual, and ecological systems</td>
</tr>
<tr>
<td>System: Living systems are interconnected and interacting</td>
<td>&quot;Evolution &amp; homeostasis”</td>
<td>Pathways and Transformations of Energy and Matter: Interaction of toxicants with organisms is described through paradigms in dose response, Absorption, Distribution, Metabolism, and Excretion (ADME), and toxicokinetics</td>
</tr>
</tbody>
</table>
CourseSource—Student-Centered Learning

- Vision and Change is at the foundation of the learning goals and objectives.
  - Integrate Core Concepts and Competencies throughout the curriculum
  - **Focus on student-centered learning**
    - Promote a campus-wide commitment to change
    - Engage the biology community in the implementation of change
CourseSource—Student-Centered Learning

- The next step: generating evidence-based curricula
- Frameworks provide the core concepts
- Contributors submit peer-reviewed articles that deliver content in the core concepts
Questions and Comments

- Please participate.
- Send to “All Panelists” via the Q&A panel in the lower right.
CourseSource: Evidence-Based Teaching Resources for Undergraduate Biology

Erin Vinson, MAT
CourseSource Managing Editor
University of Maine
CourseSource: A large and growing community that is passionate about sharing effective undergraduate biology education materials.

Course Editors: often represent professional societies

Over 400 reviewers!
Articles in CourseSource are Organized by “Courses”

CourseSource is an open-access journal of peer-reviewed teaching resources for graduate education in toxicology. We publish articles that are organized around specific toxicological concepts and designed to engage students in meaningful and thoughtful discussions. In this feature, we introduce a new resource for instructors: a set of new SquirrelNet courses and assignments.

The course editor today will provide a quick tour of the new features.

Did you know?
CourseSource’s newest addition, Toxicology isn’t just for Toxicologists anymore. It’s science that protects the health of living organisms and...

Instructors Wanted for SquirrelNet! Join CourseSource Authors’ Educational Research Team!
December 18, 2019
The CourseSource authors of the SquirrelNet learning modules are recruiting instructors to join...

Congratulations to Lauren Gerrie and all 35 authors on their recent CourseSource publication!
### Articles are Aligned to Society Learning Goals

#### Toxicology Learning Framework

<table>
<thead>
<tr>
<th>Society Learning Goals</th>
<th>Articles</th>
<th>Sample Learning Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Evolution</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How is the use of model organisms fundamental to toxicology?</td>
<td>Contribute an article in this area.</td>
<td><img src="https://www.coursesource.org/courses/toxicology" alt="Show" /></td>
</tr>
<tr>
<td>How have toxins evolved?</td>
<td>Contribute an article in this area.</td>
<td><img src="https://www.coursesource.org/courses/toxicology" alt="Show" /></td>
</tr>
<tr>
<td>How have xenobiotic defense mechanisms evolved?</td>
<td>Contribute an article in this area.</td>
<td><img src="https://www.coursesource.org/courses/toxicology" alt="Show" /></td>
</tr>
<tr>
<td>How do toxicants exert selection pressures?</td>
<td>Contribute an article in this area.</td>
<td><img src="https://www.coursesource.org/courses/toxicology" alt="Show" /></td>
</tr>
<tr>
<td><strong>Biological Information</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How does carcinogenesis occur in response to genotoxic and nongenotoxic carcinogens?</td>
<td>Contribute an article in this area.</td>
<td><img src="https://www.coursesource.org/courses/toxicology" alt="Show" /></td>
</tr>
<tr>
<td>What effects can the environment have on gene expression?</td>
<td>Contribute an article in this area.</td>
<td><img src="https://www.coursesource.org/courses/toxicology" alt="Show" /></td>
</tr>
<tr>
<td>How do biomarkers indicate exposure to toxicants?</td>
<td>Contribute an article in this area.</td>
<td><img src="https://www.coursesource.org/courses/toxicology" alt="Show" /></td>
</tr>
<tr>
<td>What differences occur in how individuals or populations are affected by exposure to different doses of a toxicant?</td>
<td>Contribute an article in this area.</td>
<td><img src="https://www.coursesource.org/courses/toxicology" alt="Show" /></td>
</tr>
</tbody>
</table>

Can expand each learning goal to see specific learning objectives

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[https://www.coursesource.org/courses/toxicology](https://www.coursesource.org/courses/toxicology) © SOT 2021
Example of how articles will be listed by learning goals, once more articles are submitted.
CourseSource Lesson Article Format:

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>Includes rationale, background information, and discussion of similar lessons</td>
</tr>
<tr>
<td>SCIENTIFIC TEACHING THEMES</td>
<td>How does the activity address the themes of active learning, assessment, and inclusive teaching?</td>
</tr>
<tr>
<td>LESSON PLAN</td>
<td>Activity is described in enough detail so that another person could replicate how the activity was done exactly (if they wanted to) in their own classroom</td>
</tr>
<tr>
<td>SUPPORTING MATERIALS</td>
<td>Any materials used in the activity (slides, worksheets, quiz questions, etc.)</td>
</tr>
<tr>
<td>TEACHING DISCUSSION</td>
<td>Observations on how effective the activity was at achieving stated learning goals and objectives, student reactions, and suggestions for improvements or adaptations</td>
</tr>
</tbody>
</table>

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We encourage submission of toxicology articles!
Benefits of Publishing in *CourseSource*

1. Promotes active learning
2. Encourages new collaborations
3. Evidence of commitment to high-quality teaching

*CourseSource* articles:

- Can be listed on a CV
- Are relevant for promotion, tenure, and job applications
- Are tracked using # of views and downloads
- Can be partnered with research articles
Connect with CourseSource!

- Become a reviewer
- Find us at professional society meetings and conferences
- Follow us on Twitter and Facebook
- Apply to participate in a CourseSource Writing Studio workshop (Summer 2021)
- Submit your lesson!
Learn more about CourseSource!

- View the video recording of our December 2019 webinar with the National Institute for Scientific Teaching
- “CourseSource: A Place to Find and Publish Peer-Reviewed Active Learning Course Materials in the Life Sciences”

https://www.nisthub.org/webinar-series
Questions and Comments

- Please participate.
- Send to "All Panelists" via the Q&A panel in the lower right.
Please Submit Your Resources!!

- CourseSource
- LifeSciTRC
Diversity, Equity, and Inclusion in Undergraduate Toxicology Workshop

Friday, March 12, 2021
3:00 PM to 4:30 PM ET

Facilitator
Nicollette Mitchell
Director of Equity and Inclusion Education
Bates College

Sign up at https://www.surveymonkey.com/r/DEIWorkshop2021 by Feb. 26
Other Educator Events
Virtual 2021 SOT Annual Meeting

Wednesday, March 17
2:45 pm-4:05 pm: Education-Career Development Session: Innovation in Toxicology Training during Summer Undergraduate Internships Education Program

Wednesday, March 24
1:00 pm-2:45 pm Author Attended Education, Ethical, Legal, and Social Issues Poster session

Use the SOT Online Planner to develop your meeting schedule.
Undergraduate Student Events
Virtual 2021 SOT Annual Meeting

Saturday, March 13
2:30 pm-3:30 pm: What is Toxicology and Why Should I Care: Introduction to Toxicology and Q&A, Marquea King, USDA

Saturday, March 20
12:30 pm-1:30 pm: Ins and Outs of Graduate School in Toxicology: Insights into Admissions, Training, and Finding Success (facilitated discussion in breakouts)

3:00 pm-4:15 pm: Case Study: Metal Levels in Whales from the Gulf of Maine: One Environmental Health Approach, John Wise, University of Louisville, and Mindy Reynolds, Washington College (small groups)
Undergraduate Student Events, continued
Virtual 2021 SOT Annual Meeting

Wednesday, March 24
4:30 pm-5:30 pm: Toxicology Career Roundtables (small groups)

Thursday, March 26
2:45 pm-3:45 pm: Undergraduate Networking with Graduate Students (Informal small group discussions)

Dates and Times Pending
Open Time with Academic Program Directors: Graduate School Virtual Career Fair
Faculty Grant Applications Due March 26

Search “Awards” at www.toxicology.org

• Undergraduate Faculty Research Grant
  – Up to $1500 for undergraduate student research

• Undergraduate Faculty Development Grant
  – Up to $1500 to support a professional development experience that will support recruitment of undergraduate students to toxicology
Undergraduate Educator Network Webinars

Thank you for participating today!