

Expanding the Reach of Undergraduate Education Programs at Regional Meetings: Model Programs at Four Regional SOT Chapters

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ABSTRACT

Regional meetings are excellent opportunities for undergraduate students to learn about toxicology and to interact with a variety of professional toxicologists. However, the scientific programs at these meetings are often at depths beyond an undergraduate audience, and absent targeted recruiting, undergraduates typically attend only if recommended by an SOT member adviser. The Faculty United for Toxicology Undergraduate Recruitment and Education (FUTURE) committee supports Regional Chapters with grants and materials to provide undergraduate programming. Several features of undergraduate-focused programming at the SOT Annual Meeting have been successfully adopted at the regional meetings. "Lunch With an Expert" provides an opportunity for undergraduates to interact with toxicologists from alternative career paths to academia, such as industry or government. Undergraduate poster sessions provide an opportunity to present data that is more preliminary, preparing them to later present at national conferences through practice and critical feedback. An undergraduate breakout session has also proven popular among attendees. An "Introduction to Toxicology" slide set provides an overview of career paths and active learning exercises such as the "Opioids" activity have been used at two regional meetings. Both are available at the SOT website in the Learning Resources area for undergraduate educators. A keynote speaker can provide a career-focused talk that describes a pathway to becoming a professional toxicologist. Participants are subsequently encouraged to apply for the national meeting's Undergraduate Diversity Program, or, if they have an abstract, the Pfizer SOT Undergraduate Travel Award. A new unified online program assessment survey was used to provide undergraduate feedback for different aspects of each program for the four Regional Chapters awarded grants in 2019-2020. Likert scale and free-form responses indicate high satisfaction with all programs, as do comments such as "enjoying meeting people", "enjoyed keynote speakers discussing toxicology and education presentations", and "enjoyed undergraduate breakout session."

INTRODUCTION

Programs for undergraduates at the SOT Annual Meeting, including the Undergraduate Diversity Program, have been a staple for more than 30 years. However, this program is limited in scope because of significant travel costs, restrictions on conference space, and lack of awareness among institutions without toxicologists. To increase outreach to undergraduates, the Faculty United for Toxicology Recruitment and Education (FUTURE) Committee partnered with two Regional Chapters in 2017 to support undergraduate-focused programming at the Northeast and Ohio Valley SOT Regional Chapter meetings. During that first year, 44 students attended regional meetings at a cost of ~\$25 per student. Since that time, FUTURE has formalized the program and is now soliciting applications to support undergraduate training by Regional Chapters that hold spring 2020 meetings.

One approach to including undergraduates in regional meetings is to adopt portions of time-tested SOT programs, such as Lunch with an Expert and undergraduate-focused poster awards. This breakout session is modeled on the Committee on Diversity Initiatives (CDI) program at the SOT Annual Meeting, including a "Introduction to Toxicology" slide presentation, a more detailed scientific lecture targeted at an undergraduate level from a renowned scientist speaker who embodies diversity, and an active learning activity focused on a topical toxicological problem, such as opioids or vaping. This year, FUTURE supported four regional meetings during the fall, including those hosted by the Northeast, Central States, Mid-Atlantic, and Michigan Regional Chapters. This poster highlights features of four regional meetings featuring FUTURE funding from the past two years. These Regional Chapters have adopted region-specific approaches, depending on the needs of their area. Other innovative approaches are welcomed as we encourage expansion of the number of Regional Chapters featuring undergraduate programs. This program will continue next year, with applications for the Fall regional meetings happening soon.

REGIONAL EDUCATION PROGRAMS INCREASE OUTREACH TO DIVERSE UNDERGRADUATES

Central States Society of Toxicology Regional Meeting – Fall 2019

- 11 undergraduate students and 30 high school students were in attendance.
- "Undergraduate Education in Toxicology" was the theme of the meeting
- "Applying Vision and Change to Your Undergraduate Toxicology Course: Tips for Using the Undergraduate Toxicology Learning Framework" was presented by Joshua Gray, U.S. Coast Guard Academy.
- "Poisoning the Curriculum (for good reason!): Novel Approaches to Spreading and Embedding Toxicology Concepts in Undergraduate Science Courses" was presented by Christine Curran, Northern Kentucky University.
- Undergraduate Poster Session with Two Awards for Best Undergraduate Poster.
- Undergraduate Breakout Session
 - "Introduction to Toxicology" was presented by Annelise Nguyen of Kansas State University.
 - "Opioids", an active learning exercise, was presented by Joshua Gray.
 - "The Strange Case of Jennifer Strange" was presented by Christine Curran.
- SOT Resources Used: "Intro to Tox" slideset, "Opioids" active learning exercise.
- \$500 in funding provided by FUTURE, supported undergraduate registration fees.



Christine Curran leads the active learning exercise "The Strange Case of Jennifer Strange."



Annelise Nguyen provided the "Intro to Toxicology" to undergrads and high school students.

Northeast Society of Toxicology Regional Meeting – Fall 2019

- 40 undergraduate students from six institutions: Brown University, Massachusetts College of Pharmacy and Health Sciences, Salve Regina, Swarthmore, University of Massachusetts Amherst, and the University of Rhode Island.
- Poster Session with an award for "Best Undergraduate Poster" (14 undergraduate participants).
- "Lunch With an Expert".
- Tour of pharmaceutical companies: Takeda, Pfizer, or Novartis.
- Undergraduate Breakout Session
 - "Introduction to Toxicology" was presented by Larissa Williams of Bates College.
 - A talk on Immunotoxicology with case studies was presented by Birgit Fogal from Boehringer-Ingelheim.
 - An active learning exercise entitled "Opioids" was presented by Larissa Williams.
- SOT Resources Used: "Intro to Tox" slideset, "Opioids" active learning exercise, "Lunch With an Expert".
- \$500 in funding provided by FUTURE, supported undergraduate registration fees.



Birgit Fogal provided a lecture on Immunotoxicology to undergraduates in the breakout session.



Sharon Zeldin of Brown University was presented the "Best Undergraduate Poster" award by Dr. Elizabeth Vancza.

Mid-Atlantic Society of Toxicology Regional Meeting – Fall 2019

- 22 undergraduate students from four institutions: John Jay College, St. Johns University, Rutgers University, and Drew University.
- Poster Session with an award for "Best Undergraduate Poster"
- Undergraduate Breakout Session
 - "Introduction to Toxicology" was presented by Kristian Fried of Colgate-Palmolive Company.
 - An active learning exercise entitled "Opioids" was presented by Josh Gray of the U.S. Coast Guard Academy.
 - "Pursuing Toxicology as a Career – From Internships to Graduate School" by Danielle Kozlosky of Rutgers and Erin Huber of St. Johns University
- SOT Resources Used: "Intro to Tox" slideset and "Opioids" active learning exercise
- \$500 in funding provided by FUTURE, supported undergraduate registration fees.
- St. Johns offered bus transportation to the meeting which greatly increased participation.



Diane Hardej and Sue Ford are shown with undergraduate students from St. Johns University.



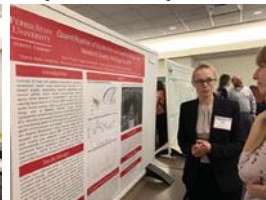
Demi Cheng is shown with undergraduates attending from John Jay College of Criminal Justice.

Michigan Society of Toxicology Regional Meeting – Fall 2019

- 14 undergraduate students
- Poster Session with undergraduate poster awards.
- Lunch With an Expert – featured tables for trainees with representation of different careers in toxicology.
- Meeting Buddies – 4-5 undergraduates were assigned to senior trainee "mentors" who introduced them to Regional Chapter members and answered questions about toxicology in a less intimidating setting.
- Poster Tours for Trainees Program – modeled after the similar program at the national SOT meeting.
- Tour of NSF International Lab.
- \$500 in funding provided by FUTURE supported registration for 26 undergraduate students.



Ferris State Undergraduates Matt Swanson, Kayla Chamberlain, Sabina Liskey, and Sierra Shaw attended MISOT's Regional Meeting.



Stacy Thurber of Ferris State University received an undergraduate poster award.

SOT provided \$3,000 in funding to enhance undergraduate experiences at six regional SOT meetings in 2019-2020. These funds are managed by SOT's FUTURE Committee.

IMPACT

- > 85 undergraduate students attended the four FUTURE-sponsored regional meetings in Fall of 2019.
- > Regional Chapters have adopted undergraduate programming from the national SOT meeting, such as "Lunch With an Expert", "Meeting Buddies", and "Poster Tours for Trainees" programs.
- > Regional Chapters have also adopted programming developed by other Regional Chapters, such as the Undergraduate Breakout Session.
- > The cost per student is <\$25, a tremendous impact per dollar.
- > Undergraduate students reported exceptional satisfaction with the programming of the undergraduate programs using the official SOT survey for undergraduates.
- > The Committee for Diversity Initiatives (CDI) core programming is deliverable to undergraduates at regional meetings with minimal staffing.
- > Regional SOT meetings provide an opportunity for increased outreach to undergraduates from under-represented institutions and/or institutions lacking toxicologists.

INCREASING THE PIPELINE OF UNDERGRADUATES INTO TOXICOLOGY

- > Identify undergraduate educators within each SOT region willing to develop an Undergraduate Education Program.
- > Utilize the SOT assessment tool for undergraduate participation in Regional Chapter meetings.
- > Encourage dialogue among Regional Chapters of SOT to develop appropriate undergraduate-targeted programming.
- > Assess effect of SOT regional programming on undergraduate membership as SOT affiliates.
- > Assess effect of SOT regional program on registrations of regional undergraduates at the annual SOT meeting.
- > Follow up with requests for Toxicology Scholars visits at underserved institutions.
- > Provide contact information for undergraduates indicating interest in graduate toxicology programs to graduate program officers.

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