FOOD SAFETY

Specialty Section | Society of Toxicology | Founded in 1993

In this issue:

President's Greeting 1
New Officer Intro 2
Mentoring Report 3
Proposal Report 4
FS³ Reception 5
Award Recipients 7
Treasury Report 7
Trainee Section 8
Member News 9
SOT 2020 Preview 9

Current FS³ Officers

Mansi Krishan, President
mansi.krishan@outlook.com

Chester Rodriguez, Vice President
chester.rodriguez@duke.edu

Vijayavel Kannappan, VP Elect
vijay.kannappan@gapac.com

Karin Ke, Past President
ke@khlaw.com

Sharon Meyer, Secretary/Treasurer
meyer@ulm.edu

Logeswari Ponnusamy, Senior Councilor
drlogs8910@gmail.com

William Tolleson, Senior Councilor
william.tolleson@fda.hhs.gov

Ray Matulka, Junior Councilor
rmatulka@burdockgroup.com

Sascha Nicklisch, Junior Councilor
nicklisch@ucdavis.edu

Jorrell Fredericks, Postdoc Rep
jorrellf@iastate.edu

Sumira Phatak, Senior Student Rep
sumira.phatak@usu.edu

Ruth Wangia, Junior Student Rep
rnw95451@uga.edu

Outgoing Officers

Janet Zang, Past President
janetzangSOT@gmail.com
Mike Bolger, Councilor
pmbolger33@gmail.com
Cody L. Wilson, Councilor
codywilson@coca-cola.com
Gopi Gadipudi, Postdoc Rep
gopi.gadupudi@nih.gov

Letter from the President

Dear SOT FS³ members,

It was great seeing everyone in Baltimore earlier this year! FS³ endorsed CE courses, symposia and roundtable sessions at SOT 2019 Annual Meeting were well received. It's exciting to see more food safety topics being presented and discussed at SOT Annual Meeting meetings. To keep the momentum going, FS³ officers completed the pre-review and review of session proposals seeking endorsement from FS³ and provided feedback to further strengthen the proposals. Also, for this year, FS³ leadership is working on developing webinars on emerging food safety topics. If you have suggestions for a webinar topic or a short debate at the FS³ reception, 2020 SOT Annual Meeting, please share it with us.

We had a great turnout at the FS³ reception at SOT 2019 Annual Meeting and the attendees enjoyed the networking opportunity. Results of the new officer ballot and our prestigious awards, the Burdock Student Award and the Frank C. Lu Graduate Student Award were announced. Congratulations to all the winners! Please see the details below to learn more about the award winners and their research. To recognize early career scientists and post docs for their scientific contributions in food safety, FS³ is thrilled to announce a new award "Frank C. Lu Early Career Scientist Award, Food Safety Specialty Section" this year! We encourage early career scientists and post docs to apply for this award. Please see the section below for more details. A big thank you to FS³ 2019-2020 Awards Subcommittee members for spearheading this effort.

On behalf of the 2018-2019 FS³ leadership team, I would like to thank our out-going officers for their contributions to the success of FS³, Janet Zang (Past President), Cody Wilson (Councilor), Michael Bolger (Councilor), Gopi Gadupudi (Postdoctoral Representative), and Suresh Nagumalli (Graduate Student Representative). To provide more leadership opportunities to graduate students, FS³ is pleased to announce a new officer position of a "junior graduate student representative" this year. This idea was well received by SOT Council and they are encouraging other specialty sections to add a similar graduate or postdoc officer position.

I am very fortunate to have a strong, enthusiastic and dedicated leadership team this year who started working even before the start of their term. I'd like to welcome our new officers Drs. Vijay Kannappan (Vice President-Elect), Ray Matulka (Councilor), Sascha Nicklish (Councilor), Jorrell Fredericks (Postdoctoral Representative), Sumira Phatak (Senior Graduate Student Representative), and Ruth Nabwire Wangia (Junior Graduate Student Representative) to the 2019-2020 Executive Committee. I'd also like to thank Drs. Karen Ke (Past President), Logeswari Ponnusamy (Councilor), William Tolleson (Councilor), Sharon Meyer (Secretary/Treasurer), Chester Rodriguez (Vice President) for continuing with their responsibilities and going above and beyond their commitments to support the leadership team.

Thanks to current and new FS³ members for continued support, FS³ is continuing to grow from strength to strength. If you have any thoughts and suggestions to help improve our specialty section or would like to share your scientific and career achievements, please feel free to contact any of the officers or me.

Sincerely,

Mansi Krishan, PhD

President of FS³

New Officers

Vice President Elect

Vijayavel **Kannappan**, PhD, ERT

Manager: Georgia Pacific LLC

Dr. Kannappan has over 15 years of active practice in human & environmental health toxicology. In his current role as a Regulatory Toxicology & Stewardship Manager, Vijay ensures human and environmental safety of personal hygiene and skin care products. Previously, he was a Senior Product Safety Toxicologist at Mary Kay Inc., accountable for the safety of raw materials used in cosmetic products. His educational qualifications includes, Post-Doctoral Research in Environmental Toxicology; PhD & MS in Environmental Toxicology; and BS in Microbiology. Dr. Kannappan is recognized as a subject matter expert and serves a Committee Member in the Safety and Regulatory Toxicology Task Force with Personal Care Products Council, advocating and driving science-based policies impacting cosmetics and personal care products. He is has authored over 100 publications (peer-reviewed and non-refereed) with a track record of 1200+ citations in the field of Human and Environmental Health Sciences. Vijay's SOT involvement includes serving as the Dermal Toxicology Specialty Section's Vice President Elect and recent recipient of the Association of Scientists of Indian Origin Special Interest Group's Senior Toxicologist Award. He is also on the Steering Committee Member of the Ecological Risk Assessment World Interest Group of the Society of Environmental Toxicology & Chemistry.

Councilor

Ray **Matulka**, PhD

Director of Toxicology: Burdock Group Consultants

Dr. Matulka has more than a decade of experience in the analysis of toxicity data, and conducting safety and risk assessments. Among other responsibilities, Dr. Matulka is accountable for the development of consumption analysis and reporting, and offers guidance in strategic scientific business planning and critical decision making to Burdock Group clients in the food and feed ingredient, health and nutrition industries for humans and animals. The Burdock Group is the leading food safety consulting firm, headquartered in Orlando, FL. Previous areas of work involve a variety of different food and feed ingredients, including evaluating the safety of micro-algae as ingredients in human food, to unique plant extracts as ingredients added to animal feed. He earned a doctorate in toxicology from the Virginia Commonwealth University & Medical College of Virginia, with post-doctoral experience at both the Boston University School of Medicine and the University of North Carolina. Ray has industry experience at the Nebraska Department of Environmental Control and as a senior genetic toxicologist at Genesys Research in North Carolina. He has been a full member of the SOT since 2004, at which time he joined FS3, where he has also served as a past President; he is currently the Chair of the Institute of Food Technology's Toxicology and Safety Evaluation Division. He has authored two book chapters and over 40 publications.

Councilor

Sascha **Nicklisch**, PhD, MS

Assistant Professor: UC Davis

Dr. Nicklisch's educational and academic background includes a masters degree in biological sciences, a PhD in protein biochemistry, and three postdocs in the fields of experimental physics, marine biomaterials, and molecular toxicology. The Nicklisch lab is interested in determining current levels of man-made environmental chemicals in food and to identify the molecular mechanisms of chemical and drug uptake and distribution in humans. The goal of this research is to develop new avenues to the rational design of both novel therapeutics with improved cell retention and "greener" environmental chemicals that are better eliminated from the body. Sascha has reviewed regional projects and co-authored reports on Environmental Pollution and Aquatic Toxicology for the City of San Diego, UC Santa Barbara, Portland State University, and the California Council on Science and Technology. He has received funding from government agencies, private donors and foundations. He has published 15 peer-reviewed articles and book chapters, including his key study in Science Advances that was granted the 2017 Best Postdoctoral Publication Award from the SOT. He has been an active member of the SOT since 2015 and of FS^3 since 2018.

Postdoctoral Representative

Jorrell **Fredericks**, PhD

Postdoctoral researcher: USDA

Dr. Fredericks holds a doctorate in toxicology from Iowa State University. In his current role at the Animal Parasitic Disease Laboratory, he provides subject matter expertise that integrates toxicology and microbiology to solve food safety issues that impact the international market. During his graduate career, Jorrell served as a mentor to both undergraduates and incoming graduate students, and received multiple awards at regional conferences for his work done in the areas of heavy metals and nanoparticles. Additional areas of research interest includes inflammatory bowels disease, gut microbiome, and food-borne parasites. Jorrell has been a member of SOT since 2016 and FS3 since 2019. He is continuing his mentoring ways as he now serves as a mentor for undergraduates with an interest in food safety. Jorrell is excited to learn more about the various areas of food safety and become involved in the leadership role of the food safety specialty session.

Grad Student Representative

Ruth **Wangia**, MS, BS

Doctoral candidate: University of Georgia

Ms. Wangia is a doctoral candidate in the College of Public Health at the University of Georgia. She hold a BS in Environmental Sciences and currently works in the Environmental Health Sciences laboratory of Professor Jia-Sheng Wang. Her research focuses on the health impacts associated with consuming mycotoxin contaminated food products. Through her work, Ruth aims to understand how mycotoxins contribute to micronutrient deficiency, immune suppression, and impaired growth in high risk populations like children. She has authored 4 peer-reviewed journal articles. Ruth has been a member of the SOT since 2016 and has served as a poster session chairperson, Program Review Committee Member for the Women in Toxicology specialty section, and volunteer for the Continuing Education programs.

FS3 Mentoring Event

March 11, 2019
Monday, 5-6 pm
Baltimore Convention Center, CC Room 34

The SOT Food Safety Specialty Section (FS³) held its second mentoring event at the 2019 SOT 58th annual meeting in Baltimore, MD. FS³ is an emerging and growing specialty section within SOT whose primary goal is to stimulate interest in food safety as it relates to the science of toxicology. The 2019 mentoring event provided toxicology trainees (students and post-docs) early in their career with an opportunity to interact with Food Safety professionals from different sectors in government, industry, academia, and CRO/non-profit organization. The trainees were able to ask questions in a comfortable roundtable format and receive critical guidance in exploring the different career paths in Food Safety.

Mentors

Jackie **Goodrich**, PhD
Research Assistant Professor
University of Michigan

Jayadev **Raju**, PhD
Research Scientist
Health Canada

Khatera **Rahmani**, PhD
Senior Toxicologist
Conagra Brands

Laurie **Dolan**, PhD, DABT, FACN
Senior Toxicologist
US FDA

Sandra **James Yi**, DVM, PhD, DABT, DABVT
Global Nutritional toxicologist
Mary Kay Inc.

Vijay **Kannappan**, PhD, DABT, ERT
Manager
Georgia Pacific

Organizing Committee

Chester **Rodriguez**
Committee Chair &
FS³ VP Elect

Gopi **Gadupudi**
FS³ Post Doc Rep

Sumira **Phatak**
FS³ Student Rep

Sponsors

Food Safety Specialty Section

SOT CRAD
(Career Resource and Development)

The event was attended by 22 trainees (graduate students and post doctoral researchers) and 6 mentors. Mentors were assigned to their respective food safety sectors, so there was a table for government, industry, academia, and CRO/non-profit organizations. The trainees had the opportunity to switch tables after a set time, so that they would receive different perspectives from all food safety sectors. Table discussions were lively and the only criticism was that there was not enough time to continue the discussion at each table. In most cases, the mentors and trainees exchanged contact information, including LinkedIn profiles, so that they could grow their professional network. This FS³ mentoring event holds tremendous potential for increasing Food Safety interest for future SOT meetings.

Proposal Report

Continuing Education Course

AM04: Complex Mixtures and UVCBs: Analysis, Testing, and Risk Assessment

Sunday, March 10 from 8:15 am to 12:00 pm
Baltimore Convention Center CC Room 316

Endorsers:
Food Safety Specialty Section
Mixtures Specialty Section
Regulatory and Safety Evaluation Specialty Section

Chairpersons:
Cynthia **Rider**, NIEHS/NTP
Mansi **Krishan**, Danone North America

Speakers:
Brenna **Flannery**, USFDA & CFSAN
A Regulatory Perspective on Complex Mixtures
Timothy **Baker**, Procter and Gamble Company
Characterization of Complex Mixtures to Enable Safety Assessments
Joshua **Kellogg**, University of North Carolina
Techniques to Identify Bioactive Constituents from Complex Mixtures: A Biochemometrics Approach
Cynthia **Rider**, NIEHS & NTP
Evaluating Sufficient Similarity of Complex Mixtures: A Review of Case Studies

A complex mixture, as defined in a 2018 update to the Agency for Toxic Substances and Disease Registry Framework for Assessing Health Impacts of Multiple Chemicals and Other Stressors, has many chemicals (often of different chemical classes), has a composition which may not be fully characterized, and can arise from a single source or multiple sources. The related, but more specifically defined, term, UVCB substances (Chemical Substances of Unknown or Variable Composition, Complex Reaction Products and Biological Materials), has been applied by both the US EPA in the Toxic Substances Control Act (TSCA) Chemical Substance Inventory and the European Chemicals Agency (ECHA) under the Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH) regulations. Complex mixtures and UVCBs can include foods and beverages, personal care or consumer products, reaction by-products, emissions, and leachates. They can exhibit a wide array of physicochemical properties and fall under different regulatory jurisdictions. However, there are common principles that can be applied to these substances to gain an understanding of their complex chemistry and evaluate their toxicity and/or safety. Historically, the prevailing dichotomy was to either treat these substances as single entities, thereby ignoring their complex and often dynamic nature, or apply a reductionist approach that only considered a small subset of known constituents (i.e., identified chemical constituents with available toxicity data). Progress in analytical chemistry techniques, untargeted analyses, and *in vitro* screening tools has allowed for a more comprehensive and holistic approach to complex mixtures. In this course, state-of-the-science approaches for evaluating complex mixtures and UVCBs were presented. It began with a presentation of the regulatory challenges and views of complex mixtures from the perspective of the US FDA Center for Food Safety and Applied Nutrition (CFSAN). Next, recommended methods for chemically analyzing complex mixtures and identifying biologically active constituents were presented. Untargeted approaches for assessing complex mixtures, such as metabolomics and chemometrics, were addressed. The use of *in vitro* assays and alternative animal models in screening complex mixtures were discussed, with attention on successful applications and pitfalls to avoid. Additionally, available methods and software for combining chemical and biological assay data were presented. Finally, existing methods for comparing across complex mixtures and determining sufficient similarity of related mixtures were presented. Presentations addressed chemistry, biological activity, and the intersection of the two, with an intentional focus on how these data can be used in safety evaluations of complex mixtures. Throughout the course, speakers provided terminology and definitions and highlight tools using a diverse array of examples, representing distinct categories of complex mixtures and UVCBs. This course was useful to those interested in understanding complex mixtures from a product development, research, or regulatory perspective. Course participants were provided with both big picture context on complex mixtures and specific recommendations learned from application of the presented methods.

Food is a complex mixture and Dr. Brenna Flannery's presentation provided one perspective from the US FDA. Her presentation addressed various challenges in detection and quantification of mixture components in foods, the exposure assessment of mixtures and evaluating toxicity of mixtures. Session participants were most interested in using the Expanded Decision Tree for toxicity assessment, and using the C. elegans *model to assess developmental neurotoxicity of mixtures.*

Click **here** to join the SOT Food Safety Specialty Section!

Click **here** to contact us and receive more information about a career in toxicology and food safety!

Proposal Report

Roundtable Session

The Delaney Clause, from 1958 to 2019: Making the Model Relevant

Tuesday, March 12 from 11:00 am to 12:20 pm
Baltimore Convention Center CC Room 309

Endorsers:

Food Safety Specialty Section
Association of Scientists of Indian Origin Special Interest Group
Regulatory and Safety Evaluation Specialty Section

Chairpersons:

Lisa **Navarro**, Givaudan Flavors Corp
Mansi **Krishan**, Danone North America

Speakers:

Barbara **Beck**, Gradient
Updating the Delaney Clause: Mode-of-Action Considerations for Carcinogens
Suzanne **Fitzpatrick**, USFDA
Relevance of the Delaney Clause to the 21st-Century Regulatory Issues
Michael **Dourson**, TERA
Pro-Delaney Perspective
Ricardo **Carvajal**, Hyman, Phelps & McNamara PC
Developing a Path Forward to Make the Delaney Clause More Relevant Based on Current Science

The following event summary was graciously provided by Dr. Barbara Beck (PhD, DABT, ATS).

The institution of the Delaney Clause occurred more than a half century ago during a time when understanding of chemical carcinogenesis was limited. Recognition that certain carcinogens could interact with DNA, causing mutation, and that tumors are clonal in origin led to a proposed mechanism for chemical carcinogenesis, whereby a single molecular event could initiate the carcinogenic process, thus increasing risk of cancer. This resulted in the development of the linear no-threshold dose-response for calculating cancer risks, although, due to the lack of empirical data at dose levels of typical regulatory interest, the risks represent hypothetical risks.

Understanding of chemical carcinogenesis has evolved dramatically since Delaney, with the recognition of two basic modes of action (MOA) for chemical carcinogenesis. The first MOA involves direct genotoxicity whereby DNA damage occurs in multiple oncogenes or tumor suppressor genes in a single progenitor or stem cell in a particular tissue, that goes unrepaired and leads to cellular growth advantage of the mutated cells over undamaged cells. The second MOA involves indirect enhancement of cell proliferation due to several potential mechanisms, including increased mitogenicity from hormonal or growth factor stimulation, prolonged cytotoxicity leading to regenerative hyperplasia, and reduced apoptosis. As discussed here, there is evidence that both of these MOAs may be associated with non-linear or threshold dose response relationship. Thus, it is time to revisit the utility of the Delaney.

For chemicals which can interact directly with DNA to induce gene mutations or chromosome aberrations (and for which a linear no-threshold model is typically recommended), a threshold dose-response

model may be appropriate. There are multiple lines of evidence for such thresholds, including repair of DNA damage and metabolic inactivation of reactive moieties. An example of a threshold dose-response for a DNA-reactive carcinogen can be found in studies on the MOA of methyl methane sulfonate (MMS). MMS is carcinogenic in rats and mice by multiple exposure routes, and mutagenic in both *in vitro* and *in vivo* test systems. Work by Swenberg et al. MMS in an *in vitro* cell system demonstrated a linear dose-response for exogenous 7-methyl guanine adducts, a biomarker of exposure. In contrast, HPRT mutation frequency, a more relevant biomarker of effect, showed a threshold dose-response with MMS in the same system, indicating that a threshold dose-response relationship would be more appropriate for cancer risk assessment.

The second MOA, enhancement of cell proliferation, is recognized as relevant to multiple carcinogens. Enhancement of cell proliferation increases the likelihood that an unrepaired DNA mutation or a DNA repair error will occur, thus increasing probability of oncogene activation or tumor suppressor gene inactivation. These events can lead to tumor induction. Owing to the lack of direct mutagenic activity, enhancement of cell proliferation clearly operates via a threshold dose-response. Enhanced cell proliferation can occur through multiple mechanisms. These mechanisms and associated example chemicals are listed below:

- Induction of cytotoxicity leading to regenerative hyperplasia
- Dimethylarsinic acid and rat bladder tumors
- D-limonene and rat renal tubular tumors
- Pulegone and rat urothelial tumors
- Receptor-mediated induction of cell proliferation
- TCDD and AhR binding and rat liver tumors
- Ciprofibrate and PPARα binding and rat liver tumors
- Hormonally-mediated mechanisms
- DES and cervical/vaginal adenocarcinoma in women
- Sulfamethazine and thyroid tumors in rats

Thus, MOA considerations support the use of non-linear dose-response models for DNA non-reactive carcinogens and likely for many DNA reactive carcinogens. The inability to use such consideration in evaluating carcinogenic substances in the food supply, based on Delaney, can, in certain situations, distort regulatory focus towards food contaminants of lesser risk versus those of greater risk.

FS3 Reception

FS3 Reception

Award Recipients

Frank C. Lu Student Award

Jeremy **Gingrich**

Doctoral Candidate
Michigan State University

Jeremy is a graduate student in the Departments of Animal Science and Pharmacology & Toxicology. The primary focus of his work aims to understand the impact maternal exposure to endocrine disrupting chemicals has on the development and function of the placenta, and how such gestational exposures may contribute to undesirable developmental outcomes such as obesity. Within the scope of his dissertation, he specifically studies bisphenol chemicals, which are heavily used in food packaging and canned food liners.

"This field really chose me, and helped evolve my interests. I had previously worked as a technician in a privately funded developmental biology laboratory that studied rare disorders, and really became interested in chemical exposures and their role in the developmental origins of disease after starting graduate school. My current work is a really great marriage between both my interest in developmental biology and in toxicology. I will likely be defending my dissertation within the year, and foresee a future career for myself in the field of experimental toxicology and/or risk assessment consulting; ideally seeking a position where I will be able to utilize my background in reproduction and developmental toxicology. It was truly an honor and great surprise to receive the Frank C. Lu award through FS³ at the 2019 SOT annual meeting. This award has given both myself and my research broad recognition in the toxicology community, and will also aid in funding my attendance to the 2020 SOT annual meeting."

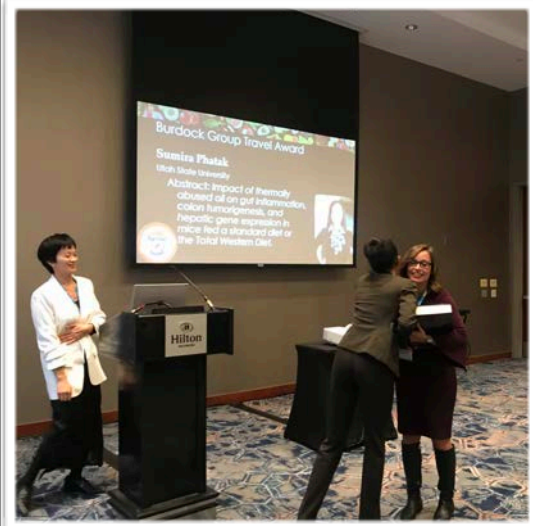
Burdock Group Travel Award

Sumira **Phatak**

USDA Predoctoral Research Fellow, Utah State University

Sumira is a graduate student in the Department of Animal, Dairy, & Veterinary Sciences. Her work explores the connection between nutrition, colorectal cancer, epigenomics, and the microbiome. The primary focus of her dissertation has been characterizing the transgenerational impact of the Western dietary pattern on health outcome, but she has also completed a number of other preclinical projects testing the chemopreventive properties of functional foods. This particular project explored the dietary impact of deep fried oil consumption on colorectal cancer, metabolic syndrome, and hepatic gene expression of a number of key regulatory targets.

"I was both honored and humbled to be selected by the Burdock Group to receive this award. The textbook was an extra special touch that, upon return to USU, was used to make my fellow lab mates jealous. I really enjoyed getting to chat with Julie Brickel at the reception and learn more about the Burdock Group. I hope to one day meet Dr. Burdock at SOT, so that I may thank him in person for his generosity. This award facilitated my attendance at SOT 2019 and continued involvement within FS³. Serving as the grad student rep has been a very fulfilling and rewarding experience that has brought many new friends, mentors, and possibly future collaborators into my life. I am so grateful for all of the opportunities that SOT, and specifically FS³, has created for me and would like to extend my eternal gratitude to Dr. Burdock for his support."



Treasury Report

Dear FS³ Members,

Although we are still awaiting some pledged donations, as of 03 Oct, 2019, our last financial statement (June) shows FS³ net assets of $22,500, for an increase of $2,200 from last year at this time. Although industry contributions are less by $600 thus far and expenses increased by $1200, FS³ made up the difference with gains in membership dues, meeting registration share and interest. Thus, 2019 financials appear to be improved by ~11% from last year. Additional effort of leadership is ongoing to collect pledged donations and membership gains appear to be sustained.

Dr. Sharon **Meyer**, FS³ Secretary & Treasurer

Trainee Section

Undergraduate Students

Submitting an abstract to present qualifies you to apply for **27** travel awards available **here**.

Undergraduate Student Affiliate

Did you know that undergraduate students and recent grads can receive complimentary SOT membership? Gain access to ToXchange, student opportunities, and CEd-Tox online courses by applying **here**.

SOT 2020 Registration

Did you know that high school and undergraduate students can receive complimentary SOT registration? Gain access to the Sunday Undergraduate Education Program and all of the annual meeting programming by applying **here**.

For all trainees

View webinars

SOT webinars are recorded and can be accessed **here**.

Join FS³!

Did you know that SOT provides free component group membership to trainees **here**.

Graduate Students

Submitting an abstract to present qualifies you to apply for **115** travel awards available **here**.

Click **here** for more information on how to apply for the following awards:

Burdock Group Travel Award

deadline: February 14

Frank C. Lu Student Award

deadline: January 27

STEP Award

deadline: May & October

Supplemental Training in Education Program: to pursue training in identified areas of professional or scientific development that is necessary to achieve career goals, but outside immediate scope of research program.

apply here

GIFT Award

deadline: February 20

Graduate Intern Fellowship in Toxicology: to engage in internships within industry, government, and non-profit organizations. The pre-application deadline is November 8.

apply here

Postdoctoral Researchers

Submitting an abstract to present qualifies you to apply for **88** travel awards available **here**.

New FS³ award!

deadline: January 27

Frank C. Lu Early Career Scientist Award

One meritorious early career trainee abstract will be selected to receive this award at the SOT Annual Meeting. Applicants must be early career scientists conducting original research in food safety or related areas, within five years of PhD completion at the submission deadline. The award winner will be announced during the FS³ reception, where they receive $600 and a plaque. This award is made possible by the Frank C. Lu Student Award Endowment Fund. To apply, contact William Tolleson.

NEXT Award

deadline: October 28

New Experiences in Toxicology: to obtain training outside of their current sector with support from their postdoctoral mentor.

apply here

ToxScholar Outreach Grant

to promote toxicology careers through the interaction of toxicologists with student audiences.

apply here

international deadline: October 9
domestic deadline: ongoing

Member News

FS3 Member Achievements

Check out all of the FS3 accomplishments!

Mina **Mahdavi-Yekta**
- *Earned degree*: PhD
- *New position:* Food Industry Lecturer

Ruth Nabwire **Wangia**
- *Leadership:* Junior Graduate Student Representative @ SOT FS3
- *Award:* Outstanding Graduate Student @ University of Georgia

Jieun **Lee**
- *New position:* VP of Food Safety & Quality @ CJ Foods

Jayadev **Raju**
- *Leadership:* Councillor @ The Society of Toxicology of Canada

David **Tonucci**
- *Leadership:* Treasurer @ ToxForum

Jorrell **Fredericks**
- *Leadership:* Postdoctoral Representative @ SOT FS3

Christine **Thiffault**
- *New position:* Advansix Inc

Sumira **Phatak**
- *Leadership:* Executive Committee Social Media Chair @ American Society for Nutrition Student Interest Group

Other meeting attended by FS3 members:

Make new connections!

American Chemical Society
American College of Toxicology
American Society for Nutrition
Environmental Mutagenesis and Genomics Society
Institute of Biological Engineering
Institute of Food Technologists
International Life Sciences Institute
International Sweetener Association
SOT Canada
ToxForum

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SOT

59th Annual Meeting
& TOXEXPO • March 15–19, 2020

Anaheim, California

Save the date!

when: March 15-19, 2020
where: Anaheim, CA

abstract submission:
10.18.2019

SOT membership:
12.31.2019

late breaking abstract:
January TBD

early-bird registration:
01.17.2020

standard registration:
02.07.2020

Chair a session!

Get involved at the SOT annual meeting by volunteering **here**

Join us at the 2020 FS3 reception!

Tuesday, March 17, 2020

Join us at the 2020 FS3 mentoring event!

Contact **Vijay Kannappan** for info