Stem Cells Specialty Section

Newsletter

Winter 2020

President's Message

Dear Stem Cells Specialty Section members,

Welcome to our new look SCSS Winter 2020 Newsletter. March is already upon us, which means we're busy planning for the Annual Meeting. The 2021 SOT program features many stem cell-themed events, including a SCSS-endorsed symposium session on neurotoxicity safety testing (see page 5 for more details). We will also be holding a virtual reception at 2021 SOT on **Wednesday March 17, from 4:15pm to 5:30pm ET**. This SCSS event will be held via a "Zoom room," and briefly cover the SCSS activities over the last year, followed by our annual awards, and short presentations by our Excellence in Research Award winners. Congratulations to all our 2021 award winners, and thank you to our sponsors for their generosity.

In May we will also welcome our newly elected SCSS Officers for 2021-22. Please join me in congratulating Blake, Sanket, Nicole, and Amy. Additionally, many thanks to all of you who ran in these elections.

On a personal note, I would like to thank each of you for your continued participation and support of the SCSS. A special thanks to each member of the SCSS Leadership Team for your conscientious and perseverance over this challenging year. In particular, I would like to thank Nicole R. Sparks for collating all the great content featured in our newsletters.

Finally, if you would like to play a more active role in the SCSS, or have ideas about how we can better serve the stem cell community within SOT, I would encourage you to contact me via email to discuss this further (mclements@axionbio.com). We look forward to seeing you all at our virtual reception on March 17.

Enjoy 2021 SOT!

Mike Clements

President, Stem Cells Specialty Section

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Nicole R. Sparks, University of California, Riverside

Student Representative
Amy Tran, University of Southern California

New Officers for 2021

Meet the new SCSS Officers starting May 2021.

Vice President-Elect

Blake Anson, StemoniX

Blake Anson, Vice President of Business Operations at StemoniX, is working to implement higher-order human iPSC-based platforms across drug development sectors. He received his doctorate in Neuroscience at the University of Oregon-Eugene with post-graduate work in Molecular Genetics and Cardiovascular Cellular Physiology at the UW-Madison. He has authored over 30 peer-reviewed manuscripts and book chapters, taught Continuing Education courses within the Safety Pharmacology Society, and has guided the development of a variety of iPSC-based solutions to Drug Discovery, Academic, and Government sectors over the past 17 years. He has been active in SOT since 2005 and a member since 2019.

Councilor

Sanket Gadhia, SafeBridge Consultants

Dr. Gadhia is a Senior Toxicologist at SafeBridge Consultants, Inc., where he conducts risk assessments for active pharmaceutical ingredients (API) and non-APIs with an emphasis on pharmacological and toxicological evaluation. He previously worked at Research Institute for Fragrance Materials, Inc. and Avon Products, Inc. in the human health/product safety group. His research efforts are towards development and application of novel alternative models in assessing as well as predicting the systemic adverse effects due to chronic chemical exposure. Dr. Gadhia serves as a member of the Expert Group developing alternate tools/models for animal testing as well as refining the concept of Threshold for Toxicological Concern (TTC) in collaboration with Cosmetics Europe (CosEU) and International Life Sciences Institute (ILSI) Europe. Recently Dr. Gadhia was also admitted as a Member of the Royal Society of Biology (RSB). He received his doctorate in Pharmaceutical Sciences with a focus in metal-induced epigenetic alterations in mouse embryonic stem cells from St. John's University, NY in 2015. Dr. Gadhia trained as an Eli Lilly Postdoctoral Research Fellow at the National Center for Advancing Translational Sciences (NCATS), a part of the National Institutes of Health (NIH) where his research focused on drug discovery, assay development, and high-throughput screening for epigenetic modulators [2015-2017]. He is author/co-author of 277 peer-reviewed articles including research papers, book chapters and safety assessments. He has been a member of the SOT since 2011 and has served the SOT in the following capacities: Postdoctoral Representative (Stem Cells; Carcinogenesis), Graduate Student Representative (Stem Cells; Continuing Education Committee; In Vitro and Alternative Methods), Undergraduate Diversity Program Mentor, Professional Development Subcommittee, Communications Subcommittee.

Officers Returning for 2021

Meet the SCSS Officers who were re-elected.

Postdoctoral Representative

Nicole R. Sparks, University of California, Riverside

Dr. Sparks is a NIEHS K99 MOSAIC Postdoctoral Fellow at the University of California Riverside. Her doctoral research focused on the adverse effects of "harm-reduction" tobacco products on the cell fate of human embryonic stem cells (hESCs), specifically differentiation into the bone-forming cells—osteoblasts. This research discovered transcriptions factors, necessary for proper bone differentiation, that were negatively impacted by tobacco exposure, potentially uncovering an underlying mechanism between maternal smoking and birth defects. Currently, she has expanded her research to elucidate the role of miRNAs in the adverse outcome pathway associated with pre-natal chemical exposure focusing on bone development. Understanding the mechanisms of chemical action could lead to innovative approaches to diagnose, prevent, and treat skeletal malformations associated with intrauterine chemical exposure. Nicole received her doctorate in Environmental Toxicology from University of California Riverside in 2018 and is a postdoctoral fellow at University of California Riverside from 2018-present. Dr. Sparks is a Diversity, Equity, and Inclusion (DEI) committee member for the Society for Birth Defects Research and Prevention (BDRP) and was previously a member of their Awards committee (2 years). Dr. Sparks served as the chair and sole organizer of the Gordon Research Seminar on Oxidative Stress and Disease. She is an author/co-author of 7 publications. She has been a member of the SOT since 2013 and has served the SOT in the following capacities in presenting at the annual meetings including the Southern California Chapter of SOT meetings. Dr. Sparks was the 2020-2021 Stem Cell Specialty Section's (SCSS) postdoctoral representative, where she has worked with SCSS team to bring about a larger presence to the specialty section. Specifically, Nicole has created the "Researcher Highlights" section and manages the quarterly newsletter. She was a panelist for SOT's Graduate Student Leadership Committee (GSLC) webinar on "The obstacles faced by minorities and what is being done to ameliorate such issues."

Student Representative

Amy Tran, University of Southern California

Amy Tran is currently a PhD Candidate at the University of Southern California Molecular Pharmacology and Toxicology Program. She received her bachelor's degree in biological sciences at the University of California, Irvine and her master's degree in regulatory sciences at USC. Amy has served several student positions at USC- as the Chair of the American Association of Pharmaceutical Sciences USC Student Chapter from 2018-2019 and currently as the Chair of Professional Development for the Pharmacy Graduate Alliance. She has presented her project entitled "*In Vitro* Impact of the Endocrine Disruptors Genistein and Mono−(2−Ethylhexyl) Phthalate (MEHP) on the Eicosanoid Pathway in Spermatogonial Stem Cells" at the 2020 SOT Annual Meeting and will soon be submitting a manuscript for publication at the Journal of Environmental Research. She has been a member of SOT since 2019 and has served the SOT as a graduate student representative for the Stem Cell Specialty Section since October 2020.

Outgoing Officers

Many thanks to our Outgoing Officers in May 2021. Thank you for your outstanding service to the SCSS.

Past President, Councilor

Patrick Allard, UCLA

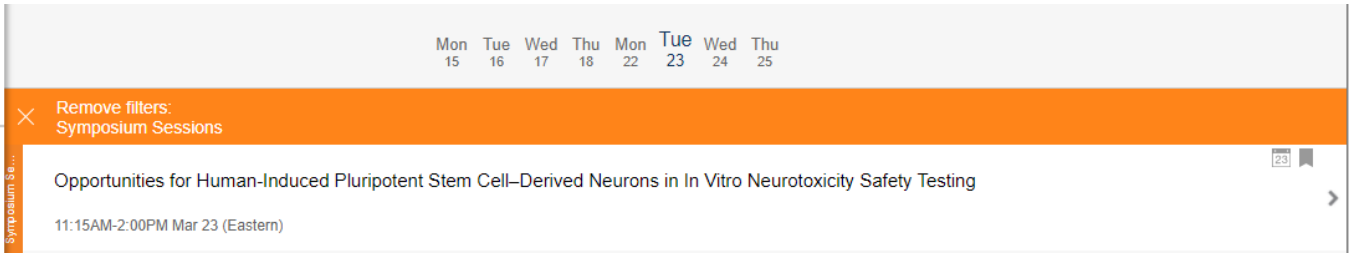
Councilor

Li Pang, FDA

SCSS at 2021 SOT

Book mark these SCSS-themed events in your 2021 SOT Meeting Schedule:

1) **Symposium Session – Endorsed by SCSS:** Tue Mar 23rd, 2021 from 11:15am to 2:00pm ET



Opportunities for Human-Induced Pluripotent Stem Cell–Derived Neurons in In Vitro Neurotoxicity Safety Testing

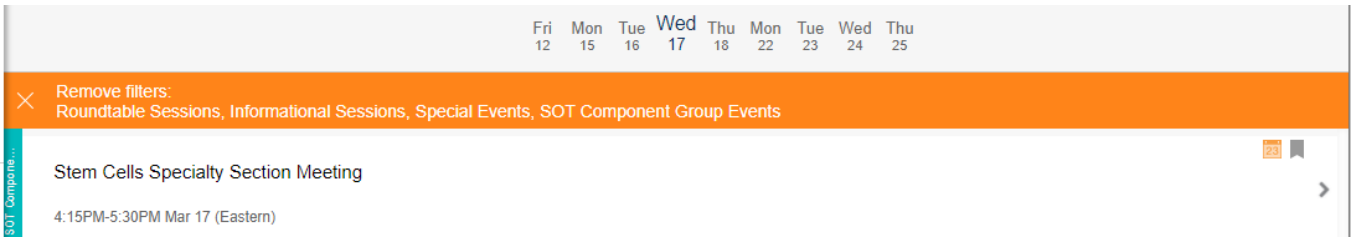
Chair:

Anke Tukker, Purdue University

Co-Chair:

Nicole Kleinstreuer, NIEHS/NICEATM

2) SCSS virtual reception at 2021 SOT: Wed Mar 17th, 2021 from 4:15pm to 5:30pm ET



3) SCSS Poster

2021 Excellence in Research Award Winners

Congratulations to the 2021 SCSS Excellence in Research Award winners. We are excited to hear their talks during the SCSS virtual reception at 2021 SOT: Wed Mar 17th, 2021 from 4:15pm to 5:30pm ET.

Graduate student

Amy Tran, University of Southern California – First Place

Cox1 Inhibition in C18-4 Spermatogonial Stem Cell Model Reveals Notch Signaling Activation

Itishree Kaushik, Texas Tech University – Second Place

A Novel Anthelminthic Drug Suppresses the Growth of Medulloblastoma Tumors by Inhibiting PKA/Gli1 Signaling Axis

Postdoctoral

Lisa Prince, Purdue University – First Place

Developmental MeHg Exposure Persistently Alters *in vitro* Human Cortical Glutamatergic Neuronal Differentiation

Sponsors:

Many thanks to our generous sponsors, Axion BioSystems and NeuCyte, for supporting the SCSS Excellence in Research Awards.

News, Research, and Reviews

Memorabilia

Commemorate the Virtual 2021 Annual Meeting and ToxExpo!
https://www.zazzle.com/collections/virtual_2021_annual_meeting_and_toxexpo-119725503386477447

Video Background

Use an SOT-branded background for your SOT presentation recordings or for video chats during the meeting. https://www.toxicology.org/events/am/AM2021/spread-the-word.asp

Publications

Comparison of acute effects of neurotoxic compounds on network activity in human and rodent neural cultures.

Saavedra, Wallace, Freudenrich, Mall, Mundy, Davila, Shafer, Wernig, Haag. *Toxicol Sci 2021 kfab008*

Effects of cryopreservation on human induced pluripotent stem cell-derived cardiomyocytes for assessing drug safety response profiles.

Zhang, Belbachir, Zhang, Liu, Shrestha, Wu. *Stem Cell Reports. 2021 Jan 12;16(1):168-181.*

Dioxin Disrupts Dynamic DNA Methylation Patterns in Genes That Govern Cardiomyocyte Maturation.

Gannes, Ko, Zhang, Biesiada, et al. *Toxicol Sci 178(2):325-337*

Evaluation of the effects of low nanomolar bisphenol A-like compounds' levels on early human embryonic development and lipid metabolism with human embryonic stem cell in vitro differentiation models.

Liang, Yang, Yin, Faiola. *J Hazard Mater 407:124387*

Researcher Highlights

Our pick of exciting researchers in Stem Cell Toxicology.

Lena Smirnova, Johns Hopkins University

Dr. Lena Smirnova is a Research Associate and a director of Education and Systems Toxicology and Microphysiological systems programs at the Center for Alternatives to Animal Testing, Bloomberg School of Public Health, Johns Hopkins University. Her primary research goal is to understand and characterize gene-environment interactions in autism spectrum disorder. She utilizes human induced pluripotent stem cells (hiPSCs) and CRISRP/Cas9 introduced mutation in autism risk gene, CHD8, to generate 3D brain organotypic cultures (BrainSpheres). She studies the effects of environmental exposures (i.e., organophosphate pesticide chlorpyrifos) on neural differentiation and functionality in those BrainSpheres and possible synergy between autism genetic background and environmental exposures. Dr. Smirnova is also developing a test strategy to accelerate the screening of chemicals for developmental neurotoxicity testing. For this purpose, she introduces multi-fluorescence tags into iPSC to visualize and monitor key processes of neurodevelopment and its perturbations by chemicals with high content imaging. Her overall goal is to develop new, more predictive, and human-relevant *in vitro* methods in developmental neurotoxicology.

Xiugong Gao, FDA

Dr. Gao has been working in the field of Toxicology since 2005 and currently is a Research Biologist at the FDA in the Division of Toxicology, Office of Applied Research and Safety Assessment, Center for Food Safety and Applied Nutrition. His previous research at the intersection of toxicology and stem cell biology includes using human embryonic stem cell (hESC)-derived neural cells to study the neurodegenerative effects of organophosphorus chemical warfare nerve agents and using mouse embryonic stem cells (mESCs) to study developmental toxicity of chemicals. Recently, Dr. Gao has focused his research on the development of in vitro hepatotoxicity models using hepatocyte-like cells (HLCs) derived from human induced pluripotent stem cells (iPSCs). Using transcriptomics in combination with stem cell biology techniques, his research has begun to demonstrate that iPSC-derived HLCs are advantageous over most hepatocarcinoma cell lines and are a promising hepatic cellular model expected to find widespread applications in toxicology. Since iPSCs could be derived from virtually any individual with specific genetic background, iPSC-derived HLCs therefore afford donor diversity not readily available to other hepatocellular models. To exploit this uniqueness of iPSC-derived HLCs, Dr. Gao has established a panel of iPSC lines with different ethnicities which are currently being differentiated into mature HLCs. The ultimate goal of this research is to provide the FDA with an ethnic-specific in vitro model that could be used for toxicity testing and risk assessment of its regulated products on susceptible subpopulations.

Zunwei Chen, Texas A&M University

Zunwei Chen is a PhD candidate from the interdisciplinary faculty of toxicology program at Texas A&M University. His research is focusing on developing practical high-throughput *in vitro* models for rapidly evaluating potential hazards of environmental chemicals and complex mixtures that can provide evidence for risk assessment. The lack of adequate toxicity data for the vast majority of chemicals and complex mixtures in the environment has spurred the development of new approach methodologies (NAMs) which span a vast array of *in vitro* and *in silico* technologies. In this research, a panel of human induced pluripotent stem cells (iPSC)-derived cells (hepatocytes, neurons, cardiomyocytes, and endothelial cells) and primary cells (HUVECs) were used to screen environmental chemicals from different classes, "designed" mixtures, and real-life environmental mixtures. First, they found chemical class-specific similarity and cell-type-specific patterns among the tested individual compounds, indicating the ability of the proposed *in vitro* model to recognize effects on different cell types. They also observed that data from the five cell-type model was as good or even better at assigning compounds to chemical classes compared to available NAM datasets such as ToxCast/Tox21 and chemical structure-based descriptors. Overall, this research demonstrates that novel iPSC-cell-based in vitro bioassays with traditional cytotoxicity endpoints and physiologically-relevant phenotypes can be used as a rapid hazard screening tool for environmental chemicals and mixtures, providing a practical solution that yields highly informative data for risk assessment.

Careers

Check out the latest job announcements. Do not forget that SOT has a job bank *https://jobbank.toxicology.org/. Please email us if you would like to post about a job.*

Postdoctoral Position in Stem Cell Biology and Toxicology – **NIEHS** Durham, North Carolina, United States

Postdoctoral Research Scientist-Toxicology – **Eli Lilly and Company** Indianapolis, Indiana, United States

Scientist/Senior Scientist, Toxicology – **Loxo Oncology at Lilly** Boulder, Colorado, United States

Finally… don't forget to follow us on LinkedIn!

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Creating a safer and healthier world by advancing the science and increasing the impact of stem cells in toxicology
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