[Nanoscience and Advanced Materials Specialty Section]

ANNUAL REPORT: 2019-2020
May 1, 2019 to April 30, 2020

I. Officers/Committees:

Officers	2019-2020	2020-2021
President:	Flemming R. Cassee	Jenny R. Roberts
President-Elect:	Jared M. Brown	Salik Hussain
Vice President:	Jenny R. Roberts	Jared M. Brown
Secretary:	Jonathan H. Shannahan	Amy K. Madl
Treasurer:	Jonathan H. Shannahan	Amy K. Madl
Past President	Aaron Erdely	Flemming R. Cassee
Councilors:	Salik Hussain	Phoebe Stapleton
	Todd A. Stueckle	Todd A. Stueckle
PDA Representative:	Vacant	Cynthia L. Browning
Graduate Student Representative:	Candance N. Wong	Dorothy J. You
Vice Student Representative:	Dorothy J. You	Mariana T. Farcas

Committees: If applicable.
Awards Committee: Andrij Holian
Jonathan Shannahan
Alison Bauer
Salik Hussain
James Roede
Aaron Erderly
Phoebe Stapleton
Valerie Minarchick

II. 2019 Membership total: 193

III. Key Outcomes in 2019-2020:

Activities:

A. 2020 SOT Annual Meeting Virtual Activities (e.g. courses, scientific sessions, or virtual receptions):
Scientific Session "Toxicological Exposure and Risk Assessment of Emissions from 3D Printers"
Chairs: Trey Thomas, US Consumer Product Safety Commission; and Yong Qian, NIOSH.
Primary Endorser: Nanoscience and Advanced Materials Specialty Section

B. 2020 Awards Information:

Best Publication Award – Mostovenko E, Young T, Muldoon PP, Bishop L, Canal CG, Vucetic A, Zeidler-Erdely PC, Erdely A, Campen MJ, and Ottens AK. 2019. Nanoparticle Exposure Driven Circulating Bioactive Peptidome causes Systemic Inflammation and Vascular Dsyfunction. Particle and Fibre Toxicology 16(1):20.

Outstanding Postdoctoral Award – Alba Rodriquez, Binghamton University, "Understanding the protective role of gut microbiota following exposure to metal oxide nanoparticles used as food additives"

Outstanding Graduate Student Award – Matthew Sydor, University of Montana, "Titanium Dioxide and Zinc Oxide Nanomaterials Change Lipid Order and Increase Permeability in Model Systems"

Outstanding Graduate Student Award Runner-up – Saeed Alqahtani, Purdue University, "Exacerbation of Nanoparticle-Induced Pulmonary Inflammation in a Mouse Model of Metabolic Syndrome"

Outstanding Graduate Student Award Runner-up – Dorothy You, North Carolina State University, "Sex Differences in Acute and Chronic Lung Inflammatory Responses of Mice to Nickel Nanoparticles"

C. Other Educational Activities Conducted (e.g. webinars, in person meetings, etc.):

NAMSS Webinar: From Nanomaterials to Advanced Materials: A Health and Safety Perspective March 4, 2020 1:00 PM EDT. Speaker: Charles L. Geraci Jr., Ph.D., CIH, FAIHA CDC/NIOSH. Description: Advances in nanoscale science have resulted in materials that are more active, more efficient, and more versatile in their commercial applications. A key outgrowth has been the development and deployment of 'Advanced Materials'. These materials are chemically and biologically more active and more efficient for the specific functions for which they are designed. Advanced materials are combining with the development of new manufacturing technologies, such as additive manufacturing, 3D printing, and engineered/synthetic biology, to give us a vision of the new materials, processes, and products that make up '21st Century Manufacturing'. The challenge for the EHS professional is to remain current on the issues of potential health hazards, the degree to which these materials are being introduced into new manufacturing technologies, and the way they are used and incorporated into products. The types of risk assessment and management approaches needed to support safe, responsible, and sustainable commercialization of nano- and advanced-material-enabled products can be challenging, but a lot of progress has been made in the past 10 years. Many of the lessons learned with nanotechnology will have direct re-application opportunities in the rapidly emerging world of advanced materials and the 21st Century Manufacturing environment.

NAMSS Webinar: Bridging the *In Vitro-In Vivo* Divide for Hazard Testing of Nanomaterials October 21, 2019. Speakers: Shareen H. Doak and Barbara Rothen-Rutishauser, Institute of Life Science & Centre for NanoHealth, Swansea University Medical School Description: There have been great developments in our understanding of nanosafety over the last decade. However, there is also now increased recognition that technical challenges remain in the use of standard *in vitro* hazard evaluation strategies, which impact their reliability and predictivity. Most hazard tests for risk assessment purposes are currently based on mammalian cells cultured as a two-dimensional (2D) monolayer, but these culture systems do not closely mimic human physiological functioning. In contrast, when cells are cultured in three dimensions (3D), the increased structural complexity results in cell-to-cell and/or cell-to-matrix cross talk, enhanced

metabolic capacity, and altered global transcriptomic and proteomic profiles, leading to 3D models that are more representative of the *in vivo* environment. The application of 3D tissue constructs and complex co-culture models incorporating multiple cell types is improving our ability to report on a wider range of potential key events leading to adverse outcome effects following exposure to nanomaterials. Thus, the continued development and standardization of such advanced *in vitro* models may provide substantial benefits in bridging the *in vitro* to *in vivo* gap for hazard assessment, potentially minimizing the necessity of animal testing. An overview will be given about the current advancement of lung, intestine, and liver 3D models as well as state-of-the art exposure approaches to understand the impact of various nanomaterials.

D. Communication Activities:
Newsletter publication frequency: Fall 2019, Winter 2019 and Spring 2020
Key Announcements/blogs:
Website highlights:

E. Mentoring activities:

V. Feedback and Ideas:

A. How might SOT better support your group's activities (perhaps something the Society should be doing that we currently do not do, or do not do effectively, that would be of importance/benefit to the members of your component group?):
Note: If funding is listed, please provide detail on the membership need that the funding would support.

Below are some of the discussion our leadership had regarding this point:

Annual Meeting Reception Costs and Attendance– Although cost of membership for specialty sections was increased recently, reception costs are continually increasing, with some cities more expensive than others. We have also lost some membership in our SS over the past few years as it is a relatively new section and the field is changing with time. There are two points related to this:

1. We have sought sponsorship from companies and partners in the past to help defray these costs. Can we increase this or is this tactic in conflict with headquarters receiving donations from the same groups? I believe this is also relevant to starting an endowment fund also. Are there any other ways to defray the costs?
2. Membership recruitment guidance from other sections that have done this successfully or headquarters would be helpful. We are attempting to expand our webinar series and to include a guest speaker at our reception to help increase attendance.

A related point to consider is whether to have an evening or a luncheon reception. I think we are better attended in the evenings, which cost more, but our membership overlaps greatly with other sections, particularly cardiovascular, inhalation, and risk assessment. Can reception be staggered differently in the evenings to accommodate this? Can SOT do an analysis of overlap of section membership and schedule the reception slots to maximize attendance and avoid scheduling SS with high degrees of overlap on the same evenings?