

NAME OF SPECIALTY SECTION : Molecular and Systems Biology

## **ANNUAL REPORT: 2018-2019**

May 1, 2018 to April 30, 2019

### **I. Officers/Committees:**

| <u>Officers</u>       | <u>2017-2018</u>      | <u>2018-2019</u>   |
|-----------------------|-----------------------|--------------------|
| President:            | Marc E Gillespie      | Shaun D McCullough |
| Vice President:       | Shaun D McCullough    | Dana C Dolinoy     |
| Vice President-Elect: | Dana C Dolinoy        | Jessica Plavicki   |
| Secretary/Treasurer:  | Robert S DeWoskin     | Robert S DeWoskin  |
| Past President        | Bhagavatula Moorthy   | Marc E Gillespie   |
| Senior Councilor:     | Jill A Franzosa       | Tamara Tal         |
| Junior Councilor:     | Tamara Tal            | Karilyn E Sant     |
| PDA Representative:   | Karilyn E Sant        | Samantha Faber     |
| GSLC Representative:  | Katelyn Susan Lavrich | Jessica Murray     |
| Junior Student Repr:  | Jessica Murray        |                    |

**Committees:** N/A

### **Elected in 2019:**

Vice President-Elect: Brian Chorely, US EPA

Junior Councilor: Larissa Williams, Bates College

Postdoctoral Representative: Katelyn Lavrich, National Institute of Environmental Health Sciences

Graduate Student Representative: Cassandra Meakin, University of North Carolina, Chapel Hill

**Membership:** MSBSS currently has 210 members.

### **II. Activities:**

**2019 SOT Annual Meeting Reception** was held in Baltimore, Maryland on March 12, 2019

Approximately 100 people were in attendance.

Dr. Shaun McCullough called the meeting to order at 6 PM  
Meeting Minutes: (see Attachment I)

**Mentoring event co-sponsored by Regulatory and Safety Evaluation Specialty Section, in collaboration with Mechanisms, In Vitro and Alternative Methods, and Computational Toxicology Specialty Sections and the American Society for Cellular and Computational Toxicology (ASCCT)**

Attended by 70 mentors and 170 mentees

Held at Tír na nÓg on March 11<sup>th</sup>, 2019

Organizers: Dr. Samantha C. Faber (Postdoctoral Rep.), Jessica Murray (Senior Graduate Student Rep.), and Cassie Meakin (Junior Graduate Student Rep.)

This year the MSBSS held their 2nd annual Collaborative Mentoring Reception for trainees of MSBSS, RSESS, MSS, CTSS, and IVAMSS at the SOT Annual Meeting in Baltimore, MD. The Mentoring Reception at Tír na nÓg on Monday, March 11<sup>th</sup>, brought students, postdocs, and mentors in MSBSS-related fields together to facilitate networking and career development in a fun, relaxed atmosphere. Over 170 graduate students and postdoctoral trainees had the opportunity to meet with 70 experts working in industry, academia, government, consulting, and non-profit careers. In addition to the MSBSS General Fund, the SOT Career Resources and Development Committee (CRAD) provided matching funds to sponsor this year's exciting event and our co-sponsors MSBSS, RSESS, MSS, CTSS, IVAMSS and ASCCT contributed funds as well. The event received very positive feedback from both mentors and mentees in attendance and MSBSS is currently planning to organize another collaborative mentoring event for the 2020 Annual Meeting.

**Awards:**

During the 2018-2019 year, MSBSS revised its award descriptions to improve clarity and increase the monetary value of each award. We also offer graduate student, postdoctoral, and paper of the year award recipients the opportunity to present their work in a MSBSS-sponsored webinar during the fall. In fall 2018, we held two webinars in November to highlight this outstanding research. We also continued to offer the second annual MSBSS Undergraduate Research Award to facilitate scientific and career development opportunities for undergraduate students presenting research at the Annual Meeting.

**Postdoctoral Research Award (9 applicants)**

First Place

Dr. Tara Catron, U.S. EPA (Mentor: Tamara Tal)

*“Estradiol exposure disrupts the microbiota-gut-brain axis during zebrafish development”*

Second Place (tie)

Dr. Jessica Hartman, Duke University (Mentor: Joel Meyer)

*“Long-term swimming exercise in *Caenorhabditis elegans* improves mitochondrial health and protects animals from age- and toxicant-induced degeneration”*

Dr. Milankumar Prajapati, Brown University (Mentor: Tom Bartnikas)

*“Manganese Transport and Toxicity in CRISPR-Cas9-Mediated SLC30A10 Knock-Out Hep3B Cells”*

Dr. Philip Wages, Vanderbilt University (Mentor: Ned Porter)

*“Inhibiting 7-Dehydrocholesterol Reductase Elevates Protein Adduction and Depletes Intracellular Glutathione”*

**Graduate Student Research Awards (8 applicants)**

First Place

Kari Neier, University of Michigan (Mentor: Dana Dolinoy)

*“Reprogramming of Peroxisome Proliferator-Activated Receptor Target Genes in Mice Perinatally Exposed to Phthalates”*

Second Place

Ryan Mote, University of Georgia (Mentor: Nick Filipov)

*“Toxic Tall Fescue Grazing During Fluctuating Environmental Conditions: Impact on the Metabolome, Microbiome and Their Interaction”*

Third Place

Archit Rastogi, University of Massachusetts (Mentor: Alicia Timme-Laragy)

*“Mapping Glutathione Utilization in the Developing Zebrafish (Danio rerio) Embryo”*

**Undergraduate Student Research Award (3 applicants)**

First Place

Matthew Wyatt Cole, Kenyon College (Mentor: Wade Powell)

*“Distinct roles for Xenopus laevis AHR paralogs in cell cycle regulation”*

Second Place

Olivia Venezia, University of Massachusetts (Mentor: Alicia Timme-Laragy)

*“Modulation of Peroxisome Proliferator-Activated Receptors gamma (PPAR $\gamma$ ) signaling perturbs embryonic pancreas development in the zebrafish, Danio Rerio”*

Third Place

Michael Andres-Mans, Oregon State University (Mentor: Susan Tilton)

*“Functional consequences of microRNA regulation by polycyclic aromatic hydrocarbons in 3D human bronchial epithelial cells”*

**Paper of the Year Award (11 applicants)**

This year's MSBSS Paper of the Year Award went to Dr. Maria Monteiro and coauthors from the Harvard Medical School. The paper titled *“A High-Throughput Screen Identifies DYRK1A Inhibitor ID-8 That Stimulates Human Kidney Tubular Epithelial Cell Proliferation”* (DOI: 10.1681/ASN.2018040392) was published in the Journal of the American Society of Nephrology in December of 2018.

**2019 SOT Annual Meeting Courses/Sessions:**

The MSBSS was the primary endorser of 3 symposia, 1 workshop, and 1 Continuing Education courses at the 2019 Annual Meeting, as well as the secondary or tertiary endorser of 6 additional symposia and 3 workshops.

**Symposia, Workshops, and CE courses with MSBSS as the Primary Endorser:**

1. Using Zebrafish as a Model to Understand and Ultimately Prevent Neurotoxicity (Symposium, 165 min)
2. The Role of Dynamic RNA Modifications in Environmental Response and Disease (Symposium, 165 min)
3. Role of Oxidative Stress in Health and Disease: Mechanisms, Methods of Detection, and Biomarkers (Symposium, 165 min)
4. Emergent Mechanisms of Cytochrome P450 Gene Regulation: Defining an Improved Roadmap toward 21st-Century Pharmacogenomics (Workshop, 165 min)
5. Assay Development Principles and Good Research Practices for Rigor and Reproducibility in In Vitro Toxicology (CE course)

**Symposia, Workshops, and CE courses with MSBSS as the Secondary or Tertiary Endorser:**

1. Assessing Acute Health Risk: Potential Application of Next-Generation Toxicological Tools (Symposium, 165 min)
2. Novel Genetic-Based Tools for Evaluating Toxicity Potential, Mechanism of Action, and Population Dynamics (Symposium, 165 min)
3. Preconception Exposure to Toxicants: Assessing Gamete Quality and Reproductive Outcomes (Symposium, 165 min)
4. Explicating the Pathogenic Environmental Factors in Nonalcoholic Fatty Liver Disease (Symposium, 90 min)
5. Integrated 'Omics Approaches to Toxicity Assessments (Symposium, 90 min)
6. Microbiota and Contributions to Neurodevelopment: Implications in Neurological Function, Behavior, and Toxicity (Symposium, 90 min)
7. Applying Systems Biology Approaches to Understand the Joint Action of Chemical and Nonchemical Stressors (Workshop, 165 min)
8. Microphysiological Systems: A New Era in Neurotoxicology? (Workshop, 165 min)
9. In Vitro Static and Dynamic Skin Metabolism Methods and Strategies to Address the Safety Assessment of Topically Applied Chemicals (Workshop, 90 min)

### **Endowment Fund Details and Treasurers Report:**

The currently available MSBSS General Fund financial statement as of March 2019 is shown below.

| <b>MSBSS Financial Statement<br/>(as of March 2019)</b> |                |
|---|----------------|
| <b>Ordinary Income/Expense:</b>                         |                |
| <b>Income</b>   |                |
| Contributions   | \$0            |
| Other   | \$0            |
| Registration  | \$1,659        |
| <b>Total Income</b>                                     | <b>\$1,659</b> |
| <br>  |                |
| <b>Expense:</b>   |                |
| Awards - Sections                                       | \$1,200        |
| Plaques   | \$421          |
| Executive Meetings                                      | \$0            |
| Global Outreach/Initiatives                             | \$0            |
| Mentoring Activities                                    | \$0            |
| Miscellaneous   | \$0            |
| Printing  | \$0            |

|  |                 |
|--|-----------------|
| Reception                                    | \$5,841         |
| Webinar                                      | \$32            |
| <b>Total Expense</b>                         | <b>\$7,494</b>  |
|  |                 |
| <b>Balance:</b>                              |                 |
| <b>Net Assets Beginning of year</b>          | <b>\$32,645</b> |
| Excess (Deficiency) of Revenue over Expenses | -\$5,834        |
| <b>Net Assets as of March 2019*</b>          | <b>\$26,810</b> |

\* Entered values are rounded to the nearest dollar.

The quarterly MSBSS endowment fund statement as of December 2018 is shown below. The MSBSS endowment fund continues to benefit from SOT's and the MSBSS endowment matching program, where SOT matches the contribution at a 1:1 ratio, and MSBSS matches at 3:1.

|   |            |
|---|------------|
| <b>MSBSS Endowment Funds<br/>(Quarterly Report - December 2018)</b> |            |
| <b>Contributions</b>  |            |
| Member Contributions  | \$0        |
| MSBSS Matching Funds  | \$0        |
| SOT Matching Funds  | \$0        |
| <b>Total Contribution</b>   | <b>\$0</b> |

|  |                 |
|--|-----------------|
| <b>Gain (loss) on Investments</b>                          |                 |
| Interests and Dividends                                    | \$1,225         |
| Unrealized Gain or (loss)                                  | \$(1,225)       |
| Total Return   | <b>\$0</b>      |
| <b>Total Added</b>   | <b>\$0</b>      |
|  |                 |
| <b>Expenses</b>  |                 |
| Awards   | \$0             |
| other  | -               |
| <b>Total Expense</b>                                       | <b>\$0</b>      |
| <b>Added - Expenses =</b>                                  | <b>\$0</b>      |
|  |                 |
| <b>Starting Value of the MSBSS Endowment Fund</b>          | <b>\$53,924</b> |
| <b>Ending Value of the MSBSS Endowment Fund</b>            | <b>\$53,924</b> |
|  |                 |
| <b>Awards and Funds Available from the MSBSS Endowment</b> |                 |
| Amount Expended on Awards in 2018                          | \$1,621         |
| Amount Provided from Endowment Fund                        | \$1,600         |

|  |                |
|--|----------------|
| <b>Excess (Deficiency)</b>                             | <b>(\$21)</b>  |
| <b>Amount Provided by the MSBSS General Fund</b>       | <b>\$21</b>    |
|  |                |
| <b>Est. Endowment Funds Available for 2019 Awards*</b> | <b>\$2,157</b> |

\* The estimated amount of Endowment Funds that will be available for awards in the next year is based upon 4% of the Fund's ending value as of the June Quarter in the preceding year.

**Newsletters:**

The Fall 2019 MSBSS newsletter is currently being planned for delivery to the membership around September-October 2019; the Fall 2018 newsletter is available on our MSBSS web site in ToXchange.

**Teleseminars/Webinars:**

MSBSS hosted three webinars during the 2018-2019 year:

**Webinar #1**

**Title:** Accepted! – *Tips On How to Get Into a Top Graduate Program*

**Date:** October 17, 2018

**Chairs:** Samantha Faber & Jessica Murray

**Co-sponsors:** Education Committee/Undergraduate Education Subcommittee

**Abstract:** The biomedical sciences are host to a broad range of exciting and engaging prospects to pursue graduate training in cutting-edge research science; however, taking part in these opportunities requires a well-refined and impactful graduate school admissions application package. Just in time for upcoming admissions deadlines, the Society of Toxicology's Molecular and Systems Biology Specialty Section proudly presents an interactive webinar that will include short presentations on key aspects of the graduate school application from graduate program directors and admission committee members at leading graduate institutions. Dr. Rebecca Fry (Carol Remmer Angle Distinguished Professor of Environmental Sciences and Engineering & Director of Graduate Studies for the Curriculum in Toxicology at the University of North Carolina at Chapel Hill) will provide an overview of the graduate admissions process, perspectives on how admissions committees review applications, invite applicants for interviews, and make decisions on admissions offers. Dr. Dana Dolinoy (NSF International Chair of Environmental Health Sciences and Professor of Environmental Health Sciences & Nutritional Sciences at the University of Michigan School of Public Health) will discuss how to select the best degree program for you and how to craft an impactful research statement. Dr. Pamela Lein (Professor of Molecular Biosciences & former Chair of Pharmacology and Toxicology Graduate Group at the University of California, Davis) will provide insight on how to write a meaningful personal statement that can help your application stand out. These short presentations will be followed by a live discussion session where our panel experts will answer attendee questions to provide a

more in-depth view that will help you gain a better understand of the graduate admissions process and strengthen your graduate school application to help you on your path to getting that acceptance letter.

**Run length:** 70 minutes

**Attendees:** Not recorded

**Archives:** Slides and recording are available on the MSBSS website

### **Webinar #2**

**Title:** *MSBSS 2018 Graduate Student Award Webinar*

**Date:** November 19, 2017

**Chair:** Kari Sant

**Co-sponsors:** N/A

**Abstract:** The Molecular and Systems Biology Specialty Section will be highlighting the research conducted by our 2018 Graduate Student Research Award recipients, Julia Tobacyk (1st place, University of Arkansas), Abhishek Venkatratnam (2nd place, University of North Carolina), and Prarthana Shankar (3rd place, Oregon State University). This webinar will be held on Monday, November 19, 2018 at 12:00 noon EST. These three presentations will highlight the exceptional research being conducted by MSBSS graduate students exploring the roles of miRNAs as biomarkers of renal injury, the hepatic transcriptomic response to trichloroethylene, and the role of long non-coding RNA is the regulation of transcription factor sox9b in the toxic response to TCDD. Individual talk abstracts are below.

**Run length:** 60 minutes

**Attendees:** Not recorded

**Archives:** Not recorded

### **Webinar #3**

**Title:** *MSBSS Award Webinar Series: Postdoctoral Fellow and Paper of the Year Award Recipients*

**Date:** November 6, 2018

**Chairs:** Dana Dolinoy & Tamara Tal

**Co-sponsors:** N/A

**Abstract:** The Molecular and Systems Biology Specialty Section will be highlighting the research conducted by our 2018 Postdoctoral Fellow Research Award recipient, Dr. Samantha Faber (University of North Carolina) and Paper of the Year Award recipient, Dr. Maria Monteiro (Harvard Medical School). Dr. Trivedi will present her paper titled, “Targeting Phospholipase D4 Attenuates Kidney Fibrosis” (DOI: 10.1681/ASN.2016111222), which was published in the Journal of the American Society of Nephrology in December 2017. She will discuss phospholipase D4 (PLD4), a single-pass transmembrane glycoprotein, which is among the most highly upregulated genes in kidneys with chronic progressive fibrosis. Dr. Faber will discuss the development and characterization of a novel three-dimensional organotypic airway model. Studies focused on examining key signaling pathways within airway fibroblasts following trans-epithelial air pollutant exposure will also be discussed. These two presentations will highlight the exceptional research being conducted by young investigators in the Molecular and Systems Biology Specialty Section.

**Run length:** 60 minutes

**Attendees:** Not recorded

**Archives:** Not recorded

**White Papers:** None

**Contributions to SOT website:**

- Recording of “Accepted! – Preparing a Successful Graduate School Admissions Package” webinar.
- The MSBSS Fall 2018 Newsletter
- 2019 Officer Candidate Biosketches - to MSBSS members via ToXchange.
- Numerous announcements for webinars or other items of interest to members – to MSBSS members via ToXchange.

**Other Specialty Section 2018-2019 Activities:**

See Collaborative Mentoring Event description.

**Attachment 1 – 2019 MSBSS Reception Agenda (Baltimore, MD)**

Molecular & Systems Biology Specialty Section Reception

Tuesday, March 12, 6:00 – 7:30 pm

| <u>Officers</u>                | <u>2018-2019</u>   |
|--------------------------------|--------------------|
| President:                     | Shaun McCullough   |
| Vice President:                | Dana C. Dolinoy    |
| Vice President-Elect:          | Jessica Plavicki   |
| Secretary/Treasurer:           | Robert S. DeWoskin |
| Past President:                | Marc Gillespe      |
| Senior Councilor:              | Tamara Tal         |
| Junior Councilor:              | Karilyn E. Sant    |
| PDA Representative:            | Samantha Faber     |
| Senior Graduate Student Repr.: | Jessica Murray     |

|                                |               |
|--------------------------------|---------------|
| Junior Graduate Student Repr.: | Cassie Meakin |
|--------------------------------|---------------|

#### MSBSS Annual Meeting Agenda (Shaun McCullough/Other Officers)

- Introduction
- Awards
- Pitch on endowment
- Membership for MSBSS
- Career development
- Award opportunities
- Mentorship
- Introduce Current Officers:
- Reports:
  - Dana - New Directions
  - Dana - Scientific Proposals - Stress process, come to MSBSS early
  - Rob – Finances
  - Shaun – Closes out