Dear IVAM Members,

Greetings and welcome to our spring newsletter! Over this past year, we have seen a progression into our new normal: there are still some concerns lingering over pathogen exposures, those of us who have been fully remote have begun to head back into the office, and some travel has commenced again. As always, we know there are challenges, and we on the IVAMSS Executive Committee sincerely hope that you and your families are doing well.

IVAMSS has had another productive year, highlights of which include: The 2022 IVAMSS Reception and Awards Ceremony was in person at the Annual Meeting; we had excellent attendance from our membership on March 29th in San Diego! We sponsored and/or co-sponsored several webinars in 2022. A joint webinar was held in May with the Risk Assessment Specialty Section (RASS) on Establishing Scientific Confidence in New Approach Methodologies (NAMs): Eye Irritation Testing and Beyond. This webinar was timely, interesting, and well attended. If you missed it, slides and recordings are available here. In addition, this past year, IVAMSS held a virtual mentoring event: Skills for a 21st-Century Career. This mentoring event connected mentees to toxicologists across multiple industry sectors including government, consulting, and NGO groups.

Most recently, we had a successful 2023 SOT Annual Meeting in Nashville and enjoyed seeing you all at the IVAMSS Reception, held on Wednesday March 22nd.

Looking to the future, IVAMSS is prepping an excellent webinar this summer in a collaboration with the SOT Immunotoxicology Specialty Section and so be on the lookout for registration details coming soon. Additional ideas for engaging topics are always welcome and so please use the QR code below to take a brief survey and provide any ideas/feedback that you may have.

This newsletter contains information on IVAMSS membership, IVAMSS-related SOT activities, a featured topic, member spotlight, plus information specific to IVAMSS postdoctoral and graduate student members. In addition, a new section highlighting some of the variety of careers in the IVAMSS membership sphere is included in “Career Corner” which aims to provide insight related to possible career trajectories and navigating career changes. Please check out the IVAMSS LinkedIn for future communications and to further engage with IVAMSS.

Sincerely,

Kathryn Page, PhD, DABT, ERT

IVAMSS President, 2022-2023
IVAMSS Announcements

Membership Update:

The IVAMSS was founded in 1994 and grew steadily until 2016 when membership peaked at 524. As of March 2023, IVAMSS had 374 members. Our members come from industry, academia, government, contract research organizations, and consulting. Over half are Full Members and one eighth are International Members. The chart below provides a summary of IVAMSS membership.

![Membership Update Chart]

2022-2023 Annual Report Highlights:

There were a variety of IVAMSS activities of note:

We reviewed 23 session proposals submitted in May 2022 for SOT’s 2023 Annual Meeting. Of these proposals, 16 were selected for the annual meeting. Of the 16 selected proposals, IVAM was the primary endorser for 6.

Over the last year, we sponsored two webinars:

1. IVAMSS Virtual Mentoring Event: Skills for a 21st-Century Career on Jun 17, 2022. Mentors included Lauren Lewis, PhD (Bristol Meyers Squibb); Joseph Henriquez, PhD (Corteva Agriscience); Kamel Mansouri, PhD (NIH/NIEHS); Kathryn Page, PhD, DABT (Clorox); Grace Chappell, MSPH, PhD (ToxStrategies); Dahea You, PharmD, PhD (Takeda California); Katie Paul-Freidman, PhD (EPA); Anna van der Zalm, MSc (PETA Science Consortium); and Ramya Rajagopal, PhD (Unilever).

2. RASS and IVAMSS Webinar—Establishing Scientific Confidence in New Approach Methodologies (NAMs): Eye Irritation Testing and Beyond on May 11, 2022. Speakers included Hans A. Raabe, MS (VP and Chief Operating Officer, Institute for in Vitro Sciences (IIVS)) and Amy J. Clippinger, PhD (President, PETA Science Consortium International e.V. (PSCI)).
In March 2022, we had our first in-person SOT Annual Meeting since 2019, during which the IVAMSS graduate student and postdoctoral award winners were announced. The winner of the Graduate Student Award was Sabina Burlă-Mihăescu from the Luxembourg Institute of Science and Technology (top left picture with Dr. Kristie M. Sullivan) and the winner of the Postdoctoral Award was Dr. Anna Kreutz from the Oak Ridge Institute for Science & Education, Oak Ridge (top middle picture with Dr. Kristie M. Sullivan). The IVAMSS Best Poster Award winner was Dr. Christian Pellevoisin from Episkin SA, Lyon (not pictured) and the Elsevier Best Poster Award winner was Dr. Megan Culbreth from the US Environmental Protection Agency, Research Triangle Park (bottom right with Dr. Kristie M. Sullivan). The MB Research Award winner was Dr. Julia Herbert from Rutgers University, Piscataway (top right with Dr. George DeGeorge). Finally, the Best Paper Award went to Dr. Amy Clippinger from PETA Science Consortium International e.V., Stuttgart (bottom left with Dr. Kristie M. Sullivan and Dr. Sean Gehen).
Upcoming Webinars

Webinar topic: “Advancements within the field of predictive immunotoxicity in vitro models for chemical safety”

Mark your calendars for an IVAMSS-hosted virtual webinar on June 14th. This webinar will be hosted in collaboration with SOT’s Immunotoxicology Specialty Section and will focus on the use of in vitro new approach methodologies for immunotoxicology chemical hazard assessment. The speakers for this webinar include Dr. Vic Johnson from Burleson Research Technologies, Inc., Michelle Smith from Bristol-Meyers Squibb, and Dr. George Papadopoulos from Takeda. More information to come!

When: June 14th, 2023; Time: 12:00 Noon - 1:30 PM EST
Where: Registration required. The event will be held on Zoom Meeting to facilitate both presentations and discussion.
Who: The webinar is open to anyone and is not restricted to IVAMSS or SOT members.

Speakers:

Victor Johnson, PhD (Director of Operations, Burleson Research Technologies, Inc)
Michelle Smith, MS (Senior Scientist, Bristol Myers Squibb)
George Papadopoulos, PhD (Principal Scientist, Takeda)

Treasurer’s Report

In February 2022, IVAMSS had a net asset of $26,930. We have received $9,454 in membership dues, interest, and contributions. After expenses for the reception at SOT 2022, plaques, and graduate student and postdoctoral awards ($10,995), IVAMSS has a net asset of $25,389.

Welcome New IVAMSS Officers!

The election results for 2023-2024 IVAMSS Officers have been finalized and we are proud to welcome new members of the Executive Committee. Dr. Shaun McCullough from US Environmental Protection Agency will join us as the Vice President-Elect, Dr. Melissa Martin from the BASF as Councilor, and Dr. Anna Kreutz from the NIEHS/NTP as Postdoctoral Representative. In addition, Dr. Kristie Sullivan from Institute for In Vitro Sciences will take on her new role as President and Dr. Samantha Faber will transition into the Vice President role. Congratulations to all the officers in their new positions!
Featured Topic: 25 Years of Dedication to Non-Animal Testing Methods

For over 25 years the Institute for In Vitro Sciences (IIVS) has been a major player in international activities to support the adoption of New Approach Methodologies (NAMS) in the toxicological evaluation of new and existing chemical products. Our goal has always been to bring people and organizations together to jointly negotiate the hurdles that block the replacement of existing, and often inaccurate, animal testing approaches to determine product safety. From our inception we realized that animal protection proponents, regulators and industry had common goals that could be attained if the proper catalyst could bring them together. This catalyst, however, needed to be a “neutral”, trusted, party with highly regarded scientific credentials. In other words, a not-for-profit entity that had laboratory capabilities and was experienced in performing in vitro studies. With this background in mind, in 1997 IIVS was created on the three pillars of Science, Education, and Outreach with a mission of “Advancing Science and Animal Welfare Together”.

Under the theme of Science, we realized that “scientific validation” of new methodologies was necessary for them to be adopted by industry and then accepted by regulators. Thus, a major portion of IIVS’ scientific strategy was organization and participation in multi-laboratory validation studies (over 15 in the first 15 years) which were conducted in collaboration with the European Center for the Validation of Alternative Methods (ECVAM), the National Toxicology Program Interagency Center for the Evaluation of Alternative Toxicological Methods (NICEATM) in the United States, and various industry and trade association partners. In conducting these studies, IIVS was an early and strong voice for the application of Good Laboratory Practices (GLPs) to in vitro studies, especially to large validation programs. This continues today with our support of the OECD’s Good In Vitro Methods Practices (GIVIMP) and our recent creation of the GIVIMP certification program.

Our next pillars are Education and Outreach, knowing that practical knowledge of how non-animal tests are conducted was necessary for increased use by both industry and regulatory authorities. Our Practical Methods for In Vitro Toxicology hands-on course (now in its 25th year) has trained more than 400 students from over a dozen countries. This has been supplemented by a separate program providing specialized instruction on-site at government and academic laboratories around the world which has reached over 1,000 scientists and regulators. IIVS’s success in this area was acknowledged in 2014 by co-sharing the first Lush Prize for Training, specifically: “For their vital work on training researchers in non-animal methods from Brazil to Japan.”

It has been our outreach to all stakeholders – animal protection, regulators, and industry – that has brought significant successes in the acceptance of NAMS. For example, collaboration between IIVS, the Procter & Gamble Company (P&G), and ECVAM led to the first non-animal test to be certified as a stand-alone method for the identification of non-eye irritants within defined chemical classes. Collaboration among animal protection advocates, the US Environmental Protection Agency (US EPA), IIVS, and seven manufacturers of anti-microbial cleaning products led to a non-animal eye irritation defined approach testing strategy, the first non-animal approach to a registration requirement that had been accepted by the US EPA. In Europe, collaborations among IIVS, Cosmetics Europe, P&G, and several individual industry partners developed the Reconstructed Skin Micronucleus Assay, the first in vitro assay developed to meet the animal testing prohibitions of the Cosmetics Directive for a genetic toxicity endpoint.

During the last 25 years, considerable progress has been made in the uptake of non-animal safety testing methods for both corporate product stewardship and regulatory use. IIVS has played a critical role in this transition due to our science programs coupled with education and outreach. Collaborations among regulators, industry and animal protection groups have been an important driver of change, and IIVS will continue to foster international collaborations to harmonize and make routine the use of non-animal testing methods throughout the world.

Sincerely,

Erin Hill, President of Institute for In Vitro Sciences, Inc.
Member Spotlight

IVAMSS would like to acknowledge members that have been recognized for outstanding achievements in 2022-2023. Erin Hill from Institute for In Vitro Sciences Inc. was awarded the SOT Enhancement of Animal Welfare Award. Robyn Tanguay from Oregon State University was awarded the SOT Toxicologist Mentoring Award. The Colgate-Palmolive Grant for Alternative Research was awarded to Fiona Murphy of University of Strathclyde and Ana Cristina Rosa da Silva of Universidade de Coimbra. Joost Boeckmans from Vrije Universiteit Brussel received the Colgate-Palmolive Postdoctoral Fellowship Award in In Vitro Toxicology and Xuelin Jia from Rowan University received the Colgate-Palmolive Award for Student Research Training in Alternative Methods. The Syngenta Fellowship Award in Human Health Applications of New Technologies was awarded to Shreyas Gaikwad from Texas Tech University Health Sciences Center. Congratulations to all for these outstanding achievements!

Graduate Student and Postdoctoral Corner

A Message to our fellow IVAMSS Graduate Student and Postdoctoral Members:

First and foremost, welcome to our new and returning IVAMSS graduate student and postdoctoral members! We hope you have had a happy, healthy, and productive 2022-2023. As we reflect and continue to evolve in this post-pandemic world, we are reminded how much the past few years have changed the scientific landscape for us all. This is particularly true for graduate students and postdocs, as the most formative years in our scientific careers have been disrupted.

Fortunately, research activities have now resumed, although many of us are still navigating this post-pandemic era as ongoing travel limitations may still prevent us from attending in-person conferences and meetings which may limit our education and networking opportunities. Thankfully, virtual meetings and conferences are now considered a new normal. However, as SOT and other scientific communities recommence in-person meetings, given how fast our field of in vitro and alternative methodologies for toxicological screening is progressing, we encourage your attendance and engagement in-person. As such, we hope that all IVAMSS graduate student and postdoctoral members were able to attend SOT this year and were able to connect with us either at our IVAMSS Reception or by stopping by our IVAMSS poster which was set up in the ToxExpo Hall.

Other SOT activities that were of interest to the graduate students and postdocs included luncheons, career-building workshops, posters, and symposia; many of which were either uploaded or recorded and can be viewed through the SOT online planner. Relevant sessions are listed below in the “SOT 2023 Annual JOIN & GET INVOLVED! Trainees are essential to growth and maintenance of IVAMSS! The specialty section is committed to creating opportunities for success in all our research careers. As a member, trainees will have access to all these opportunities. Also, most trainees do not realize SOT waives the membership fee for the first specialty section and special interest group for student and postdoc members. If you have questions or are interested in getting involved, please reach out to your graduate student or postdoctoral representatives!

Lucie Ford (Graduate Student representative) lford@cvm.tamu.edu
Melissa Martin (Postdoctoral representative) melissa.martin@basf.com
Meeting” section of this newsletter. Also, please be on the lookout for our upcoming webinar that we are cohosting with the Immunotoxicology Specialty Section this summer. This webinar will feature three 20-minute talks from experts in the field. As previously mentioned, feel free to suggest future webinar topics via this Link. Or via the QR code to the right.

We are wishing you all the best in 2023-2024!!!

WELCOME TO THE IVAMSS CAREER CORNER!

A place to read about potential career options and trajectories in the field of toxicology. We also offer here information and advice that may be useful during times of career growth and transitions.

Current positions held by our officers:

Kathryn Page (President): Product Safety Toxicologist (The Clorox Company)
Sean Gehen (Past President): Global Human Safety Leader (Corteva Agriscience)
Kristie Sullivan (Vice President): Vice President, Education and Outreach (Institute for In Vitro Sciences)
Samantha Faber (Vice President-Elect): Discovery Toxicologist (Takeda)
Sebastian Hoffmann (Secretary/Treasurer): Independent Toxicology Consultancy (seh consulting + services)
Lauren Lewis (Councilor): Senior Scientist, Project Toxicologist (Bristol Myers Squibb)
Mercedes Salvador-Silva (Councilor): Fellow Toxicologist, Preclinical Safety (Alcon)
Melissa Martin (Postdoctoral Representative): Regulatory toxicologist (BASF)
Lucie Ford (Graduate Student Representative): Doctoral Student in the Interdisciplinary Faculty of Toxicology (Texas A&M University)

We also spoke with Bill Klaren of ToxsStrategies and asked him for some career-related advice.

1. How did you find out about toxicology?
Interestingly enough, I was drawn to toxicology before I knew what it was. I have always been interested in science, especially when things do not go exactly as expected. During my undergraduate studies in biochemistry, I gave a presentation on TCDD and its adverse effects. It was not until I was in graduate school that I really understood that there is a whole field of study dedicated to adverse effects, i.e. toxicology. Purely by coincidence, my graduate work involved investigating the hepatic effects caused by dioxin-like PCBs.

2. What skills did you develop in your early career?
One of the most crucial skills that you can develop is critical thinking. I was fortunate during my graduate work to have an informal journal club where we discussed publications with new techniques. Learning how other people think through the paper was great in developing on how I think and approach a problem. Throughout your career, the focus will very likely change but having the versatility to critically assess any data or problem will make you a good toxicologist. Critical thinking is also a key aspect to highlight and demonstrate during job interviews as it shows your potential and likely success after being hired.
3. **What if your favorite part about working in the field of toxicology?**
   Toxicology is unique in that it touches on just about everything and is still directly impactful. There is always a new technique, or different chemical, or updated risk assessment, or new studies to look at. Just the huge variety of organ systems and endpoints encompassed by toxicology provides an endless resource for a curious scientist. Other scientific fields can become hyper-focused and abstract. Of course, this happens in some aspects of toxicology as well but I think it is easier to expand your scientific reach while still being grounded in reality compared to other fields.

4. **Best job negotiating tip?**
   Don’t be afraid to ask. If you are at the stage of negotiating, it is clear that the employer is interested in you. That said, set your expectations and do your homework. The SOT triennial survey is a good resource to understand potential salary expectations. And non-salary benefits should not be overlooked (e.g. working remote, flexible schedule, gym memberships, etc.) as they can greatly improve mental health and may be worth a minor reduction in salary. Also, many companies offer retirement benefits which can make a substantial impact later in life so do not overlook those opportunities.

5. **What would you tell a trainee to help them prepare for an interview?**
   In just about every interview I have been a part of, either as an interviewer or interviewee, there is a desire to understand real-life examples of your abilities. The interviewer is looking for a specific situation, an action that you took in response to that situation, and the result of your action. Prior to an interview think of scenarios, actions, and results where you have demonstrated leadership, or growth, or time management, or emotional intelligence and be ready to provide the interviewer with these examples. Importantly, these examples do not need to be job or science related but should reflect scenarios that you have encountered. Additionally, not all scenarios will have positive results so being honest and upfront about what you learned or would do differently can be impressive to a hiring manager.

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**IVAMSS Related Research 2022-2023**

Amar SK, Donohue KB, Gust KA. *Cellular and molecular responses to ethyl-parathion in undifferentiated SH-SY5Y cells provide neurotoxicity pathway indicators for organophosphorus impacts*. Toxicological Sciences. DOI: [10.1093/toxsci/kfac125](https://doi.org/10.1093/toxsci/kfac125).


Caloni F, De Angelis I, Hartung T. *Replacement of animal testing by integrated approaches to testing and assessment (IATA): a call for in vivitro*. Archives of Toxicology. DOI: [10.1007/s00204-022-03299-x](https://doi.org/10.1007/s00204-022-03299-x).


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**SOT 2023 Annual Meeting**

The SOT Annual Meeting was held in Nashville, TN March 19-23rd. Below please find a curated list of talks, posters, workshops, and activities that may be of interest to IVAMSS members. If you missed some, many of the posters were uploaded and symposia were recorded of which can still be viewed for those that registered for the meeting. For the full meeting program, look here.

**IVAMSS Relevant Activities:**

Program legend: Continuing Education, Symposium/Platform Session, Workshop/Roundtable Session, Poster Session, Student/Postdoc Interest, Featured Session

**IVAMSS Reception:**

The IVAMSS Reception was held on March 22nd, 2023, from 6:00-7:30PM CDT at the Omni Hotel.

**Sunday, March 19th**

- 8:15 AM – 12:00 Noon CDT
  - AM06: Tools Supporting Open Chemical Evaluations
  - AM02: A Training on the OECD Guidance for Characterizing, Validating, and Reporting Physiologically Based Kinetic Models
  - AM03: Advanced Discovery Toxicology: Integrating Toxicology with Other Functions on the Team
- 1:15 PM – 5:00 PM CDT
  - PM08: Checking In on Adverse Outcome Pathways: Evolving Development, Evaluation, and Application
  - PM10: In Vitro to In Vivo Extrapolation Strategy and Guidance across Organ System Toxicities
- 7:30 PM – 9:00 PM CDT
  - Student/Postdoctoral Scholar Mixer
Monday, March 20th

- 6:15 AM – 7:45 AM CDT
  - SOT Mentoring Breakfast – Registration is required, space is limited
- 9:00 AM – 10:45 AM CDT
  - Alternatives to Mammalian Models I
- 12:00 Noon – 1:30 PM CDT
  - In Vitro Toxicology Lecture and Luncheon for Students: Dedication to the Use of In Vitro Alternative Techniques to Study Toxicologic Mechanisms: Case Study of Developmental Neurotoxicity. Lecturer – Ellen Fritsche (Heinrich-Heine-Universität Düsseldorf)
- 1:45 PM – 4:30 PM CDT
  - Establishing Scientific Confidence in New Approach Methods: A Modern Framework
  - New Approach Methodologies to Evaluate Botanical Safety
- 4:45 PM – 6:05 PM CDT
  - Leader’s Digest: The Art of Scientific Leadership

Tuesday, March 21st

- 8:00 AM – 10:45 AM CDT
  - Challenges in the Development of In Vitro-In Vivo Extrapolation Models for Next-Generation Risk Assessment
  - Breaking Down Barriers: Blood-Brain Barrier Model Development and Applications in Drug Safety
  - Continuing toward Best Practices in Organizing, Assessing, and Applying Mechanistic Data in Hazard Characterization and Risk Assessment
  - Developing Human-Relevant New Approach Methodologies to Measure Key Events in Pulmonary Adverse Outcomes: Focus on Chronic Endpoints
- 11:00 AM – 12:30 PM CDT
  - Establishing Confidence in New Approach Methods for Human Health Risk Assessment: Recent Examples of Context of Use
  - Placental Biology, Toxicology, and In Vitro Modeling for Predictive Developmental Toxicology
- 12:00 Noon – 1:00 PM CDT
  - Postdoctoral Assembly Luncheon
- 1:00 PM – 2:30 PM CDT
  - Achieving Successful Reproducibility for Next-Generation Toxicological Methods
  - Challenges and Future Directions in NAM Applications to Mixtures Risk Assessment
  - Crucial Role of Physiologically Based Pharmacokinetic (PBPK) Modeling in Human Health Risk Assessment in Different Sectors
- 1:30 PM – 2:30 PM CDT
  - Career Exploration through Speed Informational Interviews
- 2:30 PM – 4:15 PM CDT
  - Alternatives to Mammalian Models II
  - Alternatives to Mammalian Models III
- 3:00 PM – 4:35 PM CDT
  - Computational Visualization Tools for Communicating Large, Complex Data
Wednesday, March 22\textsuperscript{nd}

- 8:00 AM – 10:45 AM CDT
  - Human Cells as Nonanimal Alternative Approaches for Immunotoxicity Testing
  - Moving Stem Cell-Derived New Approach Methods toward Regulatory Acceptance
  - Shedding Light on Population Variability and Susceptibility: New Approach Methods to Inform Risk Assessment
  - Peer Reviewing for Scholarly Journals: Best Practices, Tips, and Case Studies
  - Nanotoxicology: In Vitro
- 11:00 AM – 12:20 PM CDT
  - EUROTOX Award Lecture: 3D Reconstructed Tissue Models in Toxicology: From Initial Idea to Regulatory Acceptance
- 11:00 AM – 12:00 Noon CDT
  - 21st-Century Agrochemical Evaluation: Discussing a New Vision
- 11:00 AM – 12:20 PM CDT
  - A Day in the Life of an Industry Toxicologist
- 1:30 PM – 4:15 PM CDT
  - New Approach Methodologies in the Pharmaceutical Sciences: Novel Strategies Challenging the Traditional Testing Paradigm to Increase Regulatory Confidence
- 2:30 PM – 4:15 PM CDT
  - Liver II: In Vitro
- 6:00 PM – 7:30 PM CDT
  - IVAMSS Reception

Thursday, March 23\textsuperscript{rd}

- 8:30 AM – 11:15 AM CDT
  - High-Content Imaging: Cell Painting Basics and Emerging Applications to Toxicological Research
  - Refining Inhalation Risk Assessments by Integrating New Approach Methodologies
  - A Roadmap to Modernized Agrochemical Carcinogenicity Assessment
## In Vitro and Alternative Methods Websites

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<th>Website</th>
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<tr>
<td>Alternatives Research and Development Foundation</td>
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<td>Center for Alternatives to Animal Testing (CAAT)</td>
<td><a href="https://caat.jhsph.edu">https://caat.jhsph.edu</a></td>
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Sincere thanks to our 2022-2023 IVAMSS Officers

Clockwise from top: Kathryn Page (President), Kristie Sullivan (Vice President), Sean Gehen (Past President), Sebastian Hoffmann (Secretary/Treasurer), Melissa Martin (Postdoctoral Representative), Lucie Ford (Graduate Student Representative), Mercedes Salvador-Silva (Councilor), Lauren Lewis (Councilor), and Samantha Faber (Vice President-Elect)


IVAMSS website  IVAMSS LinkedIn