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# THE Pharmacologist

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## Maurice Hilleman's Life-Saving Vaccines



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# Message from The President

Dear Fellow ASPET Members,

I want to begin by congratulating those who were recently elected to ASPET Council, President-Elect Michael F Jarvis, Secretary/Treasurer-Elect Kathryn A Cunningham, and Councilor John R Traynor. Many former ASPET presidents have used the March issue of *The Pharmacologist* to highlight the upcoming EB meeting, from poster competitions to mixers and other social events, education and career development sessions, mentoring activities, and special award lectures, to name a few. Though there will be things about the in person meeting we will miss, there is also much to look forward to. EB is just around the corner and, even in the face of the many challenges that come with planning a virtual meeting the size of EB, the ASPET Program Committee and ASPET staff have organized what I am sure will be an outstanding meeting. Attendance at EB 2021 is looking very strong and I encourage you to register now if you have not done so already.

Many public health issues have taken a back seat to the ongoing pandemic – the human suffering and loss of life from COVID-19 are staggering; however, other public health issues have not gone away and in many cases have worsened. For example, opioid misuse and opioid overdose deaths have increased significantly during the pandemic and, by many estimates, other mental health problems have increased as well. One of the benefits of serving as president is the opportunity to organize the Presidential Symposium at the annual meeting. The Presidential Symposium at EB 2021 will include presentations by distinguished scientists and clinicians who are developing and testing new medications for substance use disorders and treating patients who are suffering from the combined one-two punch of a substance use disorder and the pandemic. What the US is experiencing is not an opioid epidemic; it is a substance use epidemic with deaths involving opioids and stimulant drugs like methamphetamine rising sharply nationwide. The topic of the Presidential Symposium is near and dear to my heart and is just one example of the excellent programming that will be available at EB 2021. Planning is underway and already I am looking forward to seeing many of you in person at EB 2022 in Philadelphia!

Another highlight for any ASPET president is the opportunity to recognize the scientific award winners at the annual business meeting. Although the pandemic prevents me from presenting the awards in person, I nevertheless look forward to announcing the winners and to hearing the special lectures that are associated with several of these prestigious awards. Please join me in congratulating all of the 2021 ASPET scientific award winners (page 4).

I also want to congratulate the nine young pharmacologists selected for the 2021 ASPET Washington Fellows Program (page 36), a highly successful program that enables early career scientists who are interested in science policy to learn about and become actively engaged in policy issues. Over the next year, these fellows will learn how public policy decisions are made, and they will develop the skills necessary to be lifelong advocates for biomedical research. These nine outstanding individuals are among the many early career scientists in ASPET who are the future of pharmacology!

ASPETConnect continues to grow in popularity and is a convenient, secure method for members and staff to communicate. If you are using ASPETConnect, thank you and please spread the word. If you are not, please try it – I am confident that you will find it to be an easy and efficient method for communicating among your ASPET friends and colleagues, particularly in today's increasingly virtual world.

Although ASPET is an established, relatively old society, it is not standing still. The strategic plan continues to guide programs and new initiatives, there is an ongoing governance review, Council just initiated a long overdue review of the bylaws, the series Focus on Pharmacology is providing informative, entertaining virtual content on career development and hot topics in science, and the Society is in the early stages of planning for its own meeting in 2023. There is a bright future for ASPET and I encourage you to participate in the Society by joining a committee or running for elected office. Please do not wait for someone to ask – volunteer and self-nominate!

My year as president is rushing by, and in just a few months, I will be handing over the gavel to my colleague Peggy Gnegy, whom I have come to know on Council as an incredibly thoughtful and dedicated person. I can assure you that under her presidency, ASPET will be in good hands. Among the things that we learned in 2020 was the fact that there is still much work to be done to ensure diversity and equity in our society and in our institutions; 2020 was a call to make real, substantive changes in how we operate so that societies such as ASPET reflect the diversity of our society at large. Being aware of inequities is a good start, but it is not enough – we need to be proactive in developing strategies that make ASPET as welcoming as possible to everyone. I know that Peggy as well as Past President Wayne Backes and other members of ASPET Council share my view that we need to strengthen ASPET through diversity and ensure that the Society is welcoming to all comers and especially to individuals from populations underrepresented in science. This is a challenge that we need to embrace, as individuals and as a Society.

Again, thank you for giving me the opportunity to serve as president of the Society that is my scientific home. While this has not been the presidential year that I had imagined, it has been incredibly gratifying to see how we can work together effectively when faced with seemingly insurmountable challenges. As we forge ahead, putting the pandemic behind us and imagining what a new ASPET annual meeting will look like in 2023, let us all commit ourselves to advocating for science and keeping the discipline of pharmacology strong.

Respectfully yours,

A handwritten signature in black ink, appearing to read 'C. P. France', with a stylized, flowing script.

Charles P. France, PhD  
ASPET President





# 2021 Election Results

The 2021 ASPET election closed on February 10, 2021. Congratulations to newly-elected Council members Dr. Michael F. Jarvis, Dr. Kathryn A. Cunningham, and Dr. John R. Traynor, who will begin their terms on July 1, 2021.



## President-Elect

### Michael F. Jarvis, PhD, FBPhS

Adjunct Professor, Pharmaceutical Sciences, University of Illinois-Chicago



## Secretary/Treasurer-Elect

### Kathryn A. Cunningham, PhD

Chauncey Leake Distinguished Professor of Pharmacology, Director, Center for Addiction Research and Vice Chair, Department of Pharmacology and Toxicology, University of Texas Medical Branch



## Councilor

### John R. Traynor, PhD

Edward F. Domino Research Professor, Professor and Associate Chair for Research, Department of Pharmacology, Medical School; Professor of Medicinal Chemistry, College of Pharmacy, University of Michigan



# 2021 Award Winners

ASPET awards recognize accomplishments in all areas of pharmacology and experimental therapeutics. It is our honor to announce this distinguished group of Scientific Achievement Award winners for 2021.

ASPET will present the awards on Tuesday, April 27, 2021 at the Business Meeting and Awards Presentation during the ASPET Annual Meeting at Experimental Biology 2021. Please join us to celebrate these inspirational awardees.



## John J. Abel Award in Pharmacology

The John J. Abel Award in Pharmacology is named after the founder of ASPET. It was established in 1946 to stimulate fundamental research in pharmacology and experimental therapeutics by young investigators.

### Michael R. Bruchas, PhD

University of Washington



Dr. Michael Bruchas is receiving this award in recognition of his innovative research and technology advances in the study of GPCR biology and neuromodulatory signaling.

He is a professor of anesthesiology and pharmacology at the

University of Washington School of Medicine in Seattle. He received his PhD in pharmacology at Creighton University, completed his postdoctoral training at the University of Washington, and held his first faculty position at Washington University, St. Louis.

The primary goal of Dr. Bruchas's laboratory has been to dissect the role of GPCR and neuromodulation in affective behaviors and neuropsychiatric disease. He has taken this challenge in many ways, which include studies at all levels of resolutions, from molecular-cellular, circuit, and systems. Dr. Bruchas has developed several wireless optogenetic biological and hardware tools, now becoming adopted by neuropharmacology and neuroscience fields at large, along with several key insights into GPCR biology. He has been a member of ASPET since 2001.

Dr. Bruchas will deliver the **John J. Abel Award in Pharmacology Lecture** titled *Dissecting Neuromodulatory Circuits in Affective Behavior* as part of the annual meeting on Thursday, April 29 at 12:00 pm EDT.



The ASPET Fellows (FASPET) Program  
will be opening April 1, 2021.

*Honor someone who has made a major  
impact on pharmacology, mentoring, and ASPET.*

[www.aspet.org/FASPET](http://www.aspet.org/FASPET)



## Julius Axelrod Award in Pharmacology

The Julius Axelrod Award in Pharmacology was established in 1991 to honor the memory of the eminent American pharmacologist who shaped the fields of neuroscience, drug metabolism, and biochemistry and who served as a mentor for numerous eminent pharmacologists around the world. This award is presented for significant contributions to understanding the biochemical mechanisms underlying the pharmacological actions of drugs and for contributions to mentoring other pharmacologists.

### Joan Heller Brown, PhD, FASPET

University of California, San Diego



Dr. Heller Brown is being recognized for her significant contributions in molecular and cardiovascular pharmacology research, in mentoring and training the next generation of scientists in pharmacology, as well as her contributions to ASPET and the pharmacology community.

She obtained her PhD in pharmacology at Albert Einstein College of Medicine, did her postdoctoral work in the department of pharmacology at the University of Colorado, and moved to UCSD in 1975. She served as chair of the UCSD Department of Pharmacology for the last 17 years and directs their

NIH T32 in Pharmacological Sciences. Her seminal early papers on GPCR signaling demonstrated that dopamine receptors are the target of antipsychotic drugs, that muscarinic receptors inhibit adenylate cyclase, and that phospholipase C and CaM kinase II activation mediate cardiac hypertrophy. Her current work focuses on the role of RhoA signaling pathways in cancer and of CaMKII in cardiac inflammation and heart failure development. She has been consistently funded by NIH, published 250 scholarly articles, authored chapters in seven editions of Goodman and Gilman, and served as editor of *Molecular Pharmacology*. Dr. Heller Brown has been an ASPET member since 1978 and was bestowed the honor of a Fellow of ASPET in 2020.

Dr. Heller Brown will present the **Axelrod Lecture** at the ASPET Annual Meeting at EB 2022 in Philadelphia, April 2-5, 2022.



## David Lehr Research Award

The David Lehr Research Award is intended to extend funding for preclinical or clinical research directed toward improving human health. This award is made possible by an endowment to ASPET from Mrs. Lisa Lehr in honor of her husband, the late Dr. David Lehr, former chair of the Department of Pharmacology for New York Medical College.

### Maria A. Croyle, PhD

University of Texas at Austin



Dr. Maria Croyle has been selected to receive research funding to investigate novel regulatory mechanisms of drug metabolism in the context of active infection with SARS-CoV-2 and after recovery.

Dr. Croyle is a professor of molecular pharmaceuticals and drug delivery at

the University of Texas at Austin. Her research is dedicated to the development of recombinant viruses as medicinal agents and understanding how they impact physiological processes. Early in her career, she challenged the paradigm that cytokines were responsible for suppressing cytochrome P450 (CYP) mediated drug metabolism during infection and was the first to show that a single dose of recombinant adenovirus suppressed renal and hepatic CYP isoforms in rodents and non-human primates for 14 days. More recently, she published a landmark paper identifying integrin receptors as the primary mechanism for

alteration of drug metabolism by several different viruses in the absence of inflammation.

For the past 20 years, Dr. Croyle has trained young scientists to sharpen their critical thinking

skills through the design of studies for pre-clinical evaluation of virus-based vaccines and vectors for gene therapy. She has been a member of ASPET since 2008.



## Pharmacia-ASPET Award for Experimental Therapeutics

The Pharmacia-ASPET Award for Experimental Therapeutics recognizes and stimulates outstanding research in pharmacology and experimental therapeutics, basic laboratory or clinical research that has had, or potentially will have, a major impact on the pharmacological treatment of disease.

### Alan Saltiel, PhD

University of California, San Diego



Dr. Saltiel is receiving this award in recognition of his seminal contributions to our understanding of insulin signaling, pathogenesis of insulin resistance and type 2 diabetes, and for the preclinical development of the first thiazolidinedione, troglitazone, for treatment

of type 2 diabetes. His efforts in drug discovery also resulted in the discovery of the first small molecule MEK inhibitors for cancer, now a standard tool in targeted cancer therapy.

He is the director of the Institute for Diabetes and Metabolic Health and the UCSD/UCLA Diabetes Research Center as well as a professor of medicine and pharmacology at UCSD. He received his PhD

from the University of North Carolina, did postdoctoral training at Wellcome Research Laboratories, and was the founding director of the Life Sciences Institute at the University of Michigan. He has made seminal contributions to drug discovery and development, as well as describing specificity of insulin signaling, pathogenesis of insulin resistance, and type 2 diabetes. His laboratory cloned and characterized the first “molecular scaffolding” proteins, explaining how insulin regulates phosphorylation via kinase and phosphatase cascades. He discovered a new signaling pathway controlling glucose transport by insulin. He elucidated inflammatory links between obesity and insulin resistance, uncovering macrophage subtype switching, and mechanisms by which the NFκB pathway influences energy homeostasis. His recently discovered inhibitors of IKε exert profound antidiabetic effects in animal models and in patients with obesity-related diabetes.

He has been a member of ASPET since 1988.

  
ASPET 2022  
Symposium Proposals  
Philadelphia, PA  
April 2-5

Submit Your Proposal by May 14, 2021  
[www.aspet.org/2022proposals](http://www.aspet.org/2022proposals)







## Robert R. Ruffolo Career Achievement Award in Pharmacology

The Ruffolo Award was established in 2011 in recognition of the contributions made to drug discovery and development by Dr. Robert R. Ruffolo. The award recognizes the scientific achievements of scientists who are at the height of their careers and who have made significant contributions to pharmacology.

### Nicola J. Curtin, PhD Newcastle University



Dr. Curtin is receiving this award in recognition of her pioneering discoveries that PARP inhibitors will be therapeutic for cancer treatment of BRCA mutated cancer. Importantly, Dr. Curtin has developed predictive biomarkers based on pathway function, leading to the first

discovery that >50% of ovarian cancer have DNA repair defects targetable by PARP inhibitors.

Dr. Curtin is currently a professor of experimental cancer therapeutics at Newcastle University in

the United Kingdom. She earned her PhD from the University of Surrey and joined the staff at Newcastle University shortly after. She was part of the Newcastle Anticancer Drug Discovery Initiative from 1990 until 2009, where, as well as leading the ATM and DNA-PK inhibitor programs, she led the PARP inhibitor (PARPi) program leading to the first clinical trial of a PARPi for cancer. In 2002, she proposed that PARPi may have therapeutic benefit in BRCA mutated cancers and her collaboration with Thomas Helleday led to the seminal publication (*Nature* 2005). This paradigm-shifting discovery led to the approval of 4 PARPi for cancer treatment of BRCA mutated cancer. She is a distinguished cancer biologist and pharmacologist as well as an inventor on 15 patents and author of 171 articles.



## Reynold Spector Award in Clinical Pharmacology and Translational Medicine

The Reynold Spector Award in Clinical Pharmacology and Translational Medicine was established in 2014 by ASPET in recognition of Dr. Spector's dedication and contributions to clinical pharmacology. The award recognizes excellence in research and/or teaching in clinical pharmacology. This award is made possible by an endowment to ASPET from Dr. Reynold and Mrs. Michiko Spector.

### Garret A. FitzGerald, MD University of Pennsylvania



Dr. Garret FitzGerald is receiving this award in recognition of his distinguished career and leadership in research, mentoring, education, and administration in clinical pharmacology. His discoveries are fundamental to the development of low dose

aspirin, understanding the cardiotoxicity of other NSAIDs, and the role of the molecular clocks in cardiometabolic disease and aging.

At the University of Pennsylvania, Dr. FitzGerald is the founding director of the Institute for Translational Medicine and Therapeutics (ITMAT), the associate dean for translational research, the Robert L. McNeil Professor in Translational Medicine and Therapeutics, and a former department chair. He also held prominent positions at Vanderbilt University and at the University College Dublin, where he received his MD. In addition to the above-mentioned discoveries, he has deployed

precise quantitative methodology to integrate studies in model systems and humans. He has trained high school students, graduate students, and postdocs. Dr. FitzGerald has been a member of ASPET since 1982.

Dr. FitzGerald will deliver the **Reynold Spector Award Lecture** titled *Time for Translational Science* as part of the annual meeting on Wednesday, April 28 at 3:30 pm EDT.



## Norman Weiner Award Lecture

This lecture was established in memory of Dr. Norman Weiner, past ASPET president and chair of the Department of Pharmacology at the University of Colorado. It is in honor of his many contributions to both ASPET and to pharmacology research and education.

### Margarita L. Dubocovich, PhD, FASPET University at Buffalo Jacobs School of Medicine and Biomedical Sciences



Dr. Margarita Dubocovich is professor emerita of pharmacology, Northwestern University Feinberg School of Medicine, and is currently SUNY distinguished professor of pharmacology & toxicology and senior associate dean for diversity and inclusion at the University at Buffalo Jacobs

School of Medicine and Biomedical Sciences. She received her PhD in pharmacology from the School of Chemistry and Natural Sciences, Buenos Aires University, Argentina.

Dr. Dubocovich, a career pharmacologist, joined ASPET in 1983. She has published more than 400

scientific articles, reviews, book chapters, and abstracts on the neuropharmacology of presynaptic monoamine and melatonin receptors. A world leader in melatonin receptor pharmacology, she discovered prototype MT1- and MT2-selective melatonin receptor agonists, antagonists, and inverse agonist that has guided the field in the search for functional melatonin receptor responses. Her findings are key to our understanding on the role of melatonin receptors in circadian rhythms, sleep disorders, depression, and even cardiovascular disorders and cancer. Her dedication and service to ASPET is a fitting tribute to the award lecture's namesake.

Dr. Dubocovich will deliver the **Norman Weiner Lecture** titled *Cycle of Discovery: Neuropharmacology of Melatonin Receptors and Circadian Rhythms* as part of the annual meeting on Thursday, April 29 at 3:30 pm EDT.

**ASPET Webinars On-Demand**

Log In to ASPETConnect to Explore the Webinar Library at <https://bit.ly/38AnRAp>



ASPETConnect is ASPET's exclusive online community where you can network, talk to experts and leaders, join a conversation with members who share your interests, and find resources to help your journey with the Society. Make the most of your ASPET membership and check out ASPETConnect today!

## Top Five Reasons to Join a Community on ASPETConnect



1.

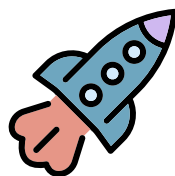
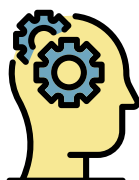
### Network, Network, Network!

ASPETConnect is a 24/7 networking hub. Your division community puts like-minded individuals together in one place to interact and share ideas. Being active in discussions helps get your name out there and can cultivate professional relationships with your peers.

2.

### Expand Your Knowledge

Scientific meetings and journals are filled with learning and knowledge, but so are your peers. ASPETConnect communities allow you to learn what others in your field are working on, ask questions, and find potential collaborators.



3.

### Get Inspired

Sometimes you need a little inspiration. By being part of a community, you can measure the pulse of what's happening in pharmacology. Let others inspire you with their experiences and share your own too.

4.

### Mentorship

ASPET members want to help and many are more than willing to provide guidance and advice to the next generation. Whether you are looking to be mentored or want to help mentor others, ASPETConnect provides a safe space to interact.



5.

### Get Involved

If you are looking for ways to get involved in ASPET, participating in ASPETConnect is a great way to find those opportunities. Divisions and leadership often seek volunteers for committee positions, symposia chairs, award nominators, and more. Get involved so you stay informed.

## Get Started Now

Start connecting with ASPET members – Log in to ASPETConnect at <https://connect.aspet.org/> using your ASPET username and password. If you do not remember your username and/or password, use the

“Forgot username or password” link. You can also contact [membership@aspet.org](mailto:membership@aspet.org) for help.

If you are logging into ASPETConnect for the first time, you will need to accept the Terms and Conditions.

## Communities on ASPETConnect

Not sure which communities to join? Below are communities on ASPETConnect that may interest you. To join these communities, simply log in to ASPETConnect and click on “All Communities” in the communities drop down menu and click “Join” next to the community you are interested in. If you are interested in starting a new community, please contact Suzie Thompson at [sthompson@aspet.org](mailto:sthompson@aspet.org) for more information.

### Division Communities

All ten ASPET divisions have a community on ASPETConnect. All members have been automatically added to their primary division community, but members are welcome to check out and join any division community on ASPETConnect.

### Focus on Pharmacology Community

The ASPET Focus on Pharmacology Virtual Series community is a forum for members to discover and present high quality, innovative science in pharmacology and experimental therapeutics. ASPET members may register for free virtual sessions, participate in discussions about the sessions, and view past recorded sessions in this community.

### NERDS PIT Community

NERDS PIT: New and Emerging Researchers Doing Science – Pharmacologists in Training is a community for members in the training stages of their career. It is an area for members to provide tips, advice, and mentoring. Trainees may gather here to build a community dedicated to issues critical to their success and well-being.

## Need Help Getting Started?

Refer to our Getting Started Guide at <https://connect.aspet.org/help/getting-started>.

Watch the short video tutorials on logging in to your account, updating your profile, joining a division community, and posting a discussion at <https://connect.aspet.org/help/video-tutorials>.

## Set Your Notifications!

Don't miss out on any important discussions happening in your community. By setting your notifications to Real Time or Daily, you will receive email notifications either in real time or once a day when someone posts to your community.



#### To set your notifications:

- Go to your "Profile"
- Click on "My Account"
- Click "Community Notifications"
- Choose "Real Time" or "Daily" notification for each community you belong to





## ASPET Annual Meeting Program

**Register by April 12** [www.aspet.org/eb2021/register](http://www.aspet.org/eb2021/register)

Join us April 27-30 for an exciting virtual scientific meeting experience at the ASPET Annual Meeting at Experimental Biology 2021! The virtual annual meeting will deliver everything you expect from ASPET and the EB community, plus more, through an environment that fosters interaction among global scientists passionate about pharmacology as well as physiology, biochemistry, molecular biology, pathology, and anatomy.

**The journey to discovering the highest quality, innovative science in pharmacology and experimental therapeutics begins by building your itinerary.** Plan to attend your sessions in real-time April 27-30 where you can participate in Q&As with the speakers or take advantage of the on-demand session recordings available to paid EB registrants from May 7-31. Use this detailed program schedule to organize your conference experience.

For speakers and full session descriptions, visit [www.aspet.org/eb2021/program](http://www.aspet.org/eb2021/program).

Tuesday, April 27, 2021	TIME ZONE CONVERSIONS FOR EVENT START TIME					Watch Real Time	Watch Recording
	CDT	MDT	PDT	GMT	UTC	✓	✓
<b>ASPET Business Meeting and Award Presentations</b> 10:00 am - 11:30 am Eastern Daylight Time	9:00 AM	8:00 AM	7:00 AM	2:00 PM	14:00	★	
<b>Break</b> 11:30 am - 12:00 pm Eastern Daylight Time <i>Refill your coffee and explore posters, exhibits, Career Central, and ASPET Datablitz videos.</i>	10:30 AM	9:30 AM	8:30 AM	3:30 PM	15:30		
<b>Protein Kinases in Tune</b> 12:00 pm - 1:30 pm Eastern Daylight Time	11:00 AM	10:00 AM	9:00 AM	4:00 PM	16:00		
<b>NIH Funding and Other Translational Research Opportunities</b> 12:00 pm - 1:30 pm Eastern Daylight Time	11:00 AM	10:00 AM	9:00 AM	4:00 PM	16:00		
<b>Utilizing Educational Tools to Enhance Student Learning in a Virtual Learning Environment</b> 12:00 pm - 1:30 pm Eastern Daylight Time	11:00 AM	10:00 AM	9:00 AM	4:00 PM	16:00	★	
<b>Mitochondrial Pathologies and Therapeutic Development – A Tribute to Craig C. Beeson</b> 12:00 pm - 1:30 pm Eastern Daylight Time	11:00 AM	10:00 AM	9:00 AM	4:00 PM	16:00		

★ This notes an interactive session with small group breakouts or audience polling that is more conducive to participating in real time.

Session/Event	CDT	MDT	PDT	GMT	UTC	Watch Real Time	Watch Recording
<b>Cardiac Leukocytes: A Therapeutic Quandary</b> 12:00 pm - 1:30 pm Eastern Daylight Time	11:00 AM	10:00 AM	9:00 AM	4:00 PM	16:00		
<b>EB Tang Prize Award Lecture</b> 1:00 pm - 2:00 pm Eastern Daylight Time <b>Keynote: Tony Hunter</b> <i>Tyrosine Phosphorylation — From Discovery to Drug Development and Beyond</i>	12:00 PM	11:00 AM	10:00 AM	5:00 PM	17:00		
<b>Break</b> 1:30 pm - 2:00 pm Eastern Daylight Time <i>Refill your coffee and explore posters, exhibits, Career Central, and ASPET Datablitz videos.</i>	12:30 PM	11:30 AM	10:30 AM	5:30 PM	17:30		
<b>Updating the Opioid Crisis: Novel Approaches to Reducing Opioid Abuse and Overdose</b> 2:00 pm - 3:30 pm Eastern Daylight Time	1:00 PM	12:00 PM	11:00 AM	6:00 PM	18:00		
<b>Intracellular GPCR Signaling: Cell Biology, Pharmacology and Physiology</b> 2:00 pm - 3:30 pm Eastern Daylight Time	1:00 PM	12:00 PM	11:00 AM	6:00 PM	18:00		
<b>Experimental Approaches for the Treatment of Infectious Disease</b> 2:00 pm - 3:30 pm Eastern Daylight Time	1:00 PM	12:00 PM	11:00 AM	6:00 PM	18:00		
<b>ADME in Neonates and Infants: Therapeutics, Toxicity, and Development of New Drugs</b> 2:00 pm - 3:30 pm Eastern Daylight Time	1:00 PM	12:00 PM	11:00 AM	6:00 PM	18:00		

★ This notes an interactive session with small group breakouts or audience polling that is more conducive to participating in real time.



## EB Programming

### Unlock the full EB program!

Did you know that your registration fee to the ASPET Annual Meeting includes the full EB program with access to the five host societies' annual meetings?

This opportunity for transdisciplinary exploration in anatomy, biochemistry, molecular biology, investigative pathology, pharmacology, and physiology is unmatched in the life sciences community.



Session/Event	CDT	MDT	PDT	GMT	UTC	Watch Real Time	Watch Recording
<b>ASPET Student - Postdoctoral Colloquium: Strategies for Dealing with Conflict and Difficult Conversations</b> 2:00 pm - 3:30 pm Eastern Daylight Time	1:00 PM	12:00 PM	11:00 AM	6:00 PM	18:00	★	
<b>Break</b> 3:30 pm - 4:00 pm Eastern Daylight Time <i>Refill your coffee and explore posters, exhibits, Career Central, and ASPET Datablitz videos.</i>	2:30 PM	1:30 PM	12:30 PM	7:30 PM	19:30		
<b>Challenges of Academic Drug Discovery in Cancer</b> 4:00 pm - 5:30 pm Eastern Daylight Time	3:00 PM	2:00 PM	1:00 PM	8:00 PM	20:00		
<b>Development of Cannabinoids for Clinical Use - CNS Hazards and Therapeutic Effects</b> 4:00 pm - 5:30 pm Eastern Daylight Time	3:00 PM	2:00 PM	1:00 PM	8:00 PM	20:00		
<b>New Tools in ADME Prediction: Quantitative Omics, Liquid Biopsies and Modeling</b> 4:00 pm - 5:30 pm Eastern Daylight Time	3:00 PM	2:00 PM	1:00 PM	8:00 PM	20:00		
<b>Diversity and Inclusion Session: Being Heard and Telling Your Story to Claim Your Place – Strategies for Success</b> 4:00 pm - 5:30 pm Eastern Daylight Time	3:00 PM	2:00 PM	1:00 PM	8:00 PM	20:00	★	
<b>Focus on Posters</b> 5:30 pm - 6:30 pm Eastern Daylight Time <i>Block this time to view poster PDFs, listen to audio clips by the authors, and leave comments or questions for the authors. Please note that posters are available 24/7.</i>	4:30 PM	3:30 PM	2:30 PM	9:30 PM	21:30		

★ This notes an interactive session with small group breakouts or audience polling that is more conducive to participating in real time.



## Division Town Halls



### March 22 – April 9

Join ASPET for your division's 2021 Town Hall Meeting. Learn about the division's latest activities and how to get involved. Afterward participate in the breakout rooms to network and meet with other division members.

All members are welcome! You do not need to be registered for EB to attend your division's Town Hall. Register here to save your seat: <https://bit.ly/384TvpD>

Wednesday, April 28, 2021	TIME ZONE CONVERSIONS FOR EVENT START TIME					Watch Real Time	Watch Recording
	CDT	MDT	PDT	GMT	UTC	✓	✓
<b>Session/Event</b>							
<b>ASPET Presidential Symposium: Its Not Just an Opioid Epidemic: A Translational/Real World Perspective on the Substance use Epidemic</b> 10:00 am - 11:30 am Eastern Daylight Time	9:00 AM	8:00 AM	7:00 AM	2:00 PM	14:00		
<b>Heavy Traffic: Targeting Diseases through Chemokine Receptor Antagonism</b> 10:00 am - 11:30 am Eastern Daylight Time <i>Sponsored by ChemoCentryx</i>	9:00 AM	8:00 AM	7:00 AM	2:00 PM	14:00		
<b>Cancer Systems Pharmacology</b> 10:00 am - 11:30 am Eastern Daylight Time	9:00 AM	8:00 AM	7:00 AM	2:00 PM	14:00		
<b>Immune Mechanisms in Pathologic Responses to Particles, Nanomaterials, and Nanomedicines</b> 10:00 am - 11:30 am Eastern Daylight Time	9:00 AM	8:00 AM	7:00 AM	2:00 PM	14:00		
<b>Teaching Blitz</b> 10:00 am - 11:30 am Eastern Daylight Time	9:00 AM	8:00 AM	7:00 AM	2:00 PM	14:00	★	
<b>Break</b> 11:30 am - 12:00 pm Eastern Daylight Time <i>Refill your coffee and explore posters, exhibits, Career Central, and ASPET Datablitz videos.</i>	10:30 AM	9:30 AM	8:30 AM	3:30 PM	15:30		
<b>Julius Axelrod Award in Pharmacology Lecture</b> 12:00 pm - 1:00 pm Eastern Daylight Time <b>Keynote: P. Jeffrey Conn</b> <i>Allosteric Modulators of Muscarinic Acetylcholine Receptors as a Novel Approach for Treatment of Schizophrenia</i>	11:00 AM	10:00 AM	9:00 AM	4:00 PM	16:00		
<b>Break</b> 1:00 pm - 1:30 pm Eastern Daylight Time <i>Refill your coffee and explore posters, exhibits, Career Central, and ASPET Datablitz videos.</i>	12:00 PM	11:00 AM	10:00 AM	5:00 PM	17:00		

★ This notes an interactive session with small group breakouts or audience polling that is more conducive to participating in real time.



## People Finder

Connecting with others at EB is easier than ever. Use the **People Finder** in the virtual meeting to search for speakers, for poster presenters, or for other scientists, both those you know or those you want to meet. Send text-based chat messages to them or request a video chat.





Session/Event	CDT	MDT	PDT	GMT	UTC	Watch Real Time	Watch Recording
<b>Julius Axelrod Symposium: Targeting Muscarinic Acetylcholine Receptors for Treatment of Brain Disorders</b> 1:30 pm - 3:00 pm Eastern Daylight Time	12:30 PM	11:30 AM	10:30 AM	5:30 PM	17:30		
<b>46 Years of GPCR Pharmacology and Mentoring in the Field of Pain Research: A Tribute to G.W. Pasternak</b> 1:30 pm - 3:00 pm Eastern Daylight Time	12:30 PM	11:30 AM	10:30 AM	5:30 PM	17:30	★	
<b>Cardiometabolic Diseases: At the Crossroads of Adipose Tissue and the Heart</b> 1:30 pm - 3:00 pm Eastern Daylight Time	12:30 PM	11:30 AM	10:30 AM	5:30 PM	17:30		
<b>Cross Talk in Metabolism of Xenobiotics and Endogenous Substrates</b> 1:30 pm - 3:00 pm Eastern Daylight Time	12:30 PM	11:30 AM	10:30 AM	5:30 PM	17:30		
<b>Pharmacology Education: Addressing the Opioid and Substance Abuse Crisis</b> 1:30 pm - 3:00 pm Eastern Daylight Time	12:30 PM	11:30 AM	10:30 AM	5:30 PM	17:30	★	
<b>Break</b> 3:00 pm - 3:30 pm Eastern Daylight Time <i>Refill your coffee and explore posters, exhibits, Career Central, and ASPET Datablitz videos.</i>	2:00 PM	1:00 PM	12:00 PM	7:00 PM	19:00		
<b>Reynold Spector Award in Clinical Pharmacology and Translational Medicine Lecture</b> 3:30 pm - 4:30 pm Eastern Daylight Time <b>Keynote: Garret A. FitzGerald</b> <i>Time for Translational Science</i>	2:30 PM	1:30 PM	12:30 PM	7:30 PM	19:30		
<b>Focus on Posters</b> 4:30 pm - 5:30 pm Eastern Daylight Time <i>Block this time to view poster PDFs, listen to audio clips by the authors, and leave comments or questions for the authors. Please note that posters are available 24/7.</i>	3:30 PM	2:30 PM	1:30 PM	8:30 PM	20:30		
<b>Undergraduate Networking and Career Development</b> 5:00 pm - 6:00 pm Eastern Daylight Time	4:00 PM	3:00 PM	2:00 PM	9:00 PM	21:00	★	

★ This notes an interactive session with small group breakouts or audience polling that is more conducive to participating in real time.



**ASPET  
Datablitz**

These 10-minute sessions are pre-recorded and available on-demand at the EB virtual meeting from April 27 to May 31. Each session includes 3 flash talks by young scientists whose presentations are limited to 3 slides in 3 minutes.

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Pharmacology Research & Perspectives

Open Access

Thursday, April 29, 2021	TIME ZONE CONVERSIONS FOR EVENT START TIME					Watch Real-time	Watch Recording
Session/Event	CDT	MDT	PDT	GMT	UTC	✓	✓
<b>Journals Workshop: An Interactive Guide to Publishing, Reviewing, and Ethics Issues</b> 10:00 am - 11:30 am Eastern Daylight Time	9:00 AM	8:00 AM	7:00 AM	2:00 PM	14:00	★	
<b>G Protein Signaling in Regulation of Metabolism and Diabetes</b> 10:00 am - 11:30 am Eastern Daylight Time	9:00 AM	8:00 AM	7:00 AM	2:00 PM	14:00		
<b>Novel and Integrated Intestine-liver Crosstalk on Hepatic Xenobiotic Metabolism</b> 10:00 am - 11:30 am Eastern Daylight Time	9:00 AM	8:00 AM	7:00 AM	2:00 PM	14:00		
<b>The Use of Chemogenetic Tools to Analyze Behavior in Non-human Primates</b> 10:00 am - 11:30 am Eastern Daylight Time	9:00 AM	8:00 AM	7:00 AM	2:00 PM	14:00		
<b>BPS-ASPET Symposium: A Current Perspective of Sphingolipid Signaling as a Therapeutic Target</b> 10:00 am - 11:30 am Eastern Daylight Time <i>Co-sponsored with the British Pharmacological Society</i>	9:00 AM	8:00 AM	7:00 AM	2:00 PM	14:00		
<b>Break</b> 11:30 am - 12:00 pm Eastern Daylight Time <i>Refill your coffee and explore posters, exhibits, Career Central, and ASPET Datablitz videos.</i>	10:30 AM	9:30 AM	8:30 AM	3:30 PM	15:30		
<b>John J. Abel Award in Pharmacology Lecture</b> 12:00 pm - 1:00 pm Eastern Daylight Time <b>Keynote: Michael R. Bruchas</b> <i>Dissecting Neuromodulatory Circuits in Affective Behavior</i>	11:00 AM	10:00 AM	9:00 AM	4:00 PM	16:00		
<b>Break</b> 1:00 pm - 1:30 pm Eastern Daylight Time <i>Refill your coffee and explore posters, exhibits, Career Central, and ASPET Datablitz videos.</i>	12:00 PM	11:00 AM	10:00 AM	5:00 PM	17:00		
<b>ASPET “Guppy Tank” Translational Science Pitch Showcase</b> 1:30 pm - 2:45 pm Eastern Daylight Time	12:30 PM	11:30 AM	10:30 AM	5:30 PM	17:30	★	
<b>Behavioral Pharmacology of Biased Agonists</b> 1:30 pm - 3:00 pm Eastern Daylight Time	12:30 PM	11:30 AM	10:30 AM	5:30 PM	17:30		
<b>Recent Progress in Drugging the ‘Undruggable’ RAS Oncogene</b> 1:30 pm - 3:00 pm Eastern Daylight Time	12:30 PM	11:30 AM	10:30 AM	5:30 PM	17:30		

★ This notes an interactive session with small group breakouts or audience polling that is more conducive to participating in real time.

Session/Event	CDT	MDT	PDT	GMT	UTC	Watch Real Time	Watch Recording
<b>Gut Microbiota in Drug Efficacy and Toxicity</b> 1:30 pm - 3:00 pm Eastern Daylight Time	12:30 PM	11:30 AM	10:30 AM	5:30 PM	17:30		
<b>Teaching Institute: Preparing the Next Generation of Scientists to be Best Practice Educators</b> 1:30 pm - 3:00 pm Eastern Daylight Time	12:30 PM	11:30 AM	10:30 AM	5:30 PM	17:30	★	
<b>Break</b> 3:00 pm - 3:30 pm Eastern Daylight Time <i>Refill your coffee and explore posters, exhibits, Career Central, and ASPET Datablitz videos.</i>	2:00 PM	1:00 PM	12:00 PM	7:00 PM	19:00		
<b>Norman Weiner Lecture</b> 3:30 pm - 4:30 pm Eastern Daylight Time <b>Keynote: Margarita L. Dubocovich</b> <i>Cycle of Discovery: Neuropharmacology of Melatonin Receptors and Circadian Rhythms</i>	2:30 PM	1:30 PM	12:30 PM	7:30 PM	19:30		
<b>Focus on Posters</b> 4:30 pm - 5:30 pm Eastern Daylight Time <i>Block this time to view poster PDFs, listen to audio clips by the authors, and leave comments or questions for the authors. Please note that posters are available 24/7.</i>	3:30 PM	2:30 PM	1:30 PM	8:30 PM	20:30		

★ This notes an interactive session with small group breakouts or audience polling that is more conducive to participating in real time.



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### ► University Information Networking Lounges

Video chat lounges with university representatives from advanced degree programs



### ► Online Job Boards

Comprehensive job openings across all five disciplines

Friday, April 30, 2021		TIME ZONE CONVERSIONS FOR EVENT START TIME					Watch Real-time	Watch Recording
Session/Event		CDT	MDT	PDT	GMT	UTC	✓	✓
<b>Division for Behavioral Pharmacology - Postdoctoral Award Competition</b> 10:00 am - 12:00 pm Eastern Daylight Time		9:00 AM	8:00 AM	7:00 AM	2:00 PM	14:00		
<b>Division for Drug Discovery and Development - Scientific Achievement Award Lecture and Notable Abstracts Platform Presentations</b> 10:00 am - 12:00 pm Eastern Daylight Time		9:00 AM	8:00 AM	7:00 AM	2:00 PM	14:00		
<b>Division for Translational and Clinical Pharmacology - Ray Fuller Lecture and Early Career Showcase</b> 10:00 am - 12:00 pm Eastern Daylight Time		9:00 AM	8:00 AM	7:00 AM	2:00 PM	14:00		
<b>Division for Cancer Pharmacology - Young Investigators Symposium</b> 10:00 am - 12:00 pm Eastern Daylight Time		9:00 AM	8:00 AM	7:00 AM	2:00 PM	14:00		
<b>Division for Cardiovascular Pharmacology - Trainee Showcase featuring the Lucchesi Early Career Awardee</b> 10:00 am - 12:00 pm Eastern Daylight Time		9:00 AM	8:00 AM	7:00 AM	2:00 PM	14:00		
<b>Break</b> 12:00 pm - 12:30 pm Eastern Daylight Time <i>Refill your coffee and explore posters, exhibits, Career Central, and ASPET Datablitz videos.</i>		11:00 AM	10:00 AM	9:00 AM	4:00 PM	16:00		
<b>ASPET - JPS Lecture</b> 12:30 pm - 1:30 pm Eastern Daylight Time <b>Keynote: Yoshikatsu Kanai</b> <i>Nutrient Transporters in Molecular Target Drug Discovery</i> <i>Co-sponsored with the Japanese Pharmacological Society</i>		11:30 AM	10:30 AM	9:30 AM	4:30 PM	16:30		
<b>Break</b> 1:30 pm - 2:00 pm Eastern Daylight Time <i>Refill your coffee and explore posters, exhibits, Career Central, and ASPET Datablitz videos.</i>		12:30 PM	11:30 AM	10:30 AM	5:30 PM	17:30		
<b>Division for Neuropsychopharmacology - Early Career Award Lecture and Postdoctoral Fellow Showcase</b> 2:00 pm - 4:00 pm Eastern Daylight Time		1:00 PM	12:00 PM	11:00 AM	6:00 PM	18:00		
<b>Division for Molecular Pharmacology - Early Career Awards and Postdoc Competition</b> 2:00 pm - 4:00 pm Eastern Daylight Time		1:00 PM	12:00 PM	11:00 AM	6:00 PM	18:00		

★ This notes an interactive session with small group breakouts or audience polling that is more conducive to participating in real time.



Session/Event	CDT	MDT	PDT	GMT	UTC	Watch Real Time	Watch Recording
<b>Division for Drug Metabolism and Disposition - Okita Early Career Award Lecture, Gillette Award Lectures, and Junior Investigator Platform Session</b> 2:00 pm - 4:00 pm Eastern Daylight Time	1:00 PM	12:00 PM	11:00 AM	6:00 PM	18:00		
<b>Division for Toxicology - Highlights and Advances in Toxicology</b> 2:00 pm - 4:00 pm Eastern Daylight Time	1:00 PM	12:00 PM	11:00 AM	6:00 PM	18:00		
<b>Division for Pharmacology Education - Multiple Choice Questions and Open-Ended Questions – Various Tools to Assess Pharmacology Knowledge</b> 2:00 pm - 4:00 pm Eastern Daylight Time	1:00 PM	12:00 PM	11:00 AM	6:00 PM	18:00	★	
<b>Break</b> 4:00 pm - 4:30 pm Eastern Daylight Time <i>Refill your coffee and explore posters, exhibits, Career Central, and ASPET Datablitz videos.</i>	3:00 PM	2:00 PM	1:00 PM	8:00 PM	20:00		
<b>ASPET Closing Networking Event and Poster Award Announcements</b> 4:30 pm - 5:30 pm Eastern Daylight Time	3:30 PM	2:30 PM	1:30 PM	8:30 PM	20:30	★	

★ This notes an interactive session with small group breakouts or audience polling that is more conducive to participating in real time.

The ASPET Annual Meeting at EB continues May 7 - 31 when on-demand recorded sessions from the schedule above become available to paid attendees for viewing at their convenience at any time of day or night.

Don't miss the GPCR Colloquium, a satellite meeting to EB on May 10 - 11. See page 21 for more information.



## Pharmacology Posters

Virtual posters are provided in a PDF format which allows you to zoom in for a more detailed view. The posters are accompanied by a brief audio narration by the author and a Q&A discussion area where you can pose comments and questions. **You can connect with authors through a private written or video chat using the *People Finder* feature.**

**Look for these icons on the pharmacology posters:**



**ASPET Program Committee Blue Ribbon Picks –  
high-scoring abstracts from every division**



**ASPET Student-Postdoc Poster Competition participants –  
tune in Friday, April 30 to see who wins**

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The EB photography and video recording policy gives presenters a chance to choose whether to allow photos, video, or any type of screen capture to be taken of their poster or oral presentation. Everyone at EB is committed to honoring the rights of copyright owners and to respectful sharing of scientific research and data. All attendees at EB are expected to adhere to this policy. Making audio or visual recordings of any part of EB in any medium or distributing audio or visual recordings of EB in any way is a violation of the EB Code of Conduct.

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## Visit the ASPET Virtual Booth

Know someone who isn't an ASPET member? Tell them to visit the ASPET virtual booth to learn more about ASPET benefits and programs. Members who recruit will be eligible for special raffle prizes.



## Joint Colloquium on G Protein-Coupled Receptors: Evolving Insights from Pharmacology, Biochemistry, and Physiology

May 10- 11, 2021

This is a satellite meeting to Experimental Biology 2021.




Thanks to the generosity of our sponsors and support from ASPET, ASBMB, and APS, the GPCR colloquium is being provided at no extra charge with your paid registration to Experimental Biology. Register for EB here: [www.aspet.org/eb2021/register](http://www.aspet.org/eb2021/register)

Tremendous scientific advancements over the last decade indicate that GPCR physiology and pharmacology are much more complex than originally thought and that it may be possible to exploit this complexity to treat a wide variety of diseases. The objective of this colloquium is to expose scientists to recent discoveries and multidisciplinary approaches used to study GPCRs and provide opportunities for establishing collaborations that bridge complementary interests. The event features speakers who have made exciting discoveries in GPCR research that range from molecular to systems biology, basic research to translational studies, and pharmacology to biochemistry to physiology.

### Co-Chairs

- Tracy M. Handel, University of California, San Diego
- Paul Insel, University of California, San Diego
- Jennifer Pluznick, Johns Hopkins University School of Medicine

## Program

Monday, May 10, 2021		TIME ZONE CONVERSIONS FOR EVENT START TIME				
Session/Event		CDT	MDT	PDT	GMT	UTC
<b>Welcome and Keynote Address</b> 11:00 am - 12:15 pm Eastern Daylight Time 						
<b>Keynote:</b> Brian Kobilka, Stanford University <i><b>Structural Insights into the Dynamic Process of G Protein–Coupled Receptor Activation</b></i>		10:00 AM	9:00 AM	8:00 AM	3:00 PM	15:00

Session/Event	CDT	MDT	PDT	GMT	UTC
<b>Symposium I</b> <b>Systems Biology Approaches to GPCR Physiology and Pharmacology</b> 12:15 pm - 2:15 pm Eastern Daylight Time Mark Knepper, NHLBI <b>V2R-omics: Multi-systems Approaches to Define Vasopressin Action</b> Nina Wettschureck, Max Planck Institute for Heart and Lung Research <b>Single Cell Analysis of GPCR Expression: Implication for Physiology and Pathophysiology</b> Kirill Martemyanov, The Scripps Research Institute <b>Deciphering Diversity of GPCR Signaling</b> Sriram Kosuri, Univ. of California, Los Angeles <b>Combining Synthesis and Multiplexed Assays to Explore Human Biology: GPCRs as a Paradigm</b>	11:15 AM	10:15 AM	9:15 AM	4:15 PM	16:15
<b>GPCR Short Talks</b> 2:30 pm - 4:00 pm Eastern Daylight Time The co-chairs have highlighted the work of 9 young scientists in this short talk session. In addition, view 150 GPCR poster PDFs along with the author audio narrations at any time of day until May 31.	1:30 PM	12:30 PM	11:30 AM	6:30 PM	18:30

Tuesday, May 11, 2021	TIME ZONE CONVERSIONS FOR EVENT START TIME				
Session/Event	CDT	MDT	PDT	GMT	UTC
<b>Symposium II</b> <b>GPCR Structural Biology and Drug Discovery</b> 11:00 am - 1:00 pm Eastern Daylight Time Chris Tate, Cambridge Univ. <b>Molecular Basis for High-affinity Agonist Binding at the Beta1-adrenoceptor</b> Bryan Roth, Univ. of North Carolina <b>New Technologies for Structure-guided GPCR Drug Discovery</b> Minghong Ma, Univ. of Pennsylvania <b>G Protein–Coupled Olfactory Receptors: Novel Insights into Responsiveness and Mechano-Sensitivity</b> Laura Wingler, Duke Univ. <b>Molecular Mechanisms of Biased Signaling at the Angiotensin Receptor</b>	10:00 AM	9:00 AM	8:00 AM	3:00 PM	15:00



Session/Event	CDT	MDT	PDT	GMT	UTC
<b>Symposium III</b> <b>GPCRs in Pathophysiology and Pathobiology</b> 1:15 pm - 3:15 pm Eastern Daylight Time Jerold Chun, Sanford Burnham Prebys. <b>Lysophospholipid - LPA and S1P - Receptors in Brain Disorders and Therapeutics</b> Kathleen Caron, Univ. of North Carolina <b>Novel Regulatory Functions of GPCRs in Vascular Growth and Remodeling</b> Willis (Rick) Samson, St. Louis Univ. <b>Novel Peptide-activated (Orphan) GPCRs: New Insights and Therapeutic Opportunities</b> Lora Heisler, Univ. of Aberdeen <b>Targeting GPCRs to Improve Obesity</b>	12:15 PM	11:15 AM	10:15 AM	5:15 PM	17:15
<b>Colloquium Best Poster Awards and Wrap Up</b> 3:30 pm - 4:00 pm Eastern Daylight Time	2:30 PM	1:30 PM	12:30 PM	7:30 PM	19:30

## The Joint GPCR Colloquium is hosted by the following Society Partners:



## Thank you to the GPCR Colloquium Sponsors!

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### Bronze Level Support

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 Division for Neuropharmacology

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Sponsor list as of 3/1/2021

# Maurice Hilleman's Life-Saving Vaccines

Rebecca J. Anderson, PhD



In 1961, Roald Dahl dedicated his new book, *James and the Giant Peach*, to his eldest daughter, Olivia. The next year, 7-year-old Olivia contracted measles at school. The illness took its usual course, and no one felt particularly alarmed. Then, one morning when Olivia was well on the way to recovery, Roald sat on her bed showing her how to fashion little animals out of colored pipe-cleaners. When she tried to make

one of her own, “her fingers and her mind were not working together and she couldn’t do anything” (1).

“Are you feeling all right?” he asked. “I feel all sleepy,” she replied (1).

Within an hour, she was unconscious. Twelve hours later, Olivia died from measles encephalitis, “and there was nothing the doctors could do to save her” (1).



Merck Archives, 2021

Maurice Hilleman

There was a time, not so long ago, when 4 million children in the US contracted measles, 50,000 of them were hospitalized, and 3,000 of them died (2). Every year. Then, along came Maurice Hilleman, the most influential and prolific scientist no one remembers.

## Montana Maverick

In 1919, in the midst of the influenza pandemic, Maurice Hilleman was born in Miles City, Montana—not far from the Little Big Horn battle site. His twin sister died at birth, and his mother died four days later. Because his father and seven older siblings were unable to care for an infant, Maurice was raised by his aunt and uncle, who lived on a neighboring farm (2, 3).

Maurice had access to a machine shop, an electrical shop, and a blacksmith shop, and he used those tools to tear apart farm equipment and put it all back together (2, 3). He also learned agronomy, raising vegetables, cutting hay, and tending livestock. In particular, he befriended chickens, talked to them, and even figured out how to hypnotize roosters (2).

Maurice also avidly read science books (3). One Sunday when he was in the 8<sup>th</sup> grade, he was caught reading Darwin's *The Origin of the Species* in church. "I told the minister that the book belonged to the public library, and I was going to turn him in if he took it from me" (2).

Maurice was a bright student, but he could not afford university tuition. Instead, the local J. C. Penney store selected him for its management trainee program—a highly sought position during the Depression (2, 3). A few weeks later, his eldest brother came home for the summer and was appalled that Maurice was a store clerk. With his brother's encouragement, Maurice received a full scholarship and entered Montana State University in Bozeman that fall (2, 3). He majored in microbiology and chemistry and graduated first in his class in 1941 (3, 4).

Hilleman applied to ten graduate schools, and they all accepted him. He selected the University of Chicago, which he considered America's leading research institution (3).

Montana State professors personally taught their classes, but the University of Chicago was different (4). The professors' attitude was, "Don't bother me and let me know when you discover something" (3). The impoverished graduate student subsisted on one meal a day and struggled to find a suitable research topic. He finally chose chlamydia, a sexually-transmitted pathogen.

At that time, scientists thought chlamydia was a virus and therefore untreatable (2, 5). Hilleman showed that it was, in fact, an unusually small bacterium, *Chlamydia trachomatis*. He raised chlamydia antibodies and used them to distinguish different subtypes of the microbe (2, 3).

His dissertation earned him an award for "the best results of research in pathology and bacteriology" (3). And his discovery led the way for antibiotic treatment of chlamydia (5).

Hilleman and his thesis professor taught the first course in virology at the University of Chicago—without a textbook, because none existed. It was assumed that he would stay in academia and teach virology after receiving his PhD in 1944 (5). But Hilleman wanted to work for a pharmaceutical company and conduct practical, applied research.

His professors strongly objected. "I was told...we do not train people for industry.' So I said what the hell, that's exactly where I'm going" (6). He accepted a position at E. R. Squibb & Sons in New Brunswick, NJ (2-4).

## War Work

With World War II still raging, military health officials asked pharmaceutical companies to bid on a vaccine against Japanese encephalitis virus (JEV). Allied soldiers in the Pacific were highly susceptible to JEV, which is

transmitted by mosquitoes. It causes brain infections leading to seizures, paralysis, coma, and death. Those who survive suffer permanent brain damage (3, 5).

Hilleman's bid promised to have Squibb's facility operational in 30 days and then produce hundreds of thousands of doses. No one in Squibb's management thought that was possible, but Hilleman proved them wrong (3, 5).

The only available facility on the Squibb campus was an old horse barn. Hilleman bulldozed out the horse manure, painted the concrete floor, cleaned out the hayloft, installed heating and electricity, and created a sterile facility (3, 5).

Viruses are notoriously difficult to grow in the laboratory, because, unlike bacteria, they need living cells to replicate. While at the University of Chicago, Hilleman had found that JEV grew and could be harvested from mouse brains (2, 3, 4). His method was similar to that discovered by Louis Pasteur, who grew rabies virus in rabbit spinal cord tissue (3).

To make his vaccine, Hilleman used a killed virus technique. In the 1920s, a French researcher found that formaldehyde killed bacteria, and when the dead bacteria were injected into a person, they generated immunity without causing disease. Similarly, Russian researchers had demonstrated that formaldehyde-treated JEV could prevent viral encephalitis (3).



Merck Archives, 2021

A vial of the influenza vaccine

Within a month, the team in Hilleman's converted barn was injecting JEV into hundreds of mice every day. The dissected mouse brains were homogenized in a Waring blender, and the homogenate was inactivated with formaldehyde (3, 5).

In 3 months, they had produced enough material to immunize 600,000 American troops (3). Manufacturers still make JEV vaccine from infected mouse brains (3-5).

After the war, Hilleman joined Walter Reed Army Institute of Research, the epicenter of infectious disease research (2). As chief of the Respiratory Diseases Department, he was assigned "to study respiratory illnesses of military significance," and influenza in particular (3, 5, 7, 8).

In his early studies, Hilleman lined up various flu strains in chronological order and saw that the hemagglutinin protein on the viral surface gradually changed (2, 3, 5). "I could see that with time these viruses kept changing, changing, changing, and that this would explain why this virus could come back each year" (3). These minor changes were called "antigenic drift" (3, 5, 7, 8).

## Asian Flu

Besides antigenic drift, Hilleman knew that once in a while, the flu virus underwent a major genetic change, with a completely different hemagglutinin surface protein. This was "antigenic shift" (2, 5). If the shifted strain turned out to be particularly virulent, it would trigger a pandemic, because no one had immunity to it.

On April 17, 1957, Hilleman sat in his office at Walter Reed reading *The New York Times*. He saw the headline, "Hong Kong Battling Influenza Epidemic" (2, 3, 5). Already, 250,000 people in Hong Kong had been infected. At every dispensary, mothers were carrying babies with "glassy-eyed stares" (2, 3, 9). Hilleman immediately recognized it: "Son of a bitch," he said. "This is the pandemic. It's here!" (9).

He immediately cabled the army's 406<sup>th</sup> Medical General Laboratory in Zama, Japan, and asked them to investigate. They tracked down a sailor who had been exposed to the virus in Hong Kong and became ill. The young man gargled with salt water, and a medical officer rushed the virus-laden specimen to Hilleman (3).

On May 17, 1957, Hilleman purified the specimen and injected it into chick embryos. His team worked around the clock for five days to grow a supply of this new virus and then tested it against blood samples



drawn from thousands of Americans (3, 9, 10). None of them had antibodies to the virus.

Hilleman also shipped the virus to WHO, the US Public Health Service, and the Armed Forces Epidemiological Board for testing (2, 3, 8). In the whole world, only a few elderly people who had survived the influenza pandemic of 1889-1890 had antibodies in their blood (3).

Hilleman had determined that only three types of hemagglutinins (H1, H2, and H3) had ever caused pandemic disease in humans (3). (The 1918 flu was H1N1.) Hilleman found that the viral strain collected from the US sailor was H2N2—the virus responsible for the 1889 pandemic. And nearly everyone was susceptible (2, 3, 10). They dubbed it “Asian flu” (8, 9).

According to Hilleman’s calculations (based on the 1918 death rate), more than one million Americans would die from the Asian flu (2). He also predicted that the pandemic would hit the US just when schools opened in September (5, 10). It was already spreading throughout China, Taiwan, Malaysia, and the Philippines, as well as Hong Kong (3, 8).

The only way to stop it was with a vaccine, and they had only four months to make it—faster than a flu vaccine had ever been made (3, 8).

On May 22, 1957, Hilleman issued a press release warning of the pandemic and urging immediate action. “I had a very difficult time getting anybody to even believe this...I was declared crazy” (3, 10).

So, Hilleman bypassed “the bureaucratic red tape” and worked directly with industry (2, 9). He sent the six largest US-based vaccine makers samples of the virus and asked them to begin vaccine production. And they did. “[Hilleman] had that sort of clout,” one historian said (10).

They utilized an attenuation technique developed by Max Theiler in the 1930s (3). Theiler found that human viruses forced to grow in animal cells underwent a series of changes, which allowed them to survive in the animal tissue. But these same changes made the virus less capable of causing disease in humans (3). By passing generations of the virus sequentially through animal cells, the virus, though still alive, was sufficiently weakened that it could be used as a vaccine—a so-called live vaccine.

Hilleman thought weakened/attenuated viruses would produce better, longer lasting immunity than killed viruses (5).

Manufacturers weakened the Asian flu virus by passing it through a series of chick embryos. Hilleman,



Merck Archives, 2021

*Maurice Hilleman with a tray of chicken eggs.*

the former Montana chicken farmer, said, “The most significant thing I told them was to please advise their chicken producers not to kill the roosters” (3). They needed roosters to fertilize the eggs. Merck alone went through 150,000 chick embryos every day (2).

On July 26, 1957, doctors began inoculating recruits at Fort Ord, California. Vaccinations at more military bases followed to establish effective dose levels (2, 9). When school began in the fall, Asian flu outbreaks appeared in the US, just as Hilleman predicted. But doctors were ready with 40 million doses of vaccine (2, 8, 9).

Like the 1918 flu pandemic, the Asian flu disproportionately killed healthy young people (3). Altogether, 70,000 Americans died, but Hilleman’s quick actions saved many lives (2, 3, 8).

Hilleman could rightly claim, “That’s the only time we ever averted a pandemic with a vaccine” (9). Surgeon General Leonard Burney praised his efforts, and Hilleman was awarded the military’s Distinguished Civilian Service Medal (3).

Public health agencies still conduct surveillance (pioneered by Hilleman) to track newly emerging flu viruses each year and prepare targeted vaccines to combat them (2).

## Merck Maverick

After the success of the Asian flu vaccine and his discovery of antigenic drift and shift, Hilleman's expertise was widely acknowledged.

Merck had mostly developed drugs to treat diseases, but by 1957, CEO Vannevar Bush and Max Tishler (the company's president and long-time head of research) recognized that vaccines were important, too (2). They sought a world-class vaccine expert and saw in Hilleman someone who had the vision, stamina, and strength to lead their effort (2, 5).

At first, Hilleman wasn't interested—he wanted to do research and had no desire to be bogged down with administrative responsibilities (2). But the longer he held out, the more persistent Merck was (2, 7).

On December 31, 1957, Hilleman joined Merck as the head of its new virus and cell biology research department in West Point, PA (3, 4). And Merck (perhaps sometimes to its regret) gave Hilleman free reign (5).

## Polio

Hilleman's first assignment at Merck was to scale up production of Jonas Salk's newly developed polio vaccine. The March of Dimes had funded a half-dozen drug companies to make the vaccine according to Salk's protocol (2, 3, 5).

Salk grew the virus in monkey kidney cells and killed it with formaldehyde (3). Merck manufactured this product, but Hilleman continued research, looking to improve the vaccine (2). Researchers had identified 39 different monkey viruses, most of which were killed by formaldehyde. But Hilleman discovered another, previously unknown virus. He called it Simian Virus 40 (SV40). And it survived formaldehyde treatment (2, 3).

Furthermore, Hilleman found that SV40 caused tumors in hamsters (2, 3, 5). No one knew whether people inoculated with Salk's monkey-derived vaccine would also develop cancer. But out of an abundance of caution, Merck removed its polio vaccine from the market (2, 5).

Around the same time, Albert Sabin's polio vaccine was introduced. Sabin attenuated the virus by passing it sequentially through monkey kidney cells. And it was effective orally (3).

Hilleman found SV40 in both Salk and Sabin's vaccines (5). But fortunately, in Sabin's oral vaccine,

SV40 passed harmlessly through the gut, and in Salk's vaccine, the amount of SV40 was very small and sufficiently weakened by formaldehyde treatment (3). After decades of polio immunization, no evidence has been found that these vaccines cause cancer. But Hilleman didn't know it at the time (3, 5).

Because of this "close-call," Hilleman made safety the final arbiter of every decision he would make (5).

## Measles

In addition to the Sabin polio and Asian flu vaccines, Theiler's attenuation method would be used to make vaccines against measles, mumps, rubella, and chickenpox (3). Measles topped the list. It was among the most infectious of the childhood viruses. In addition to causing a fever, rash, and cough, measles could cause fatal pneumonia or encephalitis, and in many

survivors, permanent brain damage or blindness (2, 3).

In 1954, John Enders and his colleagues at Boston Children's Hospital isolated measles virus from a 13-year-old boy at a private boarding school (3). They passed the virus through a series of human kidney cells, human placentas, hens' eggs, and minced chick embryos (3, 8).

Many drug companies requested and received Enders's attenuated strain to produce measles vaccines, including

Maurice Hilleman at Merck (3). In his initial tests, Hilleman found that the Enders vaccine protected children from measles, but it caused a rash in half of them, most had fevers (as high as 103 degrees), and some experienced convulsions (2, 3, 11).

Hilleman was under pressure to bring the Enders vaccine to market quickly, and Merck launched Rubeovax® in March 1963 (8, 11). But Hilleman's team recommended that Rubeovax be given in combination with gamma globulin, which significantly reduced the incidence of harmful injection reactions (2, 3).

Hilleman was also concerned that the Enders vaccine might cause cancer (2, 3, 11). Chicken eggs like those Enders used for his attenuated vaccine were contaminated with a virus that causes leukemia in 80% of infected chickens. Hilleman said, "I'd be damned if I was going to vaccinate all of these kids with [a virus causing] leukemia" (3).

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*"Hilleman's  
measles vaccine  
alone is credited  
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His search for virus-free chickens led him to Kimber Farms in Fremont, CA. Researchers there had successfully bred such a flock, but W. F. Lamoreux, the head of Kimber, refused to let Hilleman have any of them (3, 11). During their conversation, Hilleman detected a familiar accent and as he was leaving, he asked Lamoreux where he was from.

"Helena," Lamoreux said. Hilleman extended his hand and replied, "Miles City." Lamoreux broke into a broad smile and said, "Take them all. One buck apiece" (3, 5).

For four years, Hilleman's group made millions of doses of the Enders measles vaccine using the Kimber chickens. But it still required co-administration of gamma globulin to avert the severe reactions (2, 3, 5).

So, Hilleman attenuated the Enders strain by passing it through chick embryos 40 more times (5). In 1968, Merck began distribution of this Moraten strain (MOre ATtenuated ENders). Moraten induced immunity without causing any side effects, and it remains the only measles vaccine used in the US (3, 5, 8, 11).

Hilleman's measles vaccine alone is credited with preventing one million deaths worldwide every year (2, 4, 11).

## Mumps

On March 23, 1963, while Hilleman was improving the measles vaccine, another vaccine opportunity landed in his lap—literally. His 5-year-old daughter, Jeryl Lynn, woke him in the middle of the night, complaining of a sore throat. Hilleman's wife had died from breast cancer just 4 months earlier. After consulting *The Merck Manual*, he concluded that Jeryl's chipmunk cheeks were the mumps (2, 3).

In the 1960s, mumps infected a million Americans every year (3). The virus attacks the salivary glands at the back of the throat and is usually benign. But about half of children develop a mild case of meningitis, and some of them suffer seizures, paralysis, and deafness. In pregnant women, it causes fetal deformities and fetal death (2, 3).



*Kirsten Hilleman receiving the mumps vaccine from Dr. Robert Weibel (a clinical trial investigator) as her older sister, Jeryl Lynn, watches*

Merck Archives, 2021

Because Hilleman was leaving on a business trip to South America in the morning, he had to work quickly (2). Jeryl Lynn later recalled, "My dad was quite excited about my feeling bad" (5). It wasn't the reaction she expected.

While his live-in housekeeper watched Jeryl Lynn, Hilleman drove to his lab and grabbed some supplies. Back at home, he gently swabbed Jeryl Lynn's throat to collect the virus, immersed it in beef broth, and returned to the lab to put the broth in the freezer (2, 3).

When he returned from his trip, Hilleman inoculated chick embryos with Jeryl Lynn's specimen and then harvested the mumps virus. He attenuated it by passing it five times through a series of flasks containing chick embryo cells (2, 3).

About two years after Jeryl Lynn's infection, clinical trials showed that Hilleman's vaccine was safe and effective against mumps (3). Among the subjects was Hilleman's second daughter, Kirsten, whose displeasure is forever preserved in a now-famous photo (3, 6). Kirsten later said, "That photograph of me has haunted me my entire life" (5).

On March 30, 1967, the Jeryl Lynn strain of mumps vaccine was licensed (3). It was the world's first live vaccine against mumps (2). Until the COVID-19



vaccines, it held the record as the fastest-developed vaccine (from scratch).

Others have tried but failed to improve the Jeryl Lynn strain, which remains the standard mumps vaccine (3, 6). As one journalist said, “Jeryl recovered from mumps virus, but the mumps virus never recovered from infecting Jeryl” (6).

## Rubella

Of all the childhood infections that cause rash and fever, rubella is among the mildest. But when pregnant women become infected in their first trimester, the fetus has an 80-85% chance of developing severe organ defects, and in many cases, women suffer miscarriages and stillbirths (3, 5).

In 1962, Hilleman collected samples of rubella virus from an infected boy in Philadelphia and began work on a rubella vaccine (3, 11). The virus didn’t grow in chick embryo cells (11). So, he passed it through monkey kidney cells and duck embryos. Clinical trials in Philadelphia in 1965 showed the vaccine was effective (3).

Simultaneously, Harry Meyer and Paul Parkman at the National Institutes of Health (NIH) were developing their own rubella vaccine (3, 11). Hilleman’s vaccine was arguably better, but the Meyer/Parkman vaccine was further along in development (5).

There were concerns that competition between the two development programs would delay introduction of a vaccine that was desperately needed before the next rubella outbreak (11). In a generous move, Hilleman agreed to join forces with NIH (whose Division of Biologics Standards was then responsible for licensing vaccines in the US), to bring a rubella vaccine to market “in the shortest possible time” (5).

Clinical trials showed that the Meyer/Parkman vaccine frequently caused serious side effects that Hilleman found unacceptable (11). “Jesus Christ, it was awful: toxic, toxic, toxic” (3). So, Hilleman passed it five more times through duck embryos (3, 11).

Both Hilleman’s original vaccine and this newly attenuated NIH vaccine worked and were safe. But Hilleman’s produced a higher level of protective antibodies (3). Nevertheless, per their agreement, Merck manufactured and marketed the duck-

attenuated NIH vaccine in 1969. It prevented the rubella epidemic anticipated in 1970 (3, 11). Over the next 10 years, Merck distributed 100 million doses in the US.

## Fetal Cell Cultures

As Hilleman noted, rubella was one of several human viruses that grew very poorly in animal cells. Laboratory research was just beginning on human fetal cells, but they had several advantages for vaccine development: Every known human virus grew in human fetal cells, and human fetal cells were not contaminated with animal viruses (3).

In 1964, Stanley Plotkin weakened the rubella virus in human fetal cells by reducing the incubation temperature stepwise to 86 degrees over 25 consecutive passages (3). The virus adapted, growing well at the lowered temperature but poorly at normal body temperature (98.6 degrees). In clinical trials,

Plotkin’s attenuated vaccine, which he called RA27/3, induced better and longer-lasting protection against rubella than Hilleman’s modified NIH vaccine (3).

Hilleman was always about the science and the data, not personal recognition. In fact, he avoided the limelight and let clinical investigators answer reporters’ questions at press conferences (3, 5).

The only thing that mattered was getting the best vaccine, no matter where it came from (5, 6). So, Hilleman called Plotkin and

asked permission to manufacture RA27/3. Plotkin readily agreed (3). Hilleman then persuaded Merck’s management, who switched production to RA27/3 in 1970 (3, 8, 11).

Human fetal cells remain a mainstay in vaccine development. A recent analysis identified 13 candidate COVID-19 vaccines that rely on fetal cell lines, including those made by Moderna, AstraZeneca, and Johnson & Johnson (12).

## MMR

With his measles, mumps, and rubella vaccines, Hilleman became a master of attenuation (5). But, he also hoped “that it might be possible, one day, to develop a vaccine that would protect against these three diseases in a single shot” (11).

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***"The only thing that mattered was getting the best vaccine, no matter where it came from"***

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WhisperHistory via CCA 4.0

*A vial of the MMR vaccine*

In the late 1960s, he conducted extensive studies to optimize the combination vaccine. There were no relevant animal models, so all of the experimentation regarding attenuation, immunogenicity, and efficacy were necessarily carried out in humans (11).

Ultimately, Moraten (measles), the Jeryl Lynn strain (mumps), and RA27/3 (Plotkin's rubella) were used in the combined MMR

vaccine (11). Merck launched MMR in 1971, and it is now the cornerstone of pediatric health in the US (3).

## Marek's Disease

In the 1960s, researchers found that Marek's disease was caused by a herpes virus (3). This highly contagious chicken virus caused "range paralysis" and rock-hard tumors in various organs. It infected 20 percent of all chickens raised in America and cost poultry farmers millions of dollars in losses every year (2, 3).

With the discovery of a related herpes virus that causes range paralysis in turkeys, Hilleman wanted to use it to develop a vaccine against Marek's disease. But his boss, Max Tishler, discouraged him, saying Merck "was not in the chicken business" (3). Tishler was certain that the company's board of directors would nix the idea. Instead, they gave Hilleman the go-ahead (3).

The project drained Hilleman's lab resources, but he succeeded and the vaccine was introduced in 1971. It was a major milestone: the world's first cancer vaccine—albeit, for chickens (3). Hilleman had used chickens to prepare vaccines against pandemic influenza, measles, and mumps, and he said, "I figured I owed it to the chickens" (2).

## Pneumonia

In addition to viral vaccines, Hilleman developed vaccines to combat bacterial infections. Researchers had discovered that the polysaccharide capsule surrounding pneumococcus could be stripped from the bacteria. Injecting this polysaccharide into mice protected them from infection (3, 13).

The first successful pneumococcal vaccine was made during World War II. But it was not profitable because newly discovered penicillin eradicated pneumonia (3, 13).

In the 1970s, Robert Austrian at the University of Pennsylvania resurrected the research (3). He found that 13 types of pneumococcus accounted for a large portion of pneumonia cases. With support from NIH and Eli Lilly's production facilities, Austrian conducted clinical trials and found that his polysaccharide-derived vaccine reduced the incidence of pneumonia by 80 percent (3).

Unfortunately, Lilly had decided to end its vaccine business (3). And no one else seemed interested.

"Dr. Hilleman on his own decided that Merck would make a [pneumococcal] vaccine," Austrian said (3). Merck launched Austrian's vaccine in 1977 (3, 8).

Eventually, Austrian isolated more than 90 types of pneumococcal bacteria (8, 14). He selected the 23 most appropriate polysaccharides, and Hilleman used that information to develop an improved vaccine in 1983. Austrian said it was "probably the most complex vaccine" ever made. "It's designed to protect against twenty-three different infections" (3).

The Centers for Disease Control and Prevention (CDC) now recommends this vaccine, PPSV23, for all adults over age 65 (3).

## Hepatitis B

Hepatitis B infection can lead to chronic fatigue, jaundice, abdominal pain, and liver damage, including liver cancer (5, 13). Children infected at birth or during infancy are particularly prone to developing chronic hepatitis (13).

Hepatitis B virus was virtually impossible to grow in the lab (5). And unlike measles, mumps, and rubella, people infected with hepatitis B have very little virus in their throats. The largest quantities are in their blood (3). So, unconventional methods were required to harvest the virus and prepare a vaccine.

The immune system responds to hepatitis B by making antibodies against a protein on the virus's surface. To survive, the virus makes massive extra quantities of this surface protein, which soaks up all of the antibodies and allows the free virus to attack liver cells unimpeded (3).

Hilleman's vaccine strategy was to use the virus's surface protein to induce antibodies that neutralized the virus before it could gain a foothold in the liver (3). In the 1970s, hepatitis B predominantly infected

gay men and intravenous drug users. Their blood was a rich source of the surface protein. But to make his vaccine, Hilleman needed to eliminate all of the other proteins in the blood. And he had no previous methods to guide him (3).

Through trial-and-error, Hilleman arrived at a triple chemical cocktail that denatured blood proteins by brute force. Sequential treatment with pepsin, urea, and formaldehyde destroyed those blood proteins, as well as the hepatitis B virus (3).

The resulting vaccine, triply killed, would “end up to be deader than deader than dead” (5). To test his method, Hilleman subjected every known virus to his chemical cocktail, and they were all completely destroyed (3). Miraculously, the hepatitis B surface protein remained intact.

Hilleman then carried out multiple purification steps and produced a blood-derived hepatitis B vaccine that was virtually 100 percent pure hepatitis B surface protein (3). Despite these extensive procedures, Merck’s senior management and clinical investigators were still reluctant to inject people with a blood-derived vaccine (3, 5).

Hilleman summoned the whole management team to the company cafeteria, rolled up his sleeve, and was injected with the vaccine. Then he said, “Now I want all of you to do the same” (5). He stubbornly proceeded, and clinical trials demonstrated that the blood-derived vaccine was safe and effective. It was licensed by the FDA in 1981 (3, 13).

Later, when HIV was identified, concerns were raised about producing a vaccine with blood from people who were likely infected with both hepatitis B and HIV. But as hepatitis researcher Harvey Alter noted, “Hilleman was very careful about making the vaccine...he had done all the right things to kill the AIDS virus, even if he didn’t know it was in there” (3).

Others could have eventually developed most of Hilleman’s other vaccines. But only Hilleman had the wherewithal to treat human blood with chemicals, prove that he had killed all contaminating substances, and purify the surface protein. Virologist Paul Offit said, “Ironically, Hilleman’s blood-derived hepatitis B vaccine, made from the most dangerous starting material ever used, was probably the safest, purest vaccine ever made” (3).

It remained on the market until 1986, when Hilleman achieved another milestone (3).

## Recombinant HBV

When genetic engineering emerged, Hilleman and his team exploited this new method to make the first recombinant vaccine. They inserted the gene for the hepatitis B surface protein into common baker’s yeast. The genetically engineered surface protein induced infection-fighting antibodies and was licensed on July 23, 1986 (3, 8).

Merck halted production of its blood-derived vaccine in favor of the recombinant vaccine in 1990, and the CDC recommends it for all infants (2, 3, 8, 13). Hilleman’s recombinant surface protein ushered in a new era of vaccines, which were less expensive, easier to produce, more temperature-stable, and easier to administer (8).

He ranked the hepatitis B vaccine as his single greatest achievement: “We made the world’s first hepatitis vaccine, the world’s first [human] anticancer vaccine, the world’s first recombinant vaccine, and the world’s first vaccine made from a single protein” (3).

## Maverick Manager

Unlike other researchers, Hilleman controlled every facet of vaccine development: research, clinical trials, manufacturing, and marketing (3, 6). He hovered over the production staff—obsessed first, last, and always about safety—and refused any change to his process, even if the change might provide greater yields, higher profits, and shorter timelines (3, 5, 6). He knew it was already perfect.

Although he was soft spoken and blessed with both intellect and a sense of humor, Hilleman was outwardly gruff, prickly, and ridiculously tough (4, 6). When presenters at scientific meetings rambled in their talks, he was quick to stand and say, “You’re full of crap” (3).

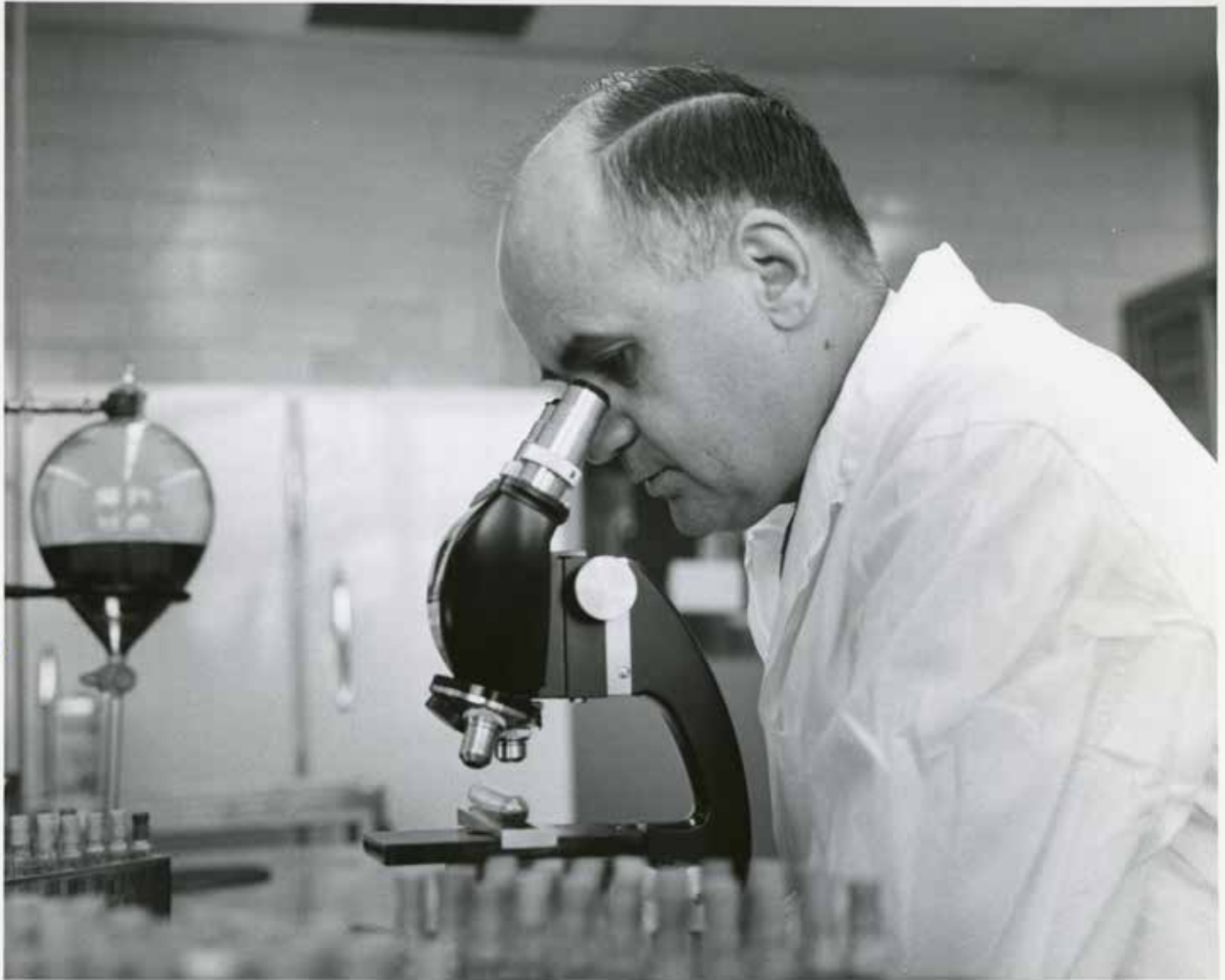
He was especially impatient with industry and government bureaucrats (4-6). “I ran into conflict with just about everybody,” he said. “I was told I had a very unusual management style” (6).

In the mid-1960s, Merck sponsored sessions to coach its executives on management etiquette (3). Max Tishler had the unenviable task of asking Hilleman to attend these sessions. Tishler said, “Usually when

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***"He ranked  
the hepatitis B  
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Merck Archives, 2021

*Maurice Hilleman at work in the lab*

people came into my office, they left shaking. But when Maurice came into my office, I'm the guy who was shaking" (3). Hilleman never attended.

At six foot one, Hilleman commanded the respect of his research team with a regimented management style that was the norm at Walter Reed. He worked a 7-day week, was "totally at it all day long," and was intolerant of those whose work ethic was less stringent than his—which was just about everybody (3). As one said, "If Hilleman told you to do something, you did it" (3).

But despite his iron hand and frightening manner, Hilleman's coworkers were fiercely devoted to him, and he protected them (3, 5). He successfully lobbied for annual 10% increases in his departmental budget, even though Merck's revenues from vaccines paled

in comparison to its drug profits. And when, in the 1970s, Merck reduced its workforce for the first time in anyone's memory, no one in Hilleman's division was touched (3, 5).

The one characteristic that everybody remembered was Hilleman's relentless profanity (3, 6). He called them "Montana adjectives" (3, 5).

But Hilleman's rough exterior hid a generous heart. He always granted interviews to neighborhood children for their science projects, patiently explaining his work. Both of his daughters fondly remember the time he spent with them, including long hours conducting experiments, building models, and exploring nature (3, 5). Jeryl Lynn said he gave her the greatest gift anyone can give. "He believed in me" (3).

## “Retirement”

In 1984, Hilleman turned 65, the required retirement age for Merck corporate officers. He refused. He had a list. It contained virtually every disease that could possibly hurt or kill a child. And there were many more vaccines to make (3, 5, 7). As he told his daughter, “There’s plenty of time to sleep when rigor mortis sets in” (5).

After months of negotiation, Merck, for the first time in its history, relented and allowed Hilleman to stay. He directed the newly created Merck Institute for Vaccinology and reported to work every day for 20 more years—often staying late (3, 6).

He zealously read scientific journals, wrote seminal review articles, published opinion pieces, and continued to shape the way scientists think about vaccines and the diseases they prevent (2, 3, 6). He also traveled the world and served as an advisor to WHO and many other public health and vaccine advisory committees (2, 8).

## Blinded by the Light

Maurice Hilleman developed more than 40 experimental and licensed animal and human vaccines (3, 4, 6-8). According to one estimate, those vaccines save nearly 8 million lives every year (6). More than half of the vaccines recommended by CDC for children were made by Hilleman (5, 7, 8).

In addition to SV40, he discovered adenovirus strains, was the first to purify interferon, and was the first to demonstrate that interferon expression is induced by double-stranded RNA. Those discoveries broadened molecular biology and immunology and jump-started the quest for antiviral medicines (6).

Throughout his long career, Hilleman insisted that science must serve society, not the reverse (2). He

championed collaborations between researchers, manufacturers, and public health leaders. Together, they shared information and developed vaccines that reduced global mortality and enhanced public health (6, 8).

Hilleman continually pushed the boundaries of vaccine development, without ever compromising safety. That legacy is still apparent in vaccine research ranging from malaria and tuberculosis to MERS-CoV and Ebola (8). And Hilleman’s long shadow still inspires Merck scientists, who are among those developing COVID-19 treatments at record speed.

Although rarely mentioned today, Hilleman was revered by his contemporaries. He received the Albert Lasker Medical Research Award in 1983. In 1985, he was elected to the National Academy of Sciences. In 1988, he received the National Medal of Science from President Reagan.

Shortly before his death in 2005, Hilleman was honored by the American Philosophical Society in Philadelphia. In his remarks, he said, “The most apt description of me was by [Merck CEO] Roy Vagelos, who said that on the outside I appeared to be a bastard but that if you looked deeper, inside, you still saw a bastard” (3).

Among the many tributes by leaders of science and medicine that night, Anthony Fauci summed it up best: “Every once in a while, you come across a scientist whose list of accomplishments shine so brightly that you’re almost blinded by them. Most scientists would have been thrilled to have achieved just one of the scores and scores of Maurice’s accomplishments...One can say without hyperbole that Maurice has changed the world” (2 3).

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***"More than  
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## Biosketch:



Rebecca J. Anderson holds a bachelor's in chemistry from Coe College and earned her doctorate in pharmacology from Georgetown University. She has 25 years of experience in pharmaceutical research and development and now works as a technical writer. Her most recent book is *Nevirapine and the Quest to End Pediatric AIDS*. Email [rebeccanderson@msn.com](mailto:rebeccanderson@msn.com).

## In the next issue of *The Pharmacologist...*

Dr. Anderson will share the story of forensics and poisoning.

## Don't miss the June 2021 issue.



# Science Policy News

## Meet the 2021 Washington Fellows

ASPET is proud to announce the selection of nine awardees to participate in the 2021 Washington Fellows program. This year's class of Fellows comprises nine graduate students and postdocs from across the country with sterling credentials and a demonstrated interest in how legislation and policy affects the pharmacology profession and the larger biomedical sciences community.

The mission of the Washington Fellows program is to enable developing and early career scientists interested in science policy to learn about and become more engaged in public policy issues. Through participating in the program, fellows will develop an understanding of how public policy decisions made in Washington, D.C. shape and impact science policy, including funding for the National Institutes of Health and the National Science Foundation. At the program's conclusion, fellows will be equipped with the skills necessary to be lifelong advocates for biomedical research.

Due to restrictions on entry to the Capitol Hill complex as a result of COVID-19, this year's program will be conducted virtually. As part of this year's program, fellows will participate in a one-day mini-conference organized by ASPET, where they will receive training in advocacy and hear from guest speakers in the policy profession. Fellows will also attend meetings with their congressional representatives and staff so that they can advocate for increased funding for biomedical research and provide education on the necessity of animal research.

### Sinibaldo R. Romero Arocha

*University of Minnesota*



Sinibaldo was born and raised in Venezuela. He received his bachelor's degree in zoology and biotechnology from North Dakota State University. As an undergraduate student, Sinibaldo developed his passion for biomedical research. After graduation,

he pursued further research training at the Mayo Clinic. This experience inspired and cemented his vision for working at the intersection between research and medicine. He is currently an MD/PhD trainee at the University of Minnesota through the NIH Oxford-Cambridge Fellowship. His research interests are in stem cell biology and regenerative medicine. In addition to research, Sinibaldo is passionate about providing care to vulnerable patient populations.

For the past five years, he has volunteered as a Spanish interpreter in various clinics that offer free healthcare to uninsured patients in Minnesota. As an ASPET Washington Fellow, Sinibaldo aims to further his understanding of clinical trials and regulatory sciences. He ultimately hopes to develop the skillset and experience to advocate for biomedical research and providing safety nets for vulnerable patient populations.

### Anu Balogun

*University of Pittsburgh*



Anu is originally a microbiologist, and earned her bachelor's degree in Nigeria where she was born and raised. She also holds a professional science master's degree in biotechnology from the University of South Florida. As part of her master's

thesis, she spent time investigating the deregulation of microRNA-29 family in melanoma at H. Lee Moffitt Cancer Center in Tampa, Florida. During this time, her training also covered topics related to technology and law which furthered her interest in science policy. Anu is currently a second year PhD candidate at the University of Pittsburgh's School of Medicine in the department of pathology. Her research revolves around the study of the porphyria which are rare disorders caused by deficiencies in heme biosynthesis pathway enzymes. In her work, she is assessing the mechanism by which inhibition of the Wnt/ $\beta$ -catenin signaling pathway protects from liver injury in a chemically induced mouse model of porphyria and whether pharmacological inhibition of  $\beta$ -catenin can prevent progression or provide protection in genetic mouse models of porphyria. In her spare time, she co-chairs the Biomedical Graduate Student Association's Diversity & Inclusion committee. As an ASPET fellow, Anu hopes to understand the diplomatic aspect of influencing how politicians understand science and harness her ability to adequately utilize science as strong evidence to support science policy enactment globally.

## Miriam Barnett

*University of Rochester*



Miriam was born and raised in Buffalo, NY. She received a Bachelor of Science degree in chemistry at the State University of New York at Geneseo, where she first got involved in research her freshman year. She became interested in the emerging field of

bioinformatics, and pursued a master's degree at the Rochester Institute of Technology. During her master's work, Miriam had the opportunity to work at the United States Department of Agriculture in conjunction with her thesis project. Her passion for science persisted, leading her to a PhD program in pharmacology and physiology at the University of Rochester, where she is currently studying opioid receptor signaling in the lab of Dr. Jean Bidlack. Miriam was recognized

as an ASPET Molecular Pharmacology Highlighted Trainee in October 2020 for her research work and has also been selected to be part of an NIH T32 fellowship during her time in the PhD program. While curiosity has driven her interests in science, personal circumstances have left her well acquainted with the struggles of patients with rare diseases. As an ASPET Washington Fellow, Miriam hopes to develop skills to apply her foundation of scientific research to advocate for patients with rare diseases in both research and policy settings.

## Kensey Bergdorf

*Vanderbilt University*



Kensey is from Ripley, WV. She received two undergraduate degrees from West Virginia University: a Bachelor of Science in immunology and medical microbiology and a Bachelor of Multidisciplinary Studies with emphases in biology, leadership studies, and

political science. While at WVU, she gained research and scientific communications experience that led her to apply to graduate programs. Kensey is now pursuing a PhD in pharmacology at Vanderbilt University. She is mentored by Drs. Vivian Weiss and Ethan Lee, with whom she studies the role of Wnt signaling in the development of aggressive thyroid tumors and the thyroid tumor microenvironment. As an ASPET fellow, Kensey hopes to develop the skills necessary to effectively advocate for science policy issues affecting Appalachia, including the opioid crisis, pollution of water supply, and access to high-speed internet.

## Phoebe Dacha

*Virginia Commonwealth University School of Medicine*



Dr. Dacha was born and raised in Nairobi, Kenya. She graduated with a Bachelor of Science degree in biology from Virginia Union University, where she graduated with honors. She also holds a master's degree in physiology from Virginia Commonwealth

University School of Medicine, an MD degree from Drexel University College of Medicine, and an MBA from Drexel University Lebow College of Business. She completed clinical training at RCH/ University of California Riverside Family Medicine program. During her graduate studies in physiology, she examined the quantification and detection of important neuromodulator nitric oxide using fluorescent indicators.

While in medical school, Dr. Dacha was selected as an Albert Schweitzer Fellow. For her fellowship, she worked with the underserved in Philadelphia, PA. Currently, Dr. Dacha is a postdoctoral fellow at Virginia Commonwealth University in the Department of Pharmacology and Toxicology under the mentorship of Dr. Hamid Akbarali. Dr. Dacha's postdoctoral work involves examining the role of the gastrointestinal microbiome and development of tolerance as it relates to opioid abuse. In her spare time, Dr. Dacha participates in overseas medical missions with Crossover Healthcare Ministry.

Dr. Dacha is motivated to understand how public policy decisions are made in Washington, D.C. and to learn how to advocate effectively on Capitol Hill, particularly as it pertains to funding for basic science and clinical research.

## Victoria Leroy

*University of Florida*



Victoria graduated with honors from Winthrop University in Rock Hill, SC with a bachelor's degree in biology and minor in chemistry. After graduating, she worked as a research technician at Atrium Health's McColl Lockwood Laboratory in Charlotte, NC conducting preclinical testing

of gene therapies for muscular dystrophy. Her time in this lab sparked her interest in therapeutic development and inspired her to pursue a career in research. She is currently working toward her PhD in Biomedical Sciences in the department of Pharmacology and Therapeutics at the University of Florida. Working under the mentorship of Dr. Ashish Sharma, she is investigating the mechanisms of inflammation resolution in post-lung transplant injury to identify potential therapeutic targets. As an ASPET Washington Fellow, Victoria hopes to understand the integral role of scientists in advising evidence-based policy writing and gain insight into the aspects of research that have the most impact on policy decision-making.

## Mark Namba

*Arizona State University*



Mark was born and raised in Florida and attended the University of Florida, where he earned a bachelor's degree in psychology. While an undergraduate at UF, Mark developed a passion for science while working under the mentorship of Drs. Lori Knackstedt and

Marek Schwendt. Here, Mark assisted with studies examining the neurobiological and behavioral underpinnings of comorbid cocaine use disorders and posttraumatic stress disorder. After graduating from UF, Mark attended Arizona State University, where he earned a master's degree in Psychology and is currently pursuing a PhD in Neuroscience. Under the joint mentorship of Drs. Janet Neisewander and



Foster Olive, Mark is studying neuroimmune and behavioral mechanisms underlying the comorbidity of cocaine use disorders and HIV using preclinical rodent models. Specifically, Mark's research focuses on how abstinence from chronic cocaine use may interact uniquely with HIV to promote neuroinflammation and increase drug-seeking behavior, which could have clinical implications for individuals living with HIV who are seeking treatment for substance abuse. Outside of the lab, Mark volunteers with a local harm reduction collective within the Phoenix area that provides syringe access, naloxone distribution, and many other harm reduction services. As an ASPET Washing Fellow, Mark hopes to gain valuable experience in public health policy and learn how to effectively advocate for continued funding of biomedical research as well as evidence-based drug policy.

## Valeria Robleto

*Medical College of Wisconsin*



Valeria was born and raised in Managua, Nicaragua. In 2014, she was awarded a Walton International Scholarship to attend the University of the Ozarks in Clarksville, AR, where she double majored in Chemistry and Biology. Currently, Valeria is pursuing

her PhD in biochemistry at the Medical College of Wisconsin, where she is a member of the Marchese lab which studies signal transduction by G protein-coupled receptors (GPCRs). Her research is focused on the chemokine receptor CXCR4, which plays an important role in physiology and disease. Valeria's career goals are to continue to study GPCR signaling as an independent investigator at a university that allows her to focus on teaching undergraduates while maintaining an active research program. Valeria cares deeply about science education and research advancement. As an ASPET fellow, she hopes she will be able to learn and practice how to effectively communicate with elected officials.

## Serena Scognamiglio

*Georgetown University*



Born and raised in Naples, Italy, Serena received her PharmD from the University of Naples - Federico II. During her PharmD, she had her first exposure to neurophysiology, and this led her to further inquire into the relationship between our brain and the

effects of substance use on behavior. As part of the program requirements, Serena trained as a pharmacist during her fourth year of school, where she gained experience preparing and dispensing medications in conformity with the European Medicines Agency (EMA) regulations. Serena carried out her experimental thesis at the National Institute on Drug Abuse (NIDA) where she studied the interactions between microglia cells and neurons in the basal ganglia. Serena is currently a doctoral candidate in pharmacology and physiology at Georgetown University. Under the mentorship of Dr. Ken Kellar, she is investigating the dysfunction of neuronal pathways in the aged brain and the potential benefits of pharmacological interventions on cognition. As an ASPET fellow, Serena hopes to enhance her understanding of the legal and regulatory processes of drug policy and thus help lay the foundation for a post-doctoral position in pharmaceutical legislation.





# Education News

## Graduate Students and Postdoctoral Scientists: Apply to Join the ASPET Mentoring Network

The ASPET Mentoring Network is a professional development program designed to supplement the training that graduate students and postdoctoral trainees receive through their universities. The ASPET Mentoring Network focuses on developing skills needed to succeed scientifically, professionally, and psychologically, including discussions about experiences and pressures faced by groups that are underrepresented in the sciences. As a professional development experience, the program uses a coaching model to help participants develop success skills for a variety of careers.

The 2021-2022 program will be virtual and is planned to run from June 2021 through April 2022. The program will begin with an orientation session for all participants to meet each other and learn about the program expectations and structure. After the orientation session, trainees will become part of a six-person coaching group with an assigned mentor. Once a month, there will be a webinar on a career and professional development topic such as networking, communicating your science, self-promotion, skills for job searches, wellness and resilience, and other topics frequently identified as important to professional growth. These webinars are recorded and can be watched on-demand in case a participant cannot attend the live session. Following each webinar, the coaching groups will meet separately for more in-depth discussion of the topics, including opportunities to talk about any questions, issues, or concerns they are experiencing in their own professional path. All meetings will occur on Zoom or a similar platform.

### Who Is Eligible?

Graduate students and postdoctoral scientists who are members of ASPET in good standing are eligible to apply. If you're not a member, it's easy to join! Please visit <https://www.aspet.org/membership/>.

### What Is Required to Participate?

You must be prepared to meet monthly with your coaching group and to be an active participant in the discussions.

### What Do Previous Participants Have to Say about the Program?

*"Our group instantly connected with each other, and it was amazing to see how much we all had in common. We support each other and plan monthly goals, which motivates us to achieve them. Most importantly, sharing each other's experiences helps us gain valuable insights."*

*"Participating in the ASPET Mentoring Network has significantly expanded my network in the ASPET community and has provided me with wonderful mentors and fellow mentees that support each other both professionally and personally. I've enjoyed hearing stories and getting career advice from a diverse group of people who are at different stages of their careers with varied experiences."*

*"I credit the Mentoring Network with helping me get my dream job in industry. The support of my coach*



*and group members during the job application and interview process was invaluable.”*

*“One memorable feature of the ASPET Mentoring Network is that it provides an open forum in which to discuss the ways our lives fit in and around science. Even though our discussions have been adeptly facilitated by established pharmacologists as mentors, of value to me has been the opportunity to interact with and learn from my peers. Despite many of us being in different pharmacology-focused fields, it is these relationships that will be most valuable as we all transition towards becoming*

*independent scientists. I recommend participating in this program enthusiastically and without reservation.”*

*“This served as an amazing support system for me. My group was a great sounding board for someone who works in a very small lab. I also feel like the activities at EB gave me a great tool kit to work with my PI to improve upon our mentor/mentee relationship.”*

## How Do I Apply?

Applications for the ASPET Mentoring Network will open in early March. Please visit [https://www.aspet.org/Education/ASPET\\_Mentoring\\_Network/](https://www.aspet.org/Education/ASPET_Mentoring_Network/) for additional details.

# Volunteer to Be a Coach for the ASPET Mentoring Network

The **ASPET Mentoring Network** is looking for volunteers to train as coaches who will work with a group of six mentees in developing broad-based career skills. Coaches will participate in virtual coach training sessions with our Mentoring Network facilitators. The training is designed to introduce our coaching model, highlight facilitation approaches and strategies, and prepare coaches to navigate conversations with a diverse group of mentees.

Coaches will participate in the June 2021 orientation session and then will be expected to hold monthly virtual group meetings through April 2022. Group meetings will be tailored to the specific needs of each coaching group, but may focus on work/life balance, interview skills, communication, networking, and other topics frequently identified as important to growth as a professional. All meetings will be held online.

## Why Become a Coach?

Prior coaches have responded positively about their own experiences, overwhelmingly agreeing that the program was worthwhile. Many coaches have also emphasized how much they learned from interacting with their groups. According to one previous coach: “I learned to see life through their eyes, which was very educational for me. The idea of discussing differences in a non-threatening and supportive environment was excellent.” Don’t miss the opportunity to get involved with mentoring at ASPET!

**To apply to be a coach, please send your CV and a short statement of interest (maximum 250 words) to Catherine Fry ([CFry@aspnet.org](mailto:CFry@aspnet.org)) by Friday, April 16, 2021.**

For more information contact Catherine L. Fry, PhD at [cfry@aspnet.org](mailto:cfry@aspnet.org).



# Journals News

## ASPET's Journals Are Plan S Compliant

On January 1, new publishing restrictions went into effect for authors who are funded by national, charitable, and international funders and research organizations that formally support Plan S. These funders are listed on the Plan S website at <https://www.coalition-s.org/organisations>. Under the new rules, Plan S-funded authors must make their published articles immediately accessible under a CC BY license. Plan S funders will not pay article processing charges (APCs) for publication in hybrid journals (i.e., those that have subscriptions and offer an open access option), which limits their authors' publishing options.

However, Plan S will allow publication in hybrid journals such as ASPET's if authors are allowed to deposit their accepted manuscript under a CC BY license in a publicly accessible repository. Called "green open access," ASPET's Board of Publications Trustees voted to allow this publication route for Plan S-funded authors effective January 1, 2021. Plan S-funded authors who publish in ASPET's journals will have to deposit the manuscript version themselves in Europe PubMed Central or another repository that is acceptable to Plan S.

With ASPET's journals, Plan S authors can publish without paying an APC and meet their funder's open



### Journal Checker Tool

open beta version



access requirements. The copyedited and formatted version of these articles will be published with an ASPET copyright line. Page charges will continue to be assessed.

ASPET's gold open access options (i.e., those that come with a fee) remain available to all authors. For *DMD*, *JPET*, and *Molecular Pharmacology*, the accepted manuscript version of all accepted articles continues to be made freely accessible on the journal's website as a Fast Forward article. ASPET has provided Fast Forward articles since April 2005.

If you are supported by a Plan S funder, ASPET's journals provide a compliant and economical publication route for your work. We welcome your manuscript submissions!

## *JPET* and *PharmRev* Editor Searches

Kenneth D. Tew and Eric L. Barker will complete their terms as editor of *JPET* and *Pharmacological Reviews*, respectively, at the end of 2021. Both have served as editor since 2016 and, per ASPET's bylaws, cannot be renewed for another term. ASPET's Board of Publications Trustees must begin the search for their successors. The deadline for nominations is 5:00 PM EDT on June 1, 2021. Self-nominations are welcome.

ASPET editors serve for a three-year term that can be renewed for one additional three-year term. The position includes an honorarium. The peer-review process is managed at the ASPET office using an online manuscript submission and peer review system. Editors are members of ASPET's Board of Publications Trustees.

Nominees must be an ASPET member in good standing and should have served on an editorial

board. Before nominating a candidate, please make sure the person is willing to serve. Nominations should include a brief statement supporting the candidate and the candidate's CV.

The selection process will include telephone interviews with the top candidates and is expected to be completed by September 2021. The incoming

editor will begin working with the outgoing editor and ASPET staff during the fall and will assume all the responsibilities of the editor effective January 1, 2022.

Nominations, including a supporting statement and the candidate's CV, should be sent to [journals@aspet.org](mailto:journals@aspet.org). You will receive confirmation of receipt of the nomination.

For more information, please contact [journals@aspet.org](mailto:journals@aspet.org).

## Adriano Marchese Joins the BPT

At its January 21 meeting, ASPET's Council approved the nomination of Adriano Marchese to serve as an at-large member of the Board of Publications Trustees. Dr. Marchese is a professor in the Department of Biochemistry at the Medical College of Wisconsin. He succeeds Beverley Greenwood-Van Meerveld on the BPT, who served from 2018 to 2020.

Dr. Marchese joined the *Molecular Pharmacology* editorial board in 2016 and,

with Kathryn Meier, the journal's editor, has managed the monthly selection process for Highlighted Trainee Authors since 2017. He has provided undergraduate student mentoring as part of ASPET's SURF program and has served in various capacities related to the annual meeting. Dr. Marchese has been an ASPET member since 2004 and has served as a member of the executive committee for the Division for Molecular Pharmacology.



Adriano Marchese

## New DMD Associate Editors

Yurong Lai and Xiao-bo Zhong have been approved by the Board of Publications Trustees to serve as associate editors for *Drug Metabolism and Disposition*. Dr. Zhong and Dr. Lai have been recruiting minireviews for the journal since 2018. As associate editors, they will continue in their role as minireview editors and be able to oversee minireviews from recruitment through peer review. They will also be able to fill the role of associate editor for other manuscripts.

Dr. Lai is senior director of drug metabolism at Gilead Sciences, Inc. He worked as a leading investigator at Pfizer and BMS prior to joining Gilead. He has served on the *DMD* editorial board since 2016 and was a co-guest editor with Qingcheng Mao and Joanne Wang for the *DMD* special section on transporters in drug disposition and pharmacokinetic prediction published in May 2018. He has been an ASPET member since 2007 and has served as a councilor for the Division for Drug Metabolism and Disposition. He is a fellow of the AAPS.



Yurong Lai



Xiao-bo Zhong

Dr. Zhong is a professor in the Department of Pharmaceutical Sciences at the University of Connecticut, Storrs. He has served on the *DMD* editorial board since 2012 and was co-guest editor with J. Steven Leeder for the *DMD* special section on epigenetic regulation of drug metabolizing enzymes and transporters published in October 2013. Dr. Zhong is chair-elect of the Division for Drug Metabolism and Disposition and has been an ASPET member since 2007.



## Highlighted Trainee Authors

Congratulations to the latest Highlighted Trainee Authors selected for *Drug Metabolism and Disposition*, *The Journal of Pharmacology and Experimental Therapeutics*, and *Molecular Pharmacology*:

### ***Drug Metabolism and Disposition***

- Joseph L. Jilek (Univ. of Arizona/ Univ. of California, Davis)
- Tatsuki Mochizuki (Univ. of Tokyo)
- Mary “Allie” Schleiff (Univ. of Arkansas for Med Sci.)



Joseph L. Jilek



Tatsuki Mochizuki



Mary “Allie” Schleiff

### ***JPET***

- Keito Hoshitsuki (Univ. of Pittsburgh)
- Rakshit S. Tanna (Washington State Univ., Spokane)
- Rahul Nachnani (Pennsylvania State Univ.)



Keito Hoshitsuki



Rakshit S. Tanna



Rahul Nachnani

### ***Molecular Pharmacology***

- Mateusz Czub (Univ. of Virginia/ Paul Scherrer Inst., Switzerland)
- Brandon Pressly (Univ. of California, Davis)
- Siennah Miller (Univ. of Arizona Col. of Pharmacy)



Mateusz Czub



Brandon Pressly



Siennah Miller

A brief description of their areas of research, current projects, the anticipated impact of their work, and what they enjoy when not in the lab is online at <https://bit.ly/2yX1YeH>. We congratulate all of them for being selected.

## Thank You, Rich!



Congratulations to ASPET Journals Director, Rich Dodenhoff, on his upcoming retirement. Rich has been an integral part of ASPET for the last 23 years. It is difficult—if not impossible—to sum up his achievements.

Rich was hired in March 1998 to bring management of ASPET's journals in house from Williams and Wilkens, a commercial publisher. The journals had started going online the previous fall. After being freely accessible for the first several months, they went under access control in March 1998. One of Rich's first tasks was transmitting subscription data to HighWire Press via FTP using DOS and helping libraries activate their online access while updating the HTML pages created by Christie Carrico, ASPET's executive officer at the time.

The transition to in-house management was completed in time to produce the January 1999 issues. Previously, issues came out toward the end of the month. Rich revised the production schedules to cut time and mail issues a couple of weeks before the cover date. Not long into the year, the BPT decided to start centralizing the peer review process at the ASPET office instead of handling it at each editor's office. By the fall of 1999, Rich had fitted out office space and hired staff to handle peer review for *Drug Metabolism and Disposition* and *Molecular Pharmacology*. *The Journal of Pharmacology and Experimental Therapeutics* was brought in house in 2004 and *Pharmacological Reviews* in 2007.

***"It was very apparent to me and to all involved that this transition only succeeded because of Rich's knowledge, technical expertise and initiative. Under Rich's leadership, we gained improved control over publication policies, the ability to take on novel approaches to enhancing the journals and expanding the reach of the achievements of our authors."***

— Brian Cox, Past Chair, Board of Publications Trustees

In 2001, Rich convinced HighWire Press to include ASPET in the development of their online manuscript system, BenchPress. *JPET* was one of three journals that served as alpha development sites for the system. The other journals were added to BenchPress over the next few years.

During 2005 and 2006, Rich oversaw the collection of all back issues of ASPET's journals so they could be scanned and posted online as PDF files. The websites

for the journals migrated to improved, newer platforms twice during Rich's tenure.

Some of the other changes that Rich implemented include the move to continuous publication, the adoption of plagiarism detection software, the use of image forensics to detect image manipulation, the launch of a mobile device version of the journals, the launch of *Pharmacology Research & Perspectives* (published with the British Pharmacological Society and Wiley), the launch and end of *Molecular Interventions*, the move to online-only publication, and the promotion of the journals on social media.

Not only has Rich made a major impact on ASPET's journals, he has also been involved in just about every area of ASPET's growth and sustainability throughout the years. From participating in and offering expert advice in Council and leadership strategic planning sessions to serving on *The Pharmacologist* production team, working at the annual meeting in almost every capacity, and serving as a leader among ASPET staff, Rich will always be remembered for his hard work, commitment, humor, positivity, and most of all, dedication to ASPET.

As a tribute to Rich, we have reached out to several members and colleagues who have worked with Rich over the years to provide their favorite memories.

"Rich Dodenhoff was the first person I hired after coming to ASPET in 1997, and it was one of the best (and luckiest) hires I ever made. Rich moved the journals to online and to self-publishing and in so doing vastly increased the income to the society. He also was instrumental in the initiation of two new journals. But in addition to his "journals empire," Rich was also a trusted confidant and advisor about the Society and its activities in general, and I am proud to say the he has remained a friend to this day."

**-Christine Carrico, PhD**  
**Former Executive Officer, ASPET**

"Rich is an amazing Journals Director. His lengthy and in-depth expertise in the journal publishing field is an invaluable asset to the success of all of our journals, both scientifically and financially. I will certainly miss his publishing acumen, but also his wonderful sense of humor."

**-Emily Scott, PhD**  
**Chair, Board of Publications Trustees**

"I've had the privilege of working closely with Rich for 15 years on the Board of Publications Trustees, as an ASPET journal Editor, and as a member of Council. I can't imagine that there is a more dedicated or effective Journals Director. His contribution to the success of ASPET's journals can't be understated, and I've valued his wise counsel and friendship immensely."

**-Edward Morgan, PhD**  
**Past Chair, Board of Publications Trustees**

"Rich Dodenhoff is one of those special persons that, if you are lucky, you get to work with at least once in your career. Rich is incredibly thoughtful, analytical, and he has a knack of being able to cut to the chase in complex issues. First and foremost, he is consummate gentleman, but he has many other attributes that I have come to admire – his intellect, candor, wisdom, good judgment, and hard work, often embedded in subtle humor. Rich is a professional of the highest standard and the primary reason why ASPET journals have remained so successful during his tenure as keeper of the Society publications. The entire ASPET family will sorely miss him."

**-Charles France, PhD**  
**ASPET President**

"Rich has been an incredible colleague and friend to work with. He is always willing to lend a hand, provide his expertise, and be a sounding board for ideas. Although he is the Journals Director, Rich has been dubbed the "Director of Fun" in the ASPET office. I am truly thankful for his kindness, humor, and friendship throughout the years."

**-Suzie Thompson**  
**Director of Marketing, ASPET**



# Meeting News

## The Future of ASPET Meetings

Evolving member needs, technological advances, accessibility issues, and an international pandemic all contribute to the changing landscape of scientific meetings and ASPET has faced these challenges head on over the last year with great success.

### Virtual Meetings

Like many other scientific societies, ASPET was forced to cancel our 2020 Annual Meeting due to COVID-19 and the world-wide pandemic. While disappointing, we recognized the need to provide our members with a way to connect with one another and still participate in scientific exchange. In the summer of 2020, ASPET launched Focus on Pharmacology, a virtual series covering important and innovative topics in pharmacology and experimental therapeutics. The first virtual session was on the coronavirus, discussing antiviral measures targeting coronavirus entry. This session was followed by three more coronavirus virtual sessions held throughout the year. Over the course of the coronavirus series, we had over 230 registrants and received positive feedback on all the sessions.

In addition to the coronavirus series, five ASPET divisions participated in the Young Scientist Research Series. These sessions showcased talks covering innovative cutting-edge science in Molecular Pharmacology, Behavioral Pharmacology,

***“Excellent basic science seminar  
the slides were beautiful and the  
explanations were very clear.”***

—Coronavirus Virtual Session Attendee

Cardiovascular Pharmacology, Neuropharmacology, and Cancer Pharmacology. The Division for Pharmacology Education also took advantage of this new virtual forum to present a Professional Development Series to demonstrate specific techniques to improve pharmacology teaching skills when moving classes online and to discuss opportunities for educators to get published. The Mentoring and Career Development Committee has also presented multiple sessions in a Trainee Career Development Series. They have covered topics including microaggressions, designing science presentations, the art of self-promotion, preparing yourself for successful hiring, and tips for using social media in your job search.

## What did you like most about the coronavirus sessions?

*“...seeing the data that news media don’t show”*

*“...up-to-date information and a peek at the clinical trial data”*

*“...very clear explanation of the relevance of the clinical studies”*



## FOCUS ON PHARMACOLOGY STATS

OVER **1,000** REGISTRANTS

MEMBERS REPRESENTED **29** DIFFERENT COUNTRIES.  
HIGHEST NUMBER OF INTERNATIONAL REGISTRANTS FROM:  
**NIGERIA / CANADA / SAUDI ARABIA / AUSTRALIA**

AVERAGE SATISFACTION RATING FOR SESSIONS:  
**4.59 OUT OF 5**

The recordings of all virtual sessions are available on demand on the ASPETConnect Focus on Pharmacology community library. ASPET has been able to successfully deliver several virtual sessions each month and will continue to provide this valuable benefit with new sessions in development. Members, divisions, and committees are encouraged to submit their virtual session ideas to the ASPET program committee.

***“I liked the opportunity to network, especially for international members who find in-person engagement a challenge before COVID-19. It was nice to put faces to names.”***

—Virtual Session Attendee

***“Reimagining our annual meeting for a virtual experience opens up so many more opportunities for our members to interact with each other, present their research, and learn about the latest discoveries in pharmacology and experimental therapeutics.”***

—Melissa Huston, ASPET Meetings Director

## Virtual Annual Meeting at Experimental Biology 2021

With the ongoing social distancing restrictions and guidelines, ASPET and our partner EB host societies made the decision to hold the annual meeting virtually for 2021. From Tuesday, April 27, through Friday, April 30, EB will be held entirely online through a dynamic and interactive platform. Attendees can expect the same level of great science including award lectures, scientific symposia, poster presentations, and workshops coupled with some new opportunities to network, connect, and reach a greater audience.

### Highlights of the Virtual Platform

- 45 scientific sessions and workshops presented over 4 days but available as recordings through May 31
- 5 keynote lectures that include Q&A with award winning scientists
- Posters include a 5-minute audio narration by the author and the ability to enlarge poster sections for easier reading at any time of day. Interact with poster presenters through Q&A threads or set up a video appointment.
- Condensed schedule starting at 10:00 am Eastern Daylight Time with built-in breaks
- Searchable attendee directory with ability to reach out via email and video
- Resources for career development and to aid a job search
- Competitive contests and games to earn prizes

We recognize the importance of the networking that happens at our annual meeting and will be debuting Town Hall meetings for each division that feature updates about the division's activities including how you can get involved, and also breakout rooms where you can get to know smaller groups of like-minded professionals. The Town Halls will be held from March 22 to April 9 and are open to all ASPET members and non-members, not just those who plan to attend EB.

We are also working on similar opportunities for networking during EB, as well as a fun poster award winner reveal party to close out EB on Friday, April 30. Stay tuned for more information as these are being planned.

## 2023 and Beyond

On December 2, 2020, we announced that Experimental Biology will no longer be held after the 2022 meeting. This decision to end the Experimental Biology meeting came after the ASPET Council spent considerable time discussing the challenges facing our Society and our annual meeting, benchmarking with other successful scientific meetings, and analyzing data from our own membership surveys. While these discussions were taking place, ASPET and their long-standing partner societies mutually agreed to retire Experimental Biology. In 2023, ASPET will be holding an independent annual meeting.

***“While participating in the Experimental Biology meeting partnership has benefited the host societies throughout the years, holding an independent ASPET Annual Meeting provides an opportunity to design a more focused, creative, and flexible meeting format, with more intimate networking interactions and better overall value to our members.”***

—Judy Siuciak, ASPET Executive Officer

***“Although it is hard to abandon traditions, and many of us will miss not interacting with colleagues from other societies, this is an opportunity to cultivate a stronger sense of community for our members and our discipline.”***

—Charles France, ASPET President

The ASPET Annual Meeting has gone through many transitions throughout its history. ASPET's first annual meeting took place in 1909 in Boston. Shortly after, ASPET helped establish FASEB and participated in the first FASEB meeting in 1914 in Philadelphia. In addition to the annual spring FASEB meeting, ASPET held independent Fall annual meetings from 1949 through 1993. These fall meetings have been remembered as intimate, focused, and successful meetings. Experimental Biology was formed in 1993 and the host societies met together for the first time in New Orleans. Over time Experimental Biology has gone through several transitions, with different partner societies joining and leaving throughout the years.

Through all these transitions, ASPET has remained focused on creating a meeting experience that delivers the highest quality, innovative science in pharmacology and experimental therapeutics. This remains our goal as we look towards the future. The Council has begun a strategic planning process that includes working with an experienced consulting group to conduct individual interviews, focus groups, and a written survey to help ASPET design a new independent annual meeting. As we move forward with implementation, we are encouraging member participation and feedback. Stay tuned for more information soon.

## Focus on Pharmacology Virtual Series



ASPET's Focus on Pharmacology Virtual Series was launched in July 2020 as a new venue for communicating innovative science in pharmacology and experimental therapeutics. The webinars are broadcast live, and many have interactive components before, during, and after each session. The Focus on Pharmacology Virtual Series is free for ASPET members. Recordings of all the sessions are available on the ASPETConnect Focus on Pharmacology community.

### Trainee Career Development Series – Part 4: Preparing Yourself for Successful Hiring

*Submitted by Pat Abrahams, PhD, Pamela Hornby, PhD, David Jewett, PhD, and Ram Kandasamy, PhD*

Regardless of the job or career, it is important to be knowledgeable about the recruitment and hiring process. In most cases, the content and presentation of the application materials play a significant role in being selected for an interview. In this session, trainees gained insights from newly hired and experienced faculty at comprehensive universities, a community college, as well as an R&D scientist who has worked for almost 20 years in the pharmaceutical industry. They shared what is required of a successful application and how applications may be reviewed by search committees, recruiters, and others.

**Do Your Homework:** **Dr. Ram Kandasamy**, assistant professor of psychology at California State University, East Bay, started by sharing the importance of aligning your CV/resume, cover letter, and other statements (e.g., teaching, research, or diversity statements) with the job description. He emphasized the importance of



doing research about the company or institution. For example, if the position is at a primarily undergraduate institution, it would be important to highlight your experiences with teaching and mentoring undergraduate students.

**Dr. Pat Abrahams**, assistant professor of biology at Montgomery County Community College in Pennsylvania, added to this and shared that the type of experience you gain is important as well.

That is, to seek out internship or teaching experiences that are the most relevant to your career interests.

**Obtain Strong References:** **Dr. David Jewett**, professor of psychology at University of Wisconsin-Eau Claire, started the next session. He emphasized that you must be certain (or as certain as you can be) that your reference is willing to provide a strong reference for you. Although this may seem unlikely, there are instances of referees writing unhelpful letters for an applicant. Ask your referee if she/he is willing to

write a supportive recommendation letter. If not, thank the potential referee and select someone else. If so, ask what information would be useful for your referee - application deadlines, copies of cover letters, etc. Indicate the skills and experiences you wish to have emphasized. Finding strong references and telling your references what you would like them to address in their letters about you is one way to facilitate success in the hiring process.

*Know the Rules to Play the Game:* **Dr. Pamela Hornby**, senior principle and fellow at Janssen Pharmaceutical R&D, shared details of the hiring process in industry. Dr. Hornby talked about the many intricacies of hiring in industry and noted that this process is quite different from processes at smaller start-ups or academic institutions. For example, she explained that your application is not first seen

by those you will ultimately work with. Rather, your application goes into a pool with other applications that will first be reviewed by a recruiter. Dr. Hornby also explained that some of the application questions are required criteria for further consideration and shared how applications get narrowed from hundreds down to a handful. Lastly, Dr. Hornby explained how networking and forming relationships can speed up the recruiting process in a fair way.

The session ended with Dr. Kandasamy providing a summary and highlighting the key take-home messages from each section such as researching the company/university as you write the application materials, ensuring that your references will speak strongly and highly of you, and know the details of the hiring process to obtain interviews and secure a job.

View the recorded session at <https://bit.ly/3aeipo7>.

## Young Scientist Research Series

Several ASPET divisions have used Focus on Pharmacology to feature their young scientists in scientific oral competitions.

### Division for Cancer Pharmacology Tribute to Young Investigators

*Submitted by Andrew Thorburn, PhD*

Perhaps the biggest thing we missed when the 2020 ASPET Annual Meeting was cancelled was the opportunity to directly hear from younger investigators about their work. In November 2020, the Division of Cancer Pharmacology was pleased to hear virtual presentations from speakers from the DCP as part of the ASPET Young Scientists Research Series. The speakers were selected based on their abstracts for the ASPET Annual Meeting at EB 2020 and were originally scheduled to be part of the DCP Young Investigators Symposium. The top four abstracts came from Hengbo Zhou of Harvard Medical School, Vrushank Bhatt from Rutgers University, Megan Zavorka Thomas from the Ohio State University, and Dana Steffen from the University of California, San Diego.



Dr. Zhou discussed his PhD thesis work when he was at the University of Colorado entitled “Novel Small Molecule Compound Disrupts the SIX1/EYA2 Complex and Inhibits Breast Cancer Metastasis.” Hengbo described a beautiful series of studies where he identified a small molecule that disrupts the interaction of the transcription factor SIX1 with its partner protein EYA2. In breast cancer, aberrant expression of the SIX1/EYA2 transcriptional complex promotes metastasis, and genetic inhibition of these activities is able to block metastatic progression. However, while genetic approaches are a great way to work out the biology, the practical application of such ideas requires that pharmacology be brought to bear. The problem is that transcription factors (and protein complexes)



are notoriously difficult to target. Hengbo identified a small molecule that reduces the interaction of SIX1 and EYA2 and demonstrated that this drug could suppress metastasis but with little effect on primary tumor growth. Thus, Hengbo's research leads to two important advances in cancer pharmacology by showing that transcription factors are not necessarily intractable pharmacological targets; they can be targeted by disrupting specific protein interactions. And second, that by inhibiting a specific transcription factor complex it is possible to block the aspect of cancer that leads to most deaths, i.e., metastasis.

Mr. Bhatt is finishing up his PhD at Rutgers where he is studying the role of autophagy in controlling response to drug treatments in specific types of lung cancer. Vrushank's talk described his recent work which is focused on a type of lung cancer that is characterized by mutations in *KRAS* and *LKB1* genes. The central problem here is that, while mutations in RAS are quite common and we know a great deal about how they drive tumor growth by, for example, activating the RAF, MEK, ERK kinase pathway, blockade of such a pathway (e.g., with MEK inhibitors) has been unsuccessful as a treatment strategy. Vrushank's talk entitled "Autophagy Inhibition Sensitizes Liver Kinase B1 (LKB1)-Deficient Kras-Driven Lung Tumors to MEK Inhibitor Trametinib" described how blockade of an entirely different cellular process – autophagy – allowed much more effective treatment with the MEK inhibitor. Vrushank's work exemplifies another important concept in cancer pharmacology: just because a particular signaling pathway drives tumor growth, that doesn't necessarily mean that effective blockade of just that pathway will be a good treatment for cancer; you may have to also target a different process to get effective combination therapy.

Dr. Zavorka Thomas broadened the discussion into another critical area of cancer pharmacology by explaining how drug treatments can alter tumor cell metabolism. In her talk entitled "Gilteritinib Inhibits Acute Myeloid Leukemia Growth via Reduction in Glutamine Uptake and Utilization," Megan described how the tyrosine kinase inhibitor (TKI) gilteritinib, which has been approved to treat refractory acute

myeloid leukemia that has mutations in the *FLT3* gene, works to block tumor cell growth. Megan showed how metabolic adaptations led to the tumor cells becoming especially dependent on glutamine, and she then found that the TKI decreases expression of glutamine transporters and thus alters glutamine metabolism to inhibit tumor cell viability. This work is important because it exemplifies yet another central concept in cancer pharmacology: when one targets the molecular drivers that cause tumor cell growth, you alter multiple aspects of cell biology, and it is often the most fundamental changes such as at the level of core metabolic pathways that are the ultimate reason for a drug's effectiveness.

Ms. Steffen, who is close to finishing her PhD at UCSD, gave a talk that brought us back to RAS-driven cancers but added a different twist. Dana's talk entitled "G $\alpha$ s (GNAS) Suppression of the p53 Genomic-stability Checkpoint Unleashes RAS-driven Oncogenesis" described how the G-protein GNAS cooperates with mutated RAS proteins to drive tumor growth. She found that tumors driven by these two oncogenes activate a novel mechanism involving protein kinase A (PKA) mediated phosphorylation of the p53 regulator MDM2 that leads to enhanced p53 degradation. This work suggests that targeting MDM2, which Dana did using a drug called Nutlin-3, would be effective at controlling these tumors. Dana's work is important because it demonstrates how integration of two quite separate pathways through a central regulator, p53, allows cooperation between RAS and GNAS to drive cancer and reveals a strategy for treating such tumors using drugs that were originally designed to activate p53.

Overall, four different talks described very different experimental approaches. However, all four talks came to the same broad conclusion – by understanding the complexity of how tumor cell behavior is modulated by pharmacological interventions, it is possible to develop rational approaches to improve cancer therapy. The Focus on Pharmacology webinar was a great way to highlight the exciting science of ASPET members from the DCP.

View the recorded session at <https://bit.ly/3qIYARC>.



# Members in the News

## Achievements, Awards, Promotions, and Scientific Breakthroughs

### Stanley V. Smith

*The University of Mississippi Medical Center*



On April 1st, 2020, the Carl G. Evers, M.D. Society announced this year's winners of the Evers Awards, which honor the achievements of medical school educators, administrators, and departments. Established as an honorary and service organization striving to improve

medical education at The University of Mississippi Medical Center (UMMC), the society is named for the late Dr. Carl Evers, who served as professor of pathology and associate dean for academic affairs in the School of Medicine from 1978 until his death in 1992. **Stanley V. Smith**, Associate Professor of Pharmacology and Toxicology in the School of Medicine at UMMC, was selected as Professor of the Year by the 2nd Year medical students of the class of 2022. He was previously selected as an All-Star Professor by the 2nd year medical students in 2018 and 2019.

Dr. Smith was born in Starkville, MS, and received his Bachelor of Science degree in biochemistry from Mississippi State University and his PhD in biochemistry from The University of Mississippi Medical Center. His postdoctoral training was at The National Institutes of Health in Bethesda, MD in The National Cancer Institute. He returned to UMMC as a faculty member in 2002 where he is currently actively involved in contributing to the education, research, and service missions. Dr. Smith is currently course director for medical pharmacology,

dental pharmacology, and fundamental (graduate) pharmacology. In addition, he is Director of the UMMC Mass Spectrometry Core Facility.

Dr. Smith has been a member of ASPET since 2015 and is a member of the **Divisions for Cardiovascular Pharmacology, Drug Discovery and Development, Drug Metabolism and Disposition, Molecular Pharmacology, Toxicology, Translational and Clinical Pharmacology**, and **Pharmacology Education**, where he serves as a member of the Executive Committee.

### Lauren Aleksunes

*Rutgers University*



In October 2020, Dr. **Lauren Aleksunes** was selected as the inaugural Chancellor Educator of the Year at Rutgers Biomedical Health Sciences. This honor recognizes her accomplishments as an educator including revamping the PharmD curriculum,

running summer internships for undergraduate and high school students, overseeing NIH T32 and R25 training grants, directing the PharmD/PhD and PhD programs in toxicology at Rutgers, and mentoring many students in her NIH-funded laboratory. She is also a director of a long-standing ASPET-funded institutional SURF program.

Dr. Aleksunes has been a member of ASPET since 2010 and is a member of the **Divisions for Toxicology, Drug Metabolism and Disposition, Pharmacology Education**, and **Translational and Clinical Pharmacology**.

## Brooks B. Pond

*East Tennessee State University, Bill Gatton College of Pharmacy*



On August 21, 2020, East Tennessee State University presented the 2020 Distinguished Faculty Award for Teaching to Dr. **Brooks Pond**, professor in the Department of Pharmaceutical Sciences. The award was presented at the annual Faculty Convocation,

which was delivered in a virtual format due to the COVID-19 pandemic.

Dr. Pond earned a BS in biochemistry and molecular biology at Centre College in 2000 and a PhD in pharmacology and certificate in cell molecular biology at Duke University in 2004. She also completed a postdoctoral research fellowship at St. Jude Children's Research Hospital.

She joined East Tennessee State University Bill Gatton College of Pharmacy as a founding faculty member in 2007. Over the past 13 years at ETSU, she has participated in didactic teaching of students within the College of Pharmacy and the biomedical science PhD program. Pond's teaching accomplishments have been recognized by both her students and her peers. For more than a decade, she has instructed and coordinated the human physiology course, a major foundational course for pharmacy students. In addition, Pond teaches pharmacology associated with several courses in the second and third years of the pharmacy curriculum. She has been selected four times as the Gatton College of Pharmacy Teacher of the Year and was recognized by her college peers when she was named Outstanding Teacher in 2015. Each year, the Gatton College of Pharmacy graduating class selects a faculty member who has been most influential on their education to serve as a "faculty hooder" at graduation. Pond has received this honor six times, more than any other faculty member. Most recently, she was selected as a Teaching and Learning Peer Consultant by the ETSU Center for Teaching Excellence.

Dr. Pond has been a member of ASPET since 2011 and is a member of the **Divisions for Neuropharmacology, Molecular Pharmacology, Pharmacology Education, and Toxicology.**

## Samba Reddy

*Texas A&M University College of Medicine*



**Samba Reddy**, PhD, RPh, professor in the Department of Neurosciences and Experimental Therapeutics at the Texas A&M University College of Medicine, has been conferred with the 2020 American Association of Pharmaceutical Scientists (AAPS) Global Leader Award.

The AAPS Global Leader Award recognizes a leader working in pharmaceutical science, technology, engineering, or education whose contributions to the pharmaceutical sciences community have resulted in an outstanding positive impact on education and/or the public health.

Dr. Reddy is a pioneer in the field of pharmaceutical research and leadership. He is a noted board-certified pharmacist-pharmacologist and has published over 200 papers and book chapters. Over the past 25 years, he has made exceptional contributions to neurotherapeutics, with a substantial impact on nervous system disorders that affect over 500 million worldwide. He discovered novel mechanisms of neurosteroids in the brain, invented neurosteroid-replacement therapy, discovered an epigenetic therapy, identified novel antidotes for chemical-warfare agents, and helped develop first-in-class medicines for epilepsy and brain disorders. Currently, he serves as editor of five biomedical journals and is a consultant to the pharma industry. In addition, he mentors next-generation pharma students, postdocs, and junior researchers.

Dr. Reddy has been a member of ASPET since 1999. He is an Editorial Board member for the *Journal of Pharmacology and Experimental Therapeutics*. Dr. Reddy is a member of the **Divisions for Neuropharmacology, Drug Discovery and Development, and Translational and Clinical Pharmacology.**

## Benard Ogola

Tulane University



**Benard Ogola** is a postdoctoral fellow at Tulane University in New Orleans. He currently works under the mentorship of Dr. Sarah Lindsey, PhD, an associate professor who holds the Dr. Barbara S. Beckman Professorship in Pharmacology. In January,

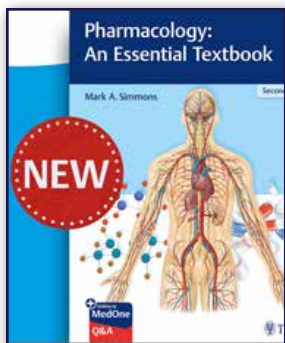
Dr. Ogola received the National Institutes of Health Maximizing Opportunities for Scientific and Academic Independent Careers (MOSAIC K99/R00), a program to facilitate the transition of promising postdoctoral fellows to faculty researchers from diverse backgrounds into independent faculty careers in research-intensive institutions.

Born in Kenya, Dr. Ogola received his undergraduate training in biochemistry from Texas Tech University in 2012 and PhD in pharmaceutical sciences from Texas Tech University Health Sciences Center in 2017. His research interests include vascular biology, sex hormones, and sex chromosomes. Dr. Ogola is a junior reviewer for *American Journal of Physiology – Heart and Circulatory Physiology* and an American Heart Association reviewer-in-training.

Dr. Ogola has been a member of ASPET since 2017 and is a member of the **Divisions for Cardiovascular Pharmacology, Drug Metabolism and Disposition, Molecular Pharmacology, and Translational and Clinical Pharmacology.**

## Mark A. Simmons

University of Maryland Eastern Shore



**Mark A. Simmons, PhD**, professor in the Department of Pharmaceutical Sciences at the University of Maryland Eastern Shore has authored a textbook entitled *Pharmacology: An Essential Textbook, Second Edition*. The book is published by Thieme Medical Publishers

and includes contributions from ASPET members Katharina Brandl, Dennis Peffley, and June Yun.

Dr. Simmons received his PhD from the Department of Pharmacology and Experimental Therapeutics at Loyola University of Chicago in 1983. He has been an ASPET member since 1996 and is a member of the **Divisions for Neuropharmacology, Molecular Pharmacology, and Pharmacology Education.**

Dr. **Katharine Brandl** contributed the Unit on Antimicrobial Drugs. She is an associate teaching professor in the School of Pharmacy and Pharmaceutical Sciences at the University of California San Diego. She received a RPh and a PhD in immunology/infectious diseases from the University of Regensburg, Germany, in 2005. She has been an ASPET member since 2015 and is currently the Chair of the **Division for Pharmacology Education**, as well as a member of the **Division for Translational and Clinical Pharmacology.**

Dr. **Dennis Peffley** contributed the Unit on Cancer Chemotherapy, Toxicology and Vitamins. He is a professor of physiology and pharmacology in the Department of Biomedical Sciences at the Georgia Campus of the Philadelphia College of Osteopathic Medicine. He received a PhD in genetics from Pennsylvania State University. He has been an ASPET member since 2014 and is a member of the **Divisions for Pharmacology Education, Cancer Pharmacology, and Drug Metabolism and Disposition.**

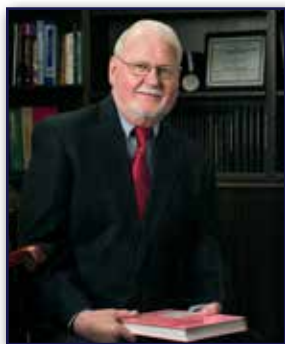
Dr. **June Yun** contributed the Unit on Renal and Cardiovascular Drugs. She is an associate professor in the Department of Integrative Medical Sciences at Northeast Ohio Medical University. She received a PhD from George Washington University and the NIH in 2001. She has been an ASPET member since 2004 and is a member of the **Divisions for Molecular Pharmacology, Cardiovascular Pharmacology, and Pharmacology Education.**

ASPET members can receive access to the e-book by contacting [sara.demic@thieme.com](mailto:sara.demic@thieme.com).



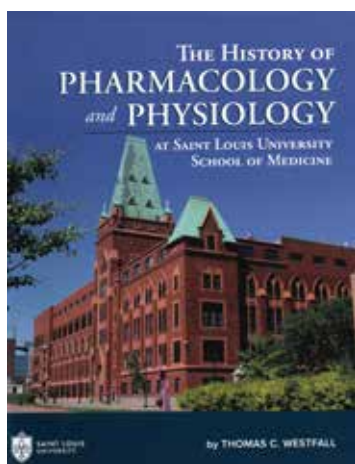
## Thomas C. Westfall

St Louis University School of Medicine



**Thomas C. Westfall, PhD**, former William Beaumont professor and chair of the Department of Pharmacology (1979-1990) as well as the Department of Pharmacology and Physiology (1990-2013) at Saint Louis University School of Medicine has written a book that has just

been published by Reedy Press, St. Louis entitled *The History of Pharmacology and Physiology at Saint Louis University School of Medicine*. The book provides a comprehensive, detailed, and exciting story of pharmacology and physiology at Saint Louis University School of Medicine from the early school in 1842, its demise by the "Know-Nothing" movement in 1855, to its rebirth in 1903 with the acquisition of the Marion Sims Beaumont College of Medicine and on to the present time. The idea for this book originated



out of the curiosity of the author about the men and women who preceded him as chairs and faculty members in the departments of the University starting with their inception in 1837.

The book, which is very comprehensive provides details of many departmental activities. There are detailed biographical

sketches of all the chairs as well as limited bios of all 152 full-time faculty members highlighting their major research, scholarly, and service accomplishments. For those individuals interested in obtaining further information or a copy of the book, please contact Tom Westfall at [Thomas.C.Westfall@slu.edu](mailto:Thomas.C.Westfall@slu.edu).

Dr. Westfall has been an ASPET member since 1965 and is a member of the **Divisions for Neuropharmacology, Cardiovascular Pharmacology, Pharmacology Education, and Translational and Clinical Pharmacology**.

## Emily E. Scott

University of Michigan



**Emily E. Scott, PhD**, was recently named F. F. Blicke Collegiate Professor of Pharmacy at the University of Michigan. This professorship was established in honor of Professor Fredrick Franklin Blicke, a former faculty member whose research and educational contributions had

considerable impact on the medicinal chemistry field. Dr. Scott is currently a member of this same medicinal chemistry department, as well as the Departments of Pharmacology and Biological Chemistry and programs in chemical biology and biophysics.

Dr. Scott's research focuses on determining links between human cytochrome P450 enzyme structures and their capabilities in drug metabolism, steroidal biosynthesis, and other biochemical processes with disease implications. This research has been continuously funded by NIH since 2004 and received a MERIT award in 2015. Her research contributions resulted in selection as a Fellow of the American Association for the Advancement of Science, the ISSX North American New Investigator Award in honor of James R. Gillette, and the Early Career Achievement Award from the Drug Metabolism and Disposition Division of ASPET.

In addition to her current work as chair of the ASPET Board of Publications Trustees, Dr. Scott served the Drug Metabolism and Disposition Division as councilor, secretary/treasurer, chair, and currently is the division council liaison. She has been a member of ASPET since 2002 and is a member of the **Divisions for Drug Metabolism and Disposition, Molecular Pharmacology, and Toxicology**.

## John Szarek

*Geisinger Commonwealth School of Medicine*



**John Szarek**, professor and director of clinical pharmacology at Geisinger Commonwealth School of Medicine, was recently appointed Vice Chair for Curriculum in the Department of Medical Education. In this role, he is responsible for management and oversight

of the curriculum and coordination of courses, threads and other educational activities/elements administered through the Department of Medical Education. The Vice Chair for Curriculum is responsible for oversight of the design and development of new curriculum, and ensures implementation, operation, review and quality improvement of existing curriculum.

He received his PhD in pharmaceutical sciences from the University of Kentucky College of Pharmacy, a BS in pharmacy from the University of Illinois Chicago College of Pharmacy, and a BS in biology from the University of Illinois Urbana. In addition to his new role, he is Education Director for Simulation at Geisinger Commonwealth and is a Certified Healthcare Simulation Educator. He is a TeamSTEPPS master trainer and works with an interprofessional team in developing simulation-based interprofessional activities. He is the Co-Director of the IUPHAR Pharmacology Education Project and has represented ASPET at the Council of Faculty and Academic Societies.

Dr. Szarek has been a member of ASPET since 2002 and is a member of the **Divisions for Pharmacology Education (past Councilor), Cardiovascular Pharmacology, and Translational and Clinical Pharmacology.**

## M. Nabeel Ghayur

*University of Pikeville*



**M. Nabeel Ghayur**, BPharm, MPhil, PhD, joined the University of Pikeville in Pikeville, KY as an assistant professor of pharmacology. His appointment is a joint one between the Kentucky College of Osteopathic Medicine (KYCOM) and Kentucky College of Optometry (KYCO).

Dr. Ghayur has an undergraduate degree in pharmacy, and master's and PhD degrees in pharmacology. He also completed a pre-doctoral fellowship in pharmacognosy from King's College London, England and a postdoctoral fellowship in physiology and pharmacology from McMaster University in Hamilton, Canada. Dr. Ghayur is a licensed community pharmacist in Ontario, Canada.

He has been a member of ASPET since 2001 when he joined as a graduate student member. Since that time, Dr. Ghayur has served twice (2002-2003 & 2004-2005) as a Student Councilor with the ASPET Student Chapter and was also affiliated in the past with one of ASPET's special interest groups on herbal medicines and medicinal plants from 2003-2005. Dr. Ghayur is a member of the **Divisions for Drug Discovery and Development, Cardiovascular Pharmacology, Molecular Pharmacology, Pharmacology Education, and Toxicology.**

## Craig W. Lindsley

*Vanderbilt University School of Medicine*



**Craig W. Lindsley**, PhD is university professor of pharmacology, chemistry and biochemistry, and director of the Warren Center for Neuroscience Drug Discovery at Vanderbilt University School of Medicine. On January 1, 2021 he was named Editor-in-Chief of the *Journal of Medicinal*

*Chemistry* (ACS) and retired from his former position of Editor-in-Chief of *ACS Chemical Neuroscience*.

Dr. Lindsley has been a member of ASPET since 2009 and is a member of the **Divisions for Molecular Pharmacology, Drug Discovery and Development, and Neuropharmacology.**



# Membership News

## The Value of ASPET Membership

Everyone at ASPET works to fulfill the Society's mission of promoting pharmacology and to provide our members with the necessary tools to enhance their careers, expand their networks, and share their important research to transform discoveries into therapies. We spoke to a member of ASPET's Council to talk a bit about what their membership means to them.



**Jin Zhang is ASPET's Past Secretary/Treasurer. She joined ASPET in 2011.**

### **Why did you join ASPET?**

**JZ:** Our work is in the area of cell signaling and molecular pharmacology. Many of my close colleagues, friends, and collaborators are within the ASPET community. I found a home.

### **How has membership in ASPET benefitted your career?**

**JZ:** I received recognition (one of my early career awards was given by ASPET – the John J. Abel Award in Pharmacology in 2012), built a strong supportive network, established collaboration, and had great opportunities to enhance my leadership skills.

### **Why do you think it is important to attend the ASPET Annual Meeting at EB?**

**JZ:** It is the best platform to showcase our own work, get exposed to the most exciting pharmacology research, build connections, and hang out with friends.

### **What advice would you give members who want to get more involved in ASPET?**

**JZ:** There are many ways to get involved. Send us an email or ASPETConnect message now.

### **What advice would you give to someone who is interested in a career in pharmacology?**

**JZ:** Pharmacology is fundamental to our fight against diseases. It will continue to evolve, and it deserves your passion and interest.

### **Do you have a fun fact about yourself you'd like to share?**

**JZ:** I only have a birthday every four years.

## Member-Get-A-Member

We would like to thank all the participants who made the 2020-2021 Member-Get-A-Member program a success. Thanks to your recruitment efforts, we welcomed 19 new members to ASPET.

### Congratulations

Courtney Bouchet is the winner of the \$100 American Express gift card renew-to-win raffle. Thank you for renewing early and supporting ASPET through your membership.

# New Members

## Regular Members

Yamina A. Berchiche, Dr.GPCR.com, MA  
 Charles B. Breckenridge, Quality Scientific Solutions, LLC, NC  
 Robert W. Busby, Busby Pharma Consulting, LLC, MA  
 Dean S. Carson, Saniona, Inc., MA  
 Young Cho, Marshall B. Ketchum Univ, CA  
 Terry D. Church, Univ of Southern California  
 Andrew Coles, Alexion, MA  
 Claudio Correa Natalini, Mississippi State Univ Col of Vet Med  
 Amanda K. Fakira, Cooper Med Sch of Rowan Univ, NJ  
 Dean Hickman, Eikonizo Therapeutics, MA  
 Mark R. Kelley, Indiana Univ Sch of Med  
 Eugene Konorev, Kansas City Univ  
 Kevin C. Lord, Sam Houston State Univ, TX  
 Marco A. Martins, Oswaldo Cruz Foundation, Brazil  
 Christoph Methfessel, Ruhr Univ Bochum, Germany  
 Yusuke Moritoh, Scchia Pharma Inc, Japan  
 Pramod Nair, Flinders Univ, Australia  
 Rajendra Nath, King George's Med Univ, India  
 Mary A. Pelleymounter, NINDS/NIH, MD  
 Francisco J. Rios, Univ of Glasgow, UK  
 Blake Rushing, Univ of North Carolina-Chapel Hill  
 Georgios Skiniotis, Stanford Univ, CA  
 James T. Stivers, Johns Hopkins Sch of Med, MD  
 Glenn M. Toney, Univ of Texas Health San Antonio  
 Anny C. Treat, Univ of Texas at Dallas  
 Hanna Wetzel, Xavier Univ, OH  
 Elizabeth Yeh, Indiana Univ Sch of Med  
 Lirong Zhang, Zhengzhou Univ, China  
 Jim Zheng, Gilead Sciences, Inc., CA

## Postdoctoral Members

Sumit Bansal, Univ of Washington  
 Daniel Bruce, Univ of Minnesota  
 Jianping Chen, Univ of Texas Med Branch  
 Qiuyan Chen, Vanderbilt Univ, IN  
 Nikki Clauss, Univ of Texas HSC At San Antonio  
 Phoebe O. Dacha, Virginia Commonwealth Univ  
 Yoko Franchetti, FDA, PA  
 Susan M. Greene, Univ of Texas HSC at San Antonio  
 Yu-Meng Jia, Xi'an Jiaotong Univ, China  
 Lingxiang Jiang, Indiana Univ Sch of Med

Victor M. Jimenez, Jr., Univ of Texas HSC at San Antonio  
 Dino Luethi, Med Univ of Vienna, Austria  
 Rian Manville, Univ of Brighton, UK  
 Md Masud Parvez, Washington State Univ  
 Karina A. Pena, Univ of Pittsburgh, PA  
 Cristina D. Peterson, Univ of Minnesota  
 Santosh Pothula, Yale Sch of Med, CT  
 Deborah Rudin, Inst of Pharmacology, Austria  
 Christopher T. Schafer, Univ of California, San Diego  
 Alexandra Scharr, Univ of California, San Francisco  
 Ashley Smith, Univ of Texas Med Branch  
 Ley C. Smith, Rutgers Univ, NJ  
 Xiaolin Su, IUPUI, IN  
 Brian C. Tooker, Univ of Colorado  
 Gaofeng Wang, Johns Hopkins Univ, MD  
 Yu-Chen Yen, Purdue Univ, IN  
 Jennica Young, Temple Univ, MI  
 Jeffrey H. Zimering, Icahn Sch of Med at Mt Sinai, NY

## Affiliate Members

Ty E. Martinez, LSU Health Shreveport, LA  
 Robert Papp, Repare Therapeutics, Canada

## Graduate Student Members

Mai S. Abdel-Ghani, Georgetown Univ, DC  
 Umar Abdullahi, Ahamdu Bello Univ Zaria, Nigeria  
 Shayan Amiri, Univ of Manitoba, Canada  
 Nana-Ama Anang, Univ of California, San Diego  
 Jaclynn Andres, Rutgers Univ, NJ  
 Tyson R. Baird, Virginia Commonwealth Univ  
 Oluwashanu R. Balogun, Univ of Pittsburgh, PA  
 Cecilia Barajas, Univ of Minnesota  
 Jasmin N. Beaver, Kent State Univ, OH  
 Kensey Bergdorf, Vanderbilt Univ, TN  
 Arryn T. Blaine, Purdue Univ, IN  
 Fathima N. Cassim Bawa, Northeast Ohio Med Univ  
 Benjamin M. Clements, Univ of Minnesota  
 Jaclyn Connelly, Univ of Pittsburgh, PA  
 Nicholas B. Conway, Florida International Univ  
 Skylar Cooper, Marshall Univ, WV  
 Javiera A. Cortes, Pontificia Univ Católica de Chile  
 Rabi Danraka Ahmadu Bello Univ, Nigeria  
 Delaney Davis, Univ of North Texas HSC  
 Rachel Y. Diao, Univ of California, San Diego  
 Krysta DiKun, Weill Cornell, NY



Colten Eberhard, Johns Hopkins Univ, MD  
 Stephanie L. Echeverria, Midwestern Univ, IL  
 Tori Ehrhardt, Florida International Univ  
 Shicheng Fan, San Yat-Sen Univ, China  
 Zahra Z. Farahbakhsh, Vanderbilt Univ, TN  
 Stephanie Gonzalez, Purdue Univ, IN  
 Anne Gresch, Univ of Munster, Germany  
 Robert Hammack, Univ of Texas HSC at San Antonio  
 Sean S. Harvey, Univ of California, San Diego  
 David S. Henry, Univ of Arkansas for Med Sciences  
 Stefanie Hodapp, Univ of California, San Diego  
 Kimberly Holter, Wake Forest Univ Hlth Sciences, NC  
 Cali Horta, Univ of California, San Diego  
 Zitha Redempta Isingizwe, Univ of Oklahoma Hlth Sci  
 Luis J. Jaimes Santiago, California State Univ,  
 Northridge  
 Omar Z. Kana, Michigan State Univ  
 Nicholas Kapolka, Univ of Miami Miller Sch of Med, FL  
 Nandini Katti, Washington State Univ  
 Jack Keady, Univ of Kentucky  
 Evan Koboric, Univ of California, San Diego  
 Kelsey Kochan, Univ of Michigan  
 Bailey Kuechenmeister, Midwestern Univ, AZ  
 Jun Kyoung, Univ of Toledo, OH  
 Bethany Latham, Univ of North Carolina-Chapel Hill  
 Victoria Leroy, Univ of Florida  
 Yedan Liu, Univ of Mississippi Med Ctr  
 Gustavo A. Martinez-Muniz, Univ of South Carolina  
 Federica Marzano, Temple Univ, PA  
 Ivan Maslov, Moscow Inst of Physics & Technology,  
 Russia  
 Melissa Mathews, Roseman Univ of Health Sciences,  
 UT  
 Paapa Mensah-Kane, Univ of North Texas HSC  
 Yazan J. Meqbil, Purdue Univ, IN  
 Loyda M. Morales Rodriguez, Univ of Michigan, Ann  
 Arbor  
 Hagar A. Morgaan, Alexandria Univ-Egypt  
 Kaushik Muralidharan, Purdue Univ, IN  
 Ryan E. Murphy, Univ of Texas Med Branch at  
 Galveston  
 Bianca Nguyen, Florida International Univ  
 Peter Obi, Washington State Univ  
 Chukwudi J. Ozokwere, Univ of Technology, South  
 Africa

Timothy M. Panknin, Univ of Arizona  
 Andrea M. Pesch, Univ of Michigan  
 Von Phan, Univ of California  
 Bethany Pierce, Wake Forest Univ, NC  
 Linnea S. Ransom, Univ of California, San Diego  
 Muhammad Abdur Razzakil, Monash Univ, Australia  
 Lauren G. Rysztak, Univ of Michigan  
 Ayse Z. Sahan, Univ of California, San Diego  
 Leticia Salvador Vieira, Univ of Washington  
 Gissell A. Sanchez, Univ of Michigan  
 Perla Sandoval, Univ of California, San Diego  
 Edna Santos, Virginia Commonwealth Univ  
 Elodie Sauge, Univ of British Columbia, Canada  
 Serena Scognamiglio, Georgetown Univ Med Ctr, DC  
 Miar M. Sherif, Egyptian Drug Authority, Egypt  
 Cheyanne K. Shinn, Univ of California, San Diego  
 Amal Shoeib, Univ of Arkansas for Med Sciences  
 Deanna Sosnowski, Univ of Alberta, Canada  
 Austin D. Sun, Univ of Washington  
 Geoffrey Taghonn, Univ of Miami Miller Sch of Med  
 Kai Ming Tan, Lincoln Memorial Univ - DeBusk Coll of  
 Osteopathic Med, TN  
 Hung-Chun Tung, Univ of Pittsburgh, PA  
 Annapoorna Venkatachalam, Mayo Clinic, MN  
 Kennedy M. Walls, Univ of Louisville, KY  
 Zilin Wang, Univ at Buffalo, NY  
 Abigail Wheeler, Johns Hopkins Univ, MD  
 Hannah M. Work, Univ of Colorado  
 Tongzhen Xie, Univ of Minnesota  
 Jiachen Xu, Univ at Buffalo, NY  
 Anjali Yadav, St. John's Univ, NY  
 Yuting Yuanc, Johns Hopkins Univ, MD  
 Bryan S. Yung, Univ of California, San Diego  
 Jennifer E. Zachry, Vanderbilt Univ, TN  
 Qian Zhang, Purdue Univ, IN

## Post-baccalaureate

Carline Bien-Aime, Radford Univ, VA  
 Josh Crossman, Univ of Arizona  
 Emily Hicks, Univ of Colorado, Anschutz  
 Christopher O'Brien, Univ of Tennessee

## Undergraduate Students

Faiyaz Ahasan, Brac Univ, Bangladesh  
 Lee M. Augenblick, Univ of South Carolina  
 Jenna G. Connolly, Univ of Michigan

Tyler D. Copus, Univ of Findlay, OH  
 Julia E. Gardner, Duke Univ, NC  
 Christopher C. Honeycutt, Duke Univ, NC  
 Sadia R. Lamia, Brac Univ, Bangladesh  
 Sarah E. Mott, Univ of South Carolina Sch of Med  
 Naushin S. Nasir, Brac Univ, Bangladesh  
 Lisa Ouyang, California State Univ, East Bay  
 Carl Rodriguez, California State Univ, East Bay

## In Sympathy

ASPET notes with sympathy the passing  
 of the following members:

William T. Beaver, MD  
 Jerry B. Hook, PhD  
 Laurence S. Kaminsky, PhD  
 Ronald P. Rubin, PhD

## Stephen Cletius Fowler (1944-2020)

*Submitted by Rong Chen, PhD*

Dr. Stephen Cletius Fowler, PhD, a known behavioral pharmacologist at the University of Kansas, passed away on June 15, 2020 at his home in Lawrence, Kansas after a long battle with Parkinson's disease. He was 76.

Steve was born in Peoria, Illinois. He spent his childhood in Somerville, Tennessee and Huntsville, Alabama. After graduating Phi Beta Kappa from the University of Alabama with degrees in math and physics, he obtained a PhD in experimental psychology from Princeton and became a professor at the University of Mississippi in 1973. Steve served as the chair of his department and was named the Barnard distinguished professor for excellence in teaching and research. In 1994, Steve accepted a position at the University of Kansas, where he served as a professor of human development until 2000 and then a professor in pharmacology and toxicology until his retirement in 2016. He was a senior scientist with the Life Span Institute and anchored their behavioral neuroscience research program during the 1990s and 2000s. He was



an integral member of the Kansas Intellectual and Developmental Disabilities Research Center. While at KU, Steve also served as the president of Division 28 (Psychopharmacology and Substance Abuse) of the American Psychological Association.

Steve was a member of ASPET since 1988. He was internationally known for his work in behavioral pharmacology. Steve had been funded by NIH for more than 20 years and had over 160 publications in high impact journals including *Science*, *Cell*, and *Proceedings of the National Academy of Sciences*. Using his extensive knowledge in mathematics and physics, he developed a novel

instrumentation called Force Plate Actimeter and wrote programs to quantitatively measure previously undetectable or unquantifiable phenomena, such as low-amplitude tremor and rapid muscle movements. This device has transformed the field in preclinical behavioral pharmacology and has been used for research on rodent models of Parkinson's disease,

Huntington's disease, ALS, ADHD, essential tremor, schizophrenia, drug abuse, Krabbe's disease, autism, and fragile X syndrome. The Force Plate Actimeter has been marketed by Bioanalytical Systems Inc.

Steve dedicated his life to research and to educating the next generation of scientists. He mentored more than 40 successful doctoral students and a number of junior faculty. He was a firm believer and a strong practitioner of promoting diversity and inclusivity. His students came from all over the world, and he treated all of them like members of his own family.

Steve had a brilliant scientific mind and an encyclopedic knowledge of his own field and many others, but what people will likely remember most about Steve is his personality. He was understated in manner, soft-spoken, generous and gracious with his time and energy, honest and open, and immensely kind.

Beyond science, Steve had many interests. In particular, Steve was an avid hiker, kayaker, and outdoorsman. Before his daughter was born, he regularly camped in the Arctic wilderness. He and a close friend used to take a plane that could only hold 3 people to be dropped off in the wilderness above the Arctic Circle where they camped for weeks.

In his personal life, Steve was married to Doreen Fowler. They loved each other deeply and were together for over 40 years. Steve and Doreen have one child, a daughter, named Carina. Doreen and Carina survive Steve. He is also survived by a younger sister, Michelle.

Steve was a role model for his students and colleagues. His absence will be missed by many of us who were on the receiving end of his mentorship, generosity, and kindness.

## Laurence Samuel Kaminsky (1940-2020)

*Submitted by Ronald S. Obach and Xinxin Ding, PhD*

The drug/xenobiotic metabolism research community is saddened to learn of the recent passing of Dr. Laurence Samuel (Larry) Kaminsky at the age of 80. Larry was born in Cape Town, South Africa, in 1940. He was trained in organic chemistry at the University of Cape Town, receiving his PhD in 1966. Following post-doctoral training at Yale and the State University of New York at Albany, he became a faculty member in the Physiology and Medical Biochemistry Department at the University of Cape Town (1968-1975). In 1975, Larry immigrated to



the United States with his wife Sylvia, son Philip, and daughter Rena, and joined the Wadsworth Center of the New York State Department of Health as a senior research scientist. Larry spent more than 30 years at the Wadsworth Center, taking on various leadership positions, including director of biochemical toxicology, chief of the Laboratory of Human Toxicology and Molecular Epidemiology, deputy director of the

Division of Environmental Disease Prevention, professor and chair of the Department of Environmental Health Sciences, and director of the Office of Environmental Research Development. In the past 14 years, Larry served as the associate chief of staff for research and development at the Stratton VA Medical Center in Albany.

Larry was an active researcher for nearly 60 years. In his early work, Larry published a number of important studies on the biochemistry of cytochrome c. His work on cytochrome c and redox enzymes led him to cytochrome P450, on which his first studies were published in 1975. His most well-known research focused on cytochrome P450 and the metabolism of the anticoagulant warfarin. An early adopter of HPLC, his lab was able to separate multiple metabolites of the stereoisomers of warfarin and leverage this in probing the activities of rat and human P450 enzymes, since multiple enzymes yield

different profiles of warfarin metabolites. This resulted in a multitude of important scientific papers on P450 enzymes, frequently in collaboration with noted P450 scientists, such as Fred Guengerich, Joyce Goldstein, and Jim Halpert. His further work on P450 enzymes included characterization of intestinal P450s and the metabolism of various drugs, such as theophylline and tolbutamide. As a researcher in a state public health research organization, Larry also carried out research of interest to public health, such as the biochemical toxicology of fluorocarbons and metals. Career-wise, Larry was the author or co-author of more than 170 original research papers and review articles, many of which were highly cited. One of his papers received the Frank R. Blood Award from the Society of Toxicology in 1991.

Larry provided important service and leadership to the drug/xenobiotic metabolism research community. He served as an associate editor for *Drug Metabolism and Disposition* (2000-2017) and *Pharmacology and Therapeutics* (2004-2008) and was a guest editor for *Molecular Pharmacology* (1992). He was elected chair of the ASPET Division for Drug Metabolism

and Disposition (2005), and councilor (1994-1997) and treasurer (2005-2009) of ISSX. He chaired two major scientific meetings in our field for ISSX (1992) and Microsomes and Drug Oxidations (2008). He was a member of the standing International Advisory Committee for Microsomes and Drug Oxidations.

Larry mentored eight PhD students and numerous postdoctoral scientists and junior faculty members. His scientific legacy continues to be realized in the research carried out in the academic and private sectors by those scientists he trained. After joining the VA, Larry changed his focus to translational research, mentoring many physician scientists and significantly expanding both basic and clinical research at the Albany VA Medical Center.

Our research community extends its condolences to Larry's family. Larry enjoyed life as much as he enjoyed research. He liked many things in life: music, food, wine, art, and travel. He was well known for his knowledge in wine tasting. He was a role model for balancing life and career. Larry will be remembered as a passionate researcher, a good friend, a great mentor, an inspiring leader, and a dedicated public servant.

## Do you know someone who is not yet a member of ASPET?



**Help ASPET stay strong by recruiting your fellow colleagues, students, and friends!**



**A growing ASPET means greater recognition for the field of pharmacology, more resources and support for our members, and a louder voice with policy makers.**

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White mug with ASPET journal covers  
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Gray silk tie with ASPET logo  
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Gray cotton with logo on front left pocket and across back  
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Members: \$15.00 + Shipping



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Black cotton with Albert Einstein quote  
Adult Sizes: S, M, L, XL, XXL  
Members: \$15.00 + Shipping



## Cooligraphy T-shirt

Black cotton with stylized ASPET design in red and gold  
Adult Sizes: S, M, L, XL, XXL  
Members: \$15.00 + Shipping



## Explore Pharmacology T-shirt

White cotton with cartoon design  
Adult Sizes: S, M, L, XL, XXL  
Members: \$15.00 + Shipping



## Experiment T-shirt

Navy blue cotton with Experiment. Learn. Fail. Repeat design  
Adult Sizes: S, M, L, XL, XXL  
\*Child sizes available in light blue  
Members: \$15.00 + Shipping



## Keep Calm T-shirt

White cotton with Keep Calm and Study Pharmacology design  
Adult Sizes: S, M, L, XL, XXL  
Members: \$15.00 + Shipping



## Toddler T-shirt/Onesie

White cotton with Genius design  
Toddler Sizes: 2T, 3T, 4T, 5T, 6T  
Onesie: NB, 6M, 12M, 18M, 24M  
Members: \$10.00 + Shipping



## Women's Scarf

Beige silk scarf with ASPET logo  
Members: \$30.00 + Shipping



# Division News

## 2021 Division Elections

The following Divisions held elections for 2021 and received an enthusiastic response from ASPET members:

- Division for Behavioral Pharmacology
- Division for Cardiovascular Pharmacology
- Division for Drug Discovery and Development
- Division for Drug Metabolism and Disposition
- Division for Molecular Pharmacology
- Division for Pharmacology Education
- Division for Toxicology

Please join us in welcoming all newly elected chairs and secretary/treasurers to their respective division's executive committee. The new officers will begin their terms on July 1, 2021.

### Division for Behavioral Pharmacology

#### Chair-Elect



**Emily Jutkiewicz, PhD**

*Associate Professor and Associate Chair for Education of Pharmacology, Department of Pharmacology, University of Michigan*

#### Secretary/Treasurer-Elect



**Brenda Gannon, PhD**

*Assistant Professor of Pharmacology, Toxicology, and Neuroscience, Louisiana State University Health Sciences Center, Shreveport*

### Division for Cardiovascular Pharmacology

#### Chair-Elect



**Hemal H. Patel, PhD**

*Professor and Vice Chair for Research, Department of Anesthesiology, University of California, San Diego*

#### Secretary/Treasurer-Elect



**Yagna PR Jarajapu, M Pharm, PhD, FAHA**

*Associate Professor, Department of Pharmaceutical Sciences, North Dakota State University*

## Division for Drug Discovery and Development

### Chair-Elect



#### **Benita Sjögren, PhD**

*Assistant Professor, Department of Medicinal Chemistry and Molecular Pharmacology, Purdue University; Adjunct Assistant Professor, Department of Pharmacology & Toxicology, Indiana University School of Medicine*

### Secretary/Treasurer-Elect



#### **Alicja Urbaniak, MSc, PhD**

*Instructor, University of Arkansas for Medical Sciences*

## Division for Drug Metabolism and Disposition

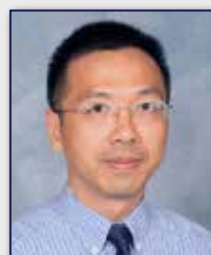
### Chair-Elect



#### **Joanne Wang, PhD**

*Professor of Pharmaceutics, University of Washington*

### Secretary/Treasurer-Elect



#### **Haojie Zhu, PhD**

*Associate Professor, University of Michigan College of Pharmacy*

## Division for Molecular Pharmacology

### Chair-Elect



#### **Carmen W. Dessauer, PhD**

*Professor and Vice-Chair, Department of Integrative Biology and Pharmacology, McGovern Medical School, University of Texas Health Science Center*

### Secretary/Treasurer-Elect



#### **Nikoleta Tsvetanova, PhD**

*Assistant Professor, Department of Pharmacology and Cancer Biology, Duke University*

## Division for Pharmacology Education

### Chair-Elect



#### **Helmut B. Gottlieb, PhD**

*Professor, Department of Pharmaceutical Sciences, University of the Incarnate Word, Feik School of Pharmacy*

### Secretary/Treasurer-Elect



#### **Joe Blumer, PhD**

*Associate Professor, Department of Cell and Molecular Pharmacology, Medical University of South Carolina*

## Division for Toxicology

### Chair-Elect



#### **Cheryl E. Rockwell, PhD**

*Associate Professor, Department of Pharmacology and Toxicology, Michigan State University; Acting Director, Applied Immunology Center for Education and Research, Michigan State University*

### Secretary/Treasurer-Elect



#### **Elaine M. Leslie, PhD**

*Associate Professor, Department of Physiology, University of Alberta*



# ASPET Division Sponsored Awards



## Division for Behavioral Pharmacology

### JH Woods Early Career Award in Behavioral Pharmacology

The ASPET Division for Behavioral Pharmacology established this award in 2019 to recognize outstanding original research by early career investigators in the area of behavioral pharmacology.



#### Gregory T. Collins, PhD

*University of Texas Health Science Center*

Dr. Collins is receiving this award in recognition of his innovative and multi-tiered approach to understanding how individual differences, including behavioral and drug histories, impact drug-taking and drug-seeking behaviors. In addition to developing a strong research program, Dr. Collins has an exemplary service record and shown dedication in his roles as a teacher and mentor of younger scientists.

Dr. Collins is an assistant professor of pharmacology at the University of Texas Health Science Center at San Antonio (UTHSCSA). He received a PhD in pharmacology from the University of Michigan and completed postdoctoral training at the University of Michigan and McLean Hospital/Harvard Medical School before joining the faculty at UTHSCSA in 2012.

Dr. Collins heads a research program broadly focused on the behavioral pharmacology of drugs of abuse. Current studies, funded by NIH/NIDA and the VA, are aimed at understanding individual differences in drug-taking behavior, determining how drug-drug interactions impact abuse-related effects, and developing novel pharmacotherapies for substance use disorders.

In addition to maintaining a well-funded research program, Dr. Collins is actively involved in scientific organizations including on the ASPET Program Committee. He is highly engaged at UTHSCSA in training both graduate students in his position as co-director of the physiology & pharmacology graduate program and postdoctoral fellows in his position as associate director of a post-doctoral T32 training grant. He has been a member of ASPET since 2004.

The award will be acknowledged at the division's Town Hall meeting on March 29. Sign up to attend at <https://bit.ly/384TvpD>.



## Division for Cardiovascular Pharmacology

### Benedict R. Lucchesi Young Scientist Travel Award in Cardiac Pharmacology

The Benedict R. Lucchesi Young Scientist Travel Award in Cardiac Pharmacology was established by the ASPET Division for Cardiovascular Pharmacology to honor Dr. Lucchesi's lifelong scientific contributions to our better understanding and appreciation of the pharmacological treatment and prevention of cardiovascular disease and for his mentoring of countless prominent cardiovascular pharmacologists in translational approaches.



#### Sarah M. Schumacher, PhD

*The Cleveland Clinic*

Dr. Schumacher is receiving this award in recognition of her contributions as an early stage scholar to our knowledge of mechanisms and therapeutic targets for heart failure.

Dr. Schumacher is an assistant professor in the Department of Cardiovascular & Metabolic Sciences at the Cleveland Clinic Lerner College of Medicine. She was first introduced to ASPET as an ASPET Summer Undergraduate Research Fellow (SURF) at the University of Michigan where she also received her PhD. Dr. Lucchesi was on her thesis committee and was one of her early mentors. She did postdoctoral training at Temple University. Dr. Schumacher is first author of

two seminal papers on the role of GRK2 in cardiac hypertrophy and heart failure. Her independent research continues to be innovative and she has found a potential novel link between GRK2 signaling and cardiac and systemic metabolism, which has significant implications. She has been a member of ASPET since 2004.

Dr. Schumacher will be honored during the ASPET Annual Meeting at Experimental Biology 2021 on Friday, April 30 when she will present a lecture titled *Enhanced Insulin-responsive AS160 Elicits Cardioprotection During Metabolic Stress*.



## Division for Drug Discovery and Development

### Scientific Achievement Award in Drug Discovery and Development

The ASPET Division for Drug Discovery and Development established this award in 2019 to recognize outstanding investigators that have made significant contributions in drug discovery, translational and/or drug development science.



**Francis S. Willard, PhD**  
*Eli Lilly and Company*

Dr. Willard is receiving this award in recognition of his exceptional accomplishments to advance drug discovery in multiple therapeutic areas including demonstrating tirzepatide as a biased agonist and describing the

novel, drug-like molecule, LSN3160440, that has a unique mechanism to target GPCRs.

Dr. Willard obtained his BSc (Hons) in physiology at Victoria University of Wellington, New Zealand, then went on to earn a PhD in neuroscience from the John Curtin School of Medical Research at the Australian National University, receiving the 2002 Frank Fenner

Medal award for his PhD thesis. He pursued studies in receptor pharmacology at University of North Carolina – Chapel Hill, first as a postdoctoral fellow then as a research assistant professor, publishing 50 papers during his time in the pharmacology department.

Dr. Willard transitioned to Eli Lilly and Company in 2007, where he has used novel pharmacology concepts to advance drug discovery. He has focused on Type 2 diabetes mellitus, and his recent work has delineated new mechanisms for therapeutically modulating G-protein coupled receptors such as the GLP-1 receptor. Dr. Willard has been an ASPET member since 2002.

Dr. Willard will be honored at the ASPET Annual Meeting at Experimental Biology 2021 on Friday, April 30 and will present a lecture titled *Novel Pharmacology Approaches for Drugging ClassB GPCRs*.



## Division for Drug Metabolism and Disposition

### Richard Okita Early Career Award in Drug Metabolism and Disposition

The ASPET Division for Drug Metabolism sponsors the Early Career Award in Drug Metabolism and Disposition, named to honor Dr. Richard Okita, in order to recognize excellent original research by early career investigators in the area of drug metabolism and disposition.



**Huichang Bi, PhD**  
*Sun Yat-sen University and Southern Medical University*

Dr. Bi is receiving this award in recognition of her interdisciplinary and seminal studies to further understand the regulation of xenobiotic and endobiotic metabolism

and the subsequent implications on drug metabolism and disease states, as well as for her outstanding publication record and commitment to professional service and mentorship.

Dr. Bi is a professor at the School of Pharmaceutical Sciences, Sun Yat-sen University and Southern Medical University. She obtained her PhD in pharmacology in 2007 and worked as a visiting scholar in Dr. Frank J. Gonzalez's laboratory at NCI/NIH in 2011. She has a

continuous interest in understanding the metabolism of xenobiotics and endobiotics and their effects on disease states and therapeutic outcome. Her research also extends to the drug-disease interactions mediated by nuclear receptors, metabolizing enzymes, and transporters.

Dr. Bi has been awarded with 20 major grants as project PI and has published more than 100 research articles in peer-reviewed journals, 70 of which she was

first or corresponding author. She has edited four books and authored seven book chapters. She is a member of the editorial board for *Drug Metabolism and Disposition* and became an ASPET member in 2020.

Dr. Bi will be honored at the ASPET Annual Meeting at Experimental Biology 2021 on Friday, April 30 and will present a lecture titled *Nuclear Receptors in Hepatomegaly and Liver Regeneration: An Update*.



## Division for Drug Metabolism and Disposition

### James R. Gillette Awards

The James R. Gillette Awards are presented each year by the ASPET Division for Drug Metabolism and Disposition for two outstanding papers published in the previous year's *Drug Metabolism and Disposition*.

The award recipient in the Pharmacokinetics/Drug Transporters category for 2020 is Bridget L. Morse, PharmD, PhD from Eli Lilly and Company for the paper titled "Pharmacokinetics of Organic Cation Transporter 1 (OCT1) Substrates in Oct1/2 Knockout Mice and Species Difference in Hepatic OCT1-Mediated Uptake."

The award recipient in the Drug Metabolism category for 2020 is Eva Hansmann for work done while at the Laboratory of Environmental Toxicology,

Department of Pharmacology at the University of California, San Diego for the paper titled "Differential Role of Liver X Receptor (LXR)  $\alpha$  and LXR $\beta$  in the Regulation of UDP-Glucuronosyltransferase 1A1 in Humanized UGT1 Mice."

The Gillette Awardees will be honored at the ASPET Annual Meeting at Experimental Biology 2021 on Friday, April 30 and will present short talks on their research.



## Division for Molecular Pharmacology

### Early Career Awards

The ASPET Division for Molecular Pharmacology Early Career Award has been established to recognize scholarly achievements of junior investigators early in their independent careers.



**Karen J. Gregory, PhD**  
Monash University

Dr. Gregory is an Australian Research Council future fellow and leads the endocrine and neuropharmacology lab at Monash Institute of Pharmaceutical Sciences (MIPS), Australia. Dr. Gregory is an internationally recognized

expert in analytical and molecular pharmacology of G protein-coupled receptors (GPCRs), focusing on promising therapeutic targets for neuropsychiatric and neurological disorders. Her research seeks to understand novel paradigms of drug action at GPCRs such as

allosteric and biased pharmacology with the goal of using these insights to facilitate rational drug discovery. Her research team explores 1) the structural basis of allosteric ligand-receptor interactions; 2) the full scope of effects of allosteric ligands on receptor function; and 3) the influence of heteromerisation on these behaviors.

Dr. Gregory obtained her PhD at Monash University. After successful postdoctoral training at Vanderbilt Center for Neuroscience Drug Discovery, she returned to Australia to establish her independent program and has been an ASPET member since 2006.

She will be honored during the ASPET Annual Meeting at EB 2021 on Friday, April 30 where she will present a lecture titled *Molecular Neuropharmacology of Metabotropic Glutamate Receptor 5 Allosteric Modulators*.



**Angeline M. Lyon, PhD**  
Purdue University

Dr. Lyon is an assistant professor at Purdue University. She uses a combination of X-ray crystallography, electron microscopy, small angle X-ray scattering, and atomic force microscopy to gain structural insights into phospholipase C (PLC) regulation at cellular membranes. One of her key contributions thus far is the atomic structure of PLC $\epsilon$ , an isozyme involved in both cardiovascular health and cancer. Her studies shed light on fundamental regulatory mechanisms controlling PLC activity and

will aid in the identification and development of novel chemical probes that could be used to study the roles of PLCs in disease.

Dr. Lyon obtained her PhD from the University of Texas Austin where she used NMR spectroscopy to study the structure of RNA binding proteins. As an American Heart Association-funded postdoctoral fellow at the University of Michigan, her research accomplishments included the first structure of a full-length PLC $\beta$  enzyme. She has been an ASPET member since 2009.

She will be honored during the ASPET Annual Meeting at EB 2021 on Friday, April 30 where she will present a lecture titled *A Structure-Based Approach to Understanding Phospholipase C Function*.



## Division for Neuropharmacology Early Career Award

The ASPET Division for Neuropharmacology sponsors the Early Career Award to honor a young independent investigator working in neuropharmacology.



**Jill R. Turner, PhD**  
University of Kentucky

Dr. Turner is receiving this award in recognition of her highly impactful research in the field of neuropharmacology, extensive and effective mentoring and service to the profession, and public outreach.

She received her PhD in neuroscience from Georgetown University. She completed postdoctoral training in behavioral genetics and pharmacogenomics at the University of Pennsylvania. Currently, Dr. Turner is an assistant professor in the University of Kentucky College of Pharmacy, where her NIDA funded research investigates biological mechanisms underlying high relapse rate among smokers using electrophysiology, behavior, and Next Gen Sequencing technologies.

Dr. Turner's research combines Next Gen sequencing approaches and behavioral

pharmacology to identify candidate molecules for pharmacogenomic evaluation in rodent models and in the human population. For example, sequencing technologies identified a novel molecule, Neuregulin 3, in mechanisms underlying nicotine withdrawal phenotypes. Dr. Turner's group has now validated this association in two independent cohorts of smokers, demonstrating that possession of a NRG3 risk allele predicts relapse to smoking, an exciting and transformative discovery informing precision medicine and nicotine use disorder treatment. She has been an ASPET member since 2013.

The award will be presented during the ASPET Annual Meeting at Experimental Biology 2021 on Friday, April 30 and she will present a lecture titled *Neuroinflammatory Drivers of Nicotine Dependence: Opportunities for Precision Medicine*.





## Division for Pharmacology Education

### Pharmacology Educators Travel Awards

The ASPET Division for Pharmacology Education sponsors travel awards for pharmacology educators. The primary goal of these travel awards is to promote participation in the ASPET Annual Meeting by pharmacology educators and to foster career development in pharmacology education.



#### **Islam N. Mohamed, PhD**

*California Northstate University College of Pharmacy (CNUCOP)*

Dr. Mohamed is receiving this award in recognition of his outstanding teaching performance in the classroom and his creative aspects of pharmacology education. He

is an assistant professor in the College of Pharmacy at California Northstate University (CNUCOP) in his first independent faculty position where he also chairs the curriculum committee. He earned his PhD from the University of Georgia in the Clinical and Experimental

Therapeutics program and did postdoctoral training at Emory University before joining CNUCOP. An international pharmacy education professional with 15 years combined experience in both the USA and abroad, his teaching, scholarship, and academic service activities include team-based and problem-solving based case studies and learning pedagogies (TBL & PBL), 12 high impact original research publications, extra-mural research support and hands-on experience in PharmD curriculum and assessments design and ACPE accreditation. He has been a member of ASPET since 2019.

Dr. Mohamed will be acknowledged at the division's Town Hall meeting on April 9. Sign up to attend at <https://bit.ly/384TvpD>.



#### **Jennelle Durnett Richardson, PhD**

*Indiana University School of Medicine*

Dr. Richardson is receiving this award in recognition of her outstanding abstract in pharmacology educational research and her exceptional teaching performance in

the classroom. She currently serves as vice chair of education for the Department of Pharmacology and Toxicology at the Indiana University School of Medicine. She is the statewide pharmacology discipline consultant for the medical school and

directs pharmacology courses for physician assistant, anesthesiologist assistant, and graduate programs. She has contributed to the development, oversight, and continual improvement of the pharmacology curriculum. Dr. Richardson is particularly interested in increasing student engagement and has been innovative in her incorporation of technology in lectures and small group sessions. She earned her PhD from the University of Minnesota with concentrations on pharmacology and neuroscience and did postdoctoral training at Harvard Medical School. She has been a member of ASPET since 2014.

Dr. Richardson will be acknowledged at the division's Town Hall meeting on April 9. Sign up to attend at <https://bit.ly/384TvpD>.



## Division for Toxicology

### Career Award

The ASPET Division for Toxicology annually sponsors the Career Award to recognize outstanding original research contributions to toxicology by an established investigator.



**Debra L. Laskin, PhD**  
Rutgers University

Dr. Laskin is receiving this award in recognition of her substantial and seminal scientific contributions to our understanding of inflammatory mechanisms of tissue injury induced by chemical toxicants, and her

outstanding and highly regarded activities related to education and training. Dr. Laskin's most significant mechanistic contributions to toxicology have been in the areas of hepatotoxicity induced by acetaminophen and pulmonary toxicity induced by environmental pollutants, including ozone and particulate matter, and chemical warfare agents.

Dr. Laskin is Distinguished Professor and Chair of the Department of Pharmacology and Toxicology and the Roy Bowers Endowed Chair of Pharmacy at Rutgers University. She joined the faculty of Rutgers in 1982 and established a research program investigating inflammatory mechanisms of disease pathogenesis. Dr. Laskin has championed the premise that there

is a "dark side" to the innate immune system that can impact chemical toxicity outcomes. For over 35 years, she has led the fields of immunotoxicology and mechanistic toxicology with numerous seminal scientific contributions; she has also been recognized for her achievements by several other major scientific awards, including the Burroughs Wellcome Toxicology Scholar Award. Over this same time period, her laboratory has been continuously funded by NIH for her research, including a grant from NIEHS for 25 years, and a grant from NIAMS for 15 years, which supports the Rutgers University CounterACT Center of Excellence. Dr. Laskin publishes her team's high impact research in top tiered journals and disseminates their findings in numerous invited presentations around the world.

Dr. Laskin earned her PhD from Virginia Commonwealth University and did her postdoctoral training at the University of Pennsylvania. She has been a member of ASPET since 2010.

She will be honored during the ASPET Annual Meeting at EB 2021 on Friday, April 30 where she will present a lecture titled *Inflammatory Macrophages and Tissue Injury: Agents of Defense or Destruction?*



## Division for Toxicology

### Early Career Award

The ASPET Division for Toxicology annually sponsors the Early Career Award to recognize excellent original research by early career investigators in the area of toxicology.



**Julia Yue Cui, PhD, DABT**  
University of Washington

Dr. Cui is receiving this award in recognition of her record of scholarship, quality of publications, the creativity and novelty of her research, and her contributions to the field of toxicology as an educator.

Dr. Cui is an associate professor in the Department of Environmental and Occupational Health Sciences at the University of Washington. She is also the Sheldon D. Murphy Endowed Chair in Toxicology and Environmental Health. She earned her PhD in toxicology at the University of Kansas Medical Center and did postdoctoral training there in both the Department of Internal Medicine and the Department of Pharmacology, Toxicology and Therapeutics.

She specializes in using toxicogenomic and toxicogenomic approaches to determine the effects of environmental chemical exposure and reprogramming the gut microbiome on the transcriptional and epigenetic regulation of genes involved in drug metabolism and obesity during development. She utilizes and teaches new technology including RNA sequencing, germ-free mice, ChIP-sequencing,

epigenetics, and ultra performance liquid chromatography - tandem mass spectrometer (UPLC-MS/MS). She joined ASPET in 2017.

She will be honored during the ASPET Annual Meeting at EB 2021 on Friday, April 30 where she will present a lecture titled *Reprogramming the Gut-liver Axis by Targeting the Gut Microbiome*.



## Division for Translational and Clinical Pharmacology

### Early Career Awards

The ASPET Division for Translational and Clinical Pharmacology sponsors Early Career Awards to recognize excellence in translational and clinical pharmacology research that comes from early career scientists.



### Raghu Ganugula, PhD

University of Alabama

Dr. Raghu Ganugula is receiving this award in recognition for his contributions in elucidating the transport mechanisms and kinetics of next generation nanosystems intended for receptor

mediated drug delivery. He recently started in a tenure track faculty position at the University of Alabama in Tuscaloosa. He earned his PhD from Acharya Nagarjuna University in India and did postdoctoral

training at both the National Institute of Nutrition in India and at Texas A&M University.

Dr. Ganugula's expertise includes in vitro and in vivo pharmacology testing of novel bioactives and dosage forms. He has developed various biochemical and cell-based functional assays and has used various in vivo models to further test the efficacy of the bioactives or their dosage forms, e.g., diabetes, retinopathy, cataract, nephropathy, lupus, cancer, and obesity. He has been a member of ASPET since 2015.

He will be honored during the ASPET Annual Meeting at EB 2021 on Friday, April 30 where he will present a lecture titled *Double-Headed Nanosystem-Curcumin Therapy Ameliorates Hepatic Stress and Ocular Complications of Diabetes*.



### Adam E. Snook, PhD

Thomas Jefferson University

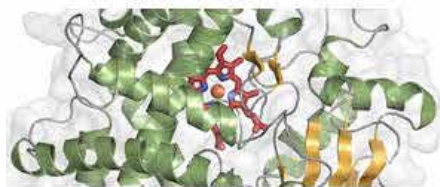
Dr. Adam E. Snook is receiving this award in recognition for his work in defining the events underlying colorectal cancer development to identify new strategies to prevent or treat gastrointestinal

cancers across the tumorigenesis continuum. He is an assistant professor in the department of pharmacology and experimental therapeutics at the Sidney Kimmel Medical College at Thomas Jefferson University. He earned his PhD in immunology and microbial

pathogenesis from Thomas Jefferson University and also did his postdoctoral training there.

Dr. Snook's work has led to 7 investigator-initiated clinical trials examining chemoprevention, cancer vaccines, and, in the near future, CAR-T cell therapies. He has authored over 80 book chapters and papers in several prestigious journals. His work has also been featured in *Nature*, *Forbes*, *Reuters*, *The New York Times*, *The Philadelphia Inquirer*, and others. He has been a member of ASPET since 2020.

He will be honored during the ASPET Annual Meeting at EB 2021 on Friday, April 30 where he will present a lecture titled *GUCY2C-Directed CAR-T Cell Therapy for Upper-GI Cancers*.



## Division for Drug Metabolism and Disposition

### On Resilience in the Lab, Scientific Curiosity, and the Future of In Vitro and In Silico Methodologies: An Interview

*Submitted by Lindsay Czuba, PhD, and D. Fernando Estrada, PhD*



Dr. Jane Kenny is enjoying a productive career as a Director of Drug Metabolism and Pharmacokinetics (DMPK) and a Principal Scientist at Genentech. Jane began her training as a pharmacologist while at the University of Liverpool, where she obtained her PhD in the lab

of Dr. Kevin Park. Jane has since continued to advance as an industry scientist with positions at AstraZeneca, and most recently at Genentech. Since 2015, she has led the in vitro/in silico absorption, distribution, metabolism, and excretion (ADME) group.

#### **How have you seen COVID-19 changing the way industry labs work?**

**JK:** As I know is the case across the biopharma industry, our primary focus has been to keep our teams at Genentech safe whilst advancing science for patients who are counting on us to deliver medicines. The pandemic has brought many challenges to us all, but I've personally been so inspired and heartened by the collaboration, the resilience and commitment I've witnessed throughout our organization.

When my lab shut down in the early days of the pandemic in the US, we were fortunate that a long-term CRO partner in another location, which had reopened with safe working practices in place, was able to quickly ramp up to continue our essential experiments. I'm also incredibly proud of my team; they truly embraced the flexibility and dedication that was needed to navigate this challenging time and

have been able to keep the majority of in vitro and computational ADME data flowing into drug discovery and development project teams whilst working under very different circumstances. Overall, we've proven that our teams can be very effective even whilst working from home – and we have all improved our tech savvy and learned to turn our cameras on!

#### **How do you suggest trainees prepare to become competitive for positions as industry scientists?**

**JK:** I think the key thing is to immerse yourself in your chosen facet of science and nurture your curiosity and passion for learning. When people are truly excited about their data and solving problems, it shines through. Get out there and share your work as often as possible with posters and presentations at meetings, many of which have student chapters and volunteer opportunities. Talk to fellow scientists and seek out areas for collaboration. Build your connections; utilize organizations such as ASPET, which have mentorship and education platforms, and the smaller meetings such as the Drug Metabolism Gordon Research Conference where you can spend extended time informally talking with scientists from many related disciplines. Internships are also a great way to get a true understanding of industry life whilst adding new skills and potential publications to your resume.

#### **With your extensive experience with DDI evaluation and predictive ADME studies, what do you think are the benefits and limits of our current in vitro and in silico approaches for predicting in vivo ADME?**

**JK:** This is a big question! Let me start with in vitro, where our capabilities have advanced so much over the years. We now have off-the-shelf, high-quality



cryopreserved cells and subcellular fractions across species with pooled donors, advances in co-culture systems affording many days of primary hepatocyte culture without loss of enzyme activity and increases in LC-MS/MS detection sensitivity. All of these are important tools which allow us to address a multitude of ADME questions in the small molecule world.

One area where we're still gaining understanding is how best to handle so called "beyond-rule-of-five molecules," or "medium-sized molecules" (i.e., molecules that are not traditional small molecules or antibodies/therapeutic proteins). Our well-established in vitro assay formats were not designed for these next generation modalities. This creates an exciting opportunity for in vitro scientists, as we're re-inventing our approaches.

It's also an extremely exciting time in the in silico field. Advances in computing power and machine learning are enabling us to tap into our large databases of in vitro ADME data in new ways. We can now use these data to build models that predict conceptual molecules and, importantly, link multiple parameters together with physiological relevance for early in silico mechanistic PK prediction. I can imagine a future in which the first ADME and PK data that guide teams is in silico, and then confirmation comes in vitro with advanced culture models including microphysiological systems. I'm very interested to see the evolution in how we build these tools for new modalities and future medicines beyond small and large molecules.

**How do you envision the future of drug development and pharmaceutical research and are there critical unmet needs that you think would improve DDI predictions?**

**JK:** I'm optimistic about the future and inspired by the critical work we've seen in drug research and

development this year. We've all witnessed first-hand the impact that diseases like COVID-19 can have on society, and the importance of scientific advances that enable both treatment and prevention.

I believe data will play an increasingly critical role in the future of R&D - generating, storing, mining, learning and extrapolating, at all levels from bench to bedside. The Simcyp simulator is an example of how tools evolve as data and scientific understanding advance. Over the years, this platform has developed from a DDI focus to a population-based simulator that integrates all aspects of in vitro ADME and PK to predict human clinical outcomes, integrating learning from pre-clinical species.

In terms of unmet needs for DDI prediction, a big advance would be a robust approach to reliably predict complex DDI, that is, simultaneous inhibition and induction at steady state, as well as metabolism-transporter interplay. Personally, I also want to better understand the mechanisms and translatability of in vitro CYP down-regulation.

**How has your interaction with the drug metabolism and disposition community been beneficial in your career?**

**JK:** I've been fortunate to have many great mentors and collaborators over the years, and several of these relationships have sprung from discussions at conferences with members of the drug metabolism and disposition community. Engaging in conversations with people who have different perspectives has expanded my horizons and challenged what I thought I knew. These interactions helped me think about problems from different angles and hopefully helped me to become a better scientist.

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## Division for Toxicology

### Talking Tox: An Interview with Dr. Bryan Yamamoto

*Submitted by Kalina Rivera & Brendan D. Stamper, PhD*



Dr. Bryan Yamamoto was the recipient of ASPET's 2020 Career Award in Toxicology. Dr. Yamamoto is the chair of the Department of Pharmacology and Toxicology and the Robert B. Forney Professor of Toxicology at the Indiana University School of Medicine. Research in

his laboratory focuses on how drugs of abuse affect brain neurochemistry. Over his illustrious career, Dr. Yamamoto has earned a reputation for being a thoughtful researcher, stellar educator, and passionate mentor. ASPET's Division for Toxicology would like to thank Dr. Yamamoto for his enthusiasm and willingness to share his experiences with us for this article.

**What drew you into the field of toxicology and why? Additionally, what sparked your specific interest in neurotoxicology?**

**BY:** My PhD thesis was on heavy metal neurotoxicity. I've always had a longstanding interest in neurodegeneration and neurodegenerative diseases. Neurotoxicology has provided me with a means and conceptual framework to study neurodegenerative disease and processes underlying neurotoxicity. I've been able to merge the two disciplines. In that context, I've actually used specific intoxicants, mainly drugs of abuse, as tools to study the processes underlying neurodegeneration.

**How has toxicology research changed throughout your career?**

**BY:** In the classic sense, toxicology has changed from being primarily focused on the identification

of poisons to more of a focus on issues like safety testing, hazard protection, and development of innovative testing methods to test possible intoxicants. It continues to evolve due to the availability of newer technologies, instrumentation, and molecular biology. Now, we're able to ask and answer specific mechanistic questions about the underlying causes of toxicant exposures. These aspects of toxicology continue to gain importance in public health as well as in drug development. For instance, once mechanisms underlying the toxicity are identified, a therapeutic drug could be developed to target those mechanisms. Therefore, the elucidation of mechanisms could very well help to identify possible therapeutics.

**In your opinion, what do you think has been the greatest contribution your research lab has given to the field of neurotoxicology?**

**BY:** My hope is that I train critical thinking scientists to enter the job market. I feel that is my biggest contribution. I have trained numerous students and postdocs to enter the job market whether it be in academia or in industry. It has been very important for me to keep in touch with those who have been in my lab and have entered the job market to get their feedback as to how I might modify my training methods to best prepare them for the job market. It has been informative because some people that I have trained in my lab have gone on to medical writing, an area unfamiliar to me. But I was pleased to hear how they use their training in toxicology and in pharmacology including experimental design and statistics. From an experimental perspective, my lab has examined how psychostimulant drugs of abuse have produced

brain injury through a confluence of metabolic, cytotoxic, and inflammatory mechanisms.

**How has your approach to mentoring future toxicologists evolved over your career, as an early investigator to becoming a more established PI?**

**BY:** Honestly, I think my career has evolved in a reverse sense from solely being a mentor early on in my career to being more of a mentee. The people that have been in my lab, my mentees, have taught me much more than I could have taught them. Over my career, my mentoring has focused more on the big picture. How do you think about science? How do you approach science? How do you approach scientific experimentation? Also, I encourage out-of-the-box thinking and the conceptualization of problems and ideas. It has been more about the big picture rather than details. That thought process helps to guide and focus you on important problems and helps move the field forward. It's easy to get lost in the details. Of course, we have to continue to pay attention to details and be very rigorous about how we approach our experiments, but it helps to have a long-term goal in mind to keep you motivated.

**What do you value most from your mentor-mentee interactions?**

**BY:** It really is the knowledge they impart to me and their differing viewpoints. It has been very beneficial in my development as a scientist and mentor. Each person and mentee approaches a problem differently, especially in the ways that they probe questions. The interactions with mentees have really been the most rewarding aspect of my career. It's really the diversity of thought that is important to recognize. For instance, when a student comes into my lab for the first time, I'll say to him or her "try it this way first but if you later have a way that's a little bit different that works for you, that is fine." We're constantly modifying our laboratory protocols based on input from new people joining the lab. It has shaped how we perform our day to day.

**As a teacher, mentor, and researcher, how has ASPET contributed to your career?**

**BY:** It has facilitated scientific exchange. Not only within my field of interest, but areas outside of my interests have been influential. I believe science moves forward by assimilating ideas and thoughts from other areas of interest and incorporating them into my particular area of focus. The national meetings from ASPET have provided those opportunities for scientific exchange. ASPET has provided opportunities to network with other scientists in toxicology and neuropharmacology. Interdisciplinary exposure at ASPET meetings has expanded the breadth and depth of my research and teaching and have provided new ideas for teaching, research and mentoring. The meetings have been very important in the development in my career and the careers of my mentees. Some students and postdocs in my lab have received travel awards to attend the national meeting, and it has been rewarding for them to get feedback and interact with other scientists. Hopefully we'll be able to resume in person meetings when this pandemic is over.

**What advice do you have for students interested in research?**

**BY:** Learn as much as you can. At times it's going to seem like you're drinking from the fire hose, but you really need to take in as much as possible. Some of the things that you may be learning right now you may think that you will never use. I was trained as a neuro-type, but in my pharmacology courses we had to learn about other organ systems that have now become an important aspect of my research. It is important to have a thirst for knowledge because it will serve you well in the future. Maintain a focus on the process of discovery and the scientific method; it will help sustain you. Overall, just enjoy the process and learn as much as you can!





# Chapter News

## Canadian Society of Pharmacology and Therapeutics (CSPT)

### Looking Forward in 2021

*Submitted by Dylan Burger, PhD, Chair, CSPT Publications Committee*

I think many of us were happy to finally put 2020 in our hindsight and look forward to the promise of 2021. We at the Canadian Society of Pharmacology and Therapeutics (CSPT) are no different. Beginning with the experience of hosting a virtual meeting in June 2020, we have significantly expanded our online activities. Most notably, we launched our first year-long webinar series.

Our inaugural offering, “An Update on COVID-19: Basic and Clinical Perspectives,” was highly successful. Offered free-of-charge in November 2020, the event attracted 143 registrants who gathered online to hear from two engaging speakers. The first presenter was Dr. Srinivas Murthy, a clinical associate professor in the Department of Pediatrics at the University of British Columbia and a principal investigator on the Treatments for COVID-19: Canadian Arm of the SOLIDARITY Trial (CATCO). Dr. Murthy provided a fascinating update on the current clinical standard of care for COVID-19 patients. The second speaker was Dr. Antonios Diab. Dr. Diab is a postdoctoral fellow with CSPT and in the College of Pharmacy, Dalhousie University. He presented an overview of the SARS-CoV-2 coronavirus, shared the natural history of COVID-19, and highlighted experimental pharmacological strategies being trialled for the prevention and treatment of COVID-19.

Building off our success, we are delighted to announce that we will be presenting a number of other webinars, including “Medical Cannabis: Roles in Women’s and Children’s Health” in January, the use of technology to teach pharmacology and therapeutics in professional programs in March, and studying rare diseases in children in May. We are pleased to be able

to provide our webinars free to CSPT members and look forward to interacting with you at these sessions.

Given the uncertainty of vaccine availability, the CSPT Scientific Program Committee made the decision to hold our annual meeting virtually again this year. The meeting will be held June 8 to 11, 2021. Further details and a call for abstracts will soon be issued and posted on our website. One highlight of our 2021 meeting will be our first “High Cost—High Value Drugs Summit.” The quickly evolving dynamic of high cost and high value drugs in children’s health care has created a number of challenges for children and their families, health care providers, and the health care system, as well as industry, government, researchers, and research funding organizations. Given the rapid and accelerating pace of change and the urgent need for innovative and collaborative approaches to ensure that Canadian children have continued access to safe and effective therapy, the CSPT is offering this innovative symposium to bring together key stakeholders from industry, academia, government, and patient and professional organizations to discuss collaborative strategies and possible approaches to ensuring access to therapy in the age of high cost and high value therapies. We look forward to using this as a launch pad for further discussion on this important issue and hope ASPET members from other chapters will choose to join us. ASPET members are being extended a conference registration rate on par with that available to CSPT members.

For more information, please visit us at [pharmacologycanada.org](http://pharmacologycanada.org) and follow us on social media: @pharmacologycanada.

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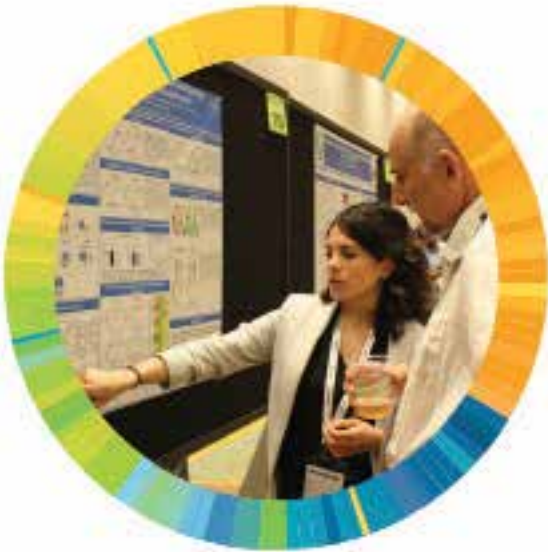
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