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Breaking Barriers: The Life and Work of Rosalyn Yalow

Inside:

2018 Annual Meeting

2017 ASPET/ADDC

Academic Drug Discovery
Colloquium

2017 ASPET/CNPHARS
Joint Meeting



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Message from The President

Dear ASPET Members,

It is a special honor and a privilege to begin my term as president of the American Society for Pharmacology and Experimental Therapeutics. My predecessor, our 85th president, David Sibley, PhD, deserves a thank you from all of us; he spearheaded the development of our strategic plan. Dave has been an outstanding role model, and his shoes will be impossible to fill. Fortunately, he will continue to serve as an officer of ASPET for an additional year in his role of past-president. I am especially grateful that I will be able to rely on both his counsel and that of our president-elect, Eddie Morgan, during my term.

In my role as president-elect this past year, I participated in many of our society's committee meetings. This provided me with a chance to learn first-hand about many of the important activities in which ASPET is currently involved. Thanks to the hard work of all of our committees, Council leadership, and our outstanding staff, led by Judy Siuciak, PhD, ASPET is in very good shape.

Everything we do is for our members, and we have worked hard over the past year to ensure excellence for ASPET and the strategic plan, which embodies that desire. The strategic plan will be a template, reflecting our current strategies to ensure a strong future for pharmacologists and the Society. This document is not static, but will be malleable according to our society's current and future needs. I encourage you to visit the [ASPET website](#) to read it, if you have not already, and more importantly, I look forward to your input as we develop an implementation plan over the coming months.

Under the watchful eye of Charles Rutledge, chair and Matthew Hilliker, ASPET's chief financial officer, our investment subcommittee has done a terrific job of shepherding the Society's reserve funds. And this year (as part of strategic planning), a financial task force developed recommendations that will help us to continue our good stewardship of these resources. The reserve funds generate income that supports many of our activities, including staffing, as well as enabling outstanding programs such as the Washington Fellows program, where advocacy is learned first hand; the Summer Undergraduate Research Fellowship (SURF) program, which is celebrating its 25th anniversary this year; and over 125 travel awards for students and postdocs to attend our annual meeting.

The Science Policy Committee has been ably led by Annette Fleckenstein, and now Ken Thummel, and their efforts are facilitated by the enthusiasm and dedication of Susanna Aguirre, ASPET's manager of government affairs and science policy. They have led the charge and guided the committee's activities with great leadership. Relationships have been fostered with members of the U.S. Congress, as well as with representatives of all of the institutes at the NIH (National Institutes of Health). Examples of the committee's efforts range from ASPET's statements on the FY2018 budget blueprint and full budget, to thanking Congress for their support (*Wall Street Journal* and *Politico* advertisements), to congressional testimony on the value of sustained NIH funding. Our advocacy will ensure that investigator-initiated, evidence-based research remains a top priority for our elected officials and that the interests of pharmacologists are heard. I encourage you to visit the [ASPET website](#) to view highlights of our advocacy activities.

A major effort of mine will be to work with the Board of Publications Trustees, Rich Dodenhoff, ASPET's journals director, and our editors, to develop measures to raise the profile and value of our journals. As one of you said in response to the 2016 member survey: they are our lifeblood, and I believe this as well. They are a vital resource

and provide over 70% of the revenue for our society. Our journals should provide a face, an identity, essential for pharmacologists and the scientific community to cite.

I firmly believe that one of our priorities as a scientific society is to address the needs of our younger members and provide opportunities for them to develop their careers. One step in that direction is to provide a clear career path. The trajectory to a career in pharmacology is not obvious as few undergraduate programs in our field are available. However, ASPET's programs to enhance undergraduate engagement have been growing; especially by the recent efforts of Catherine Fry, PhD, ASPET's director of education, but also by members including Carol Beck, PhD, and Catherine Davis, PhD, who developed ASPET's "Big Ideas" initiative that expands opportunities for undergraduate engagement at ASPET's Annual Meeting at Experimental Biology, including travel awards and opportunities for networking and professional development. I would like to also highlight an initiative to support graduate students, conceived and designed by the Young Scientists Committee (spearheaded by Ore Adedoyin, PhD, and Eman Gohar, PhD, with YSC Chair Karen Tonsfeldt, PhD) called Partnering for Success (PfS). The PfS initiative includes the encouragement of first time EB meeting attendees (typically students) and provides them with chances to network and be mentored by postdocs attending the meeting. By all metrics, this has been a tremendous success. I further encourage these young scientists to share their research and academic experiences and, importantly, I would love to hear from you.

So, why should you be an ASPET member and support this society? ASPET is devoted to promoting the discipline of pharmacology. This means using all of our resources to expand and improve scientific exchange and to train and mentor all levels of scientists from the young embarking on their careers, to established scientists, to those in-between. Our resources are used to provide venues for members to share their findings - in person at ASPET's Annual Meeting at EB, in print, and online. In these challenging times, ASPET unites our voices to advocate for biomedical research.

Warm regards,

A handwritten signature in black ink, appearing to read "John D. Schuetz", written in a cursive style.

John D. Schuetz, PhD
President, ASPET



Meeting Highlights

Join us in **San Diego** next spring for the ASPET Annual Meeting at Experimental Biology 2018. The meeting will be held at the San Diego Convention Center from **April 21-25, 2018**.

The ASPET program includes a wide variety of scientific symposia with invited and abstract-based speakers, award-winning lecturers, poster sessions, division-focused sessions, education and career development sessions, a student and postdoc

poster competition, and numerous mixers and networking events.

At the annual meeting, you will learn about the latest developments in your field. Not only will your participation help you gain scientific information, but it will also bring you in contact with others from your scientific community who can advise you on research issues and career concerns.

5 Reasons to be in San Diego for EB 2018

- 1) **Hear the latest cutting-edge science** at 50 ASPET sessions and more than 300 EB host society sessions that will add a new dimension to the work in your lab or office.
- 2) **Present your own research** and receive feedback from experts across the globe.
- 3) **Interact face-to-face** with current and potential collaborators and mentors in the ASPET member lounge or at ASPET division mixers.
- 4) **Put yourself in the path** of pharmacology experts, NIH directors, journal editors, and potential employers.
- 5) **Grow the non-research skills** that are critical for professional scientists at all levels with career-focused training workshops in the EB Career Center as well as specific pharmacology career development opportunities.





Register by
Tuesday, February 27, 2018
 to obtain the deepest discount.
www.aspet.org/eb2018

The ASPET 2018 Annual Meeting Website

Visit the ASPET website at www.aspet.org/eb2018 to access full information on the meeting program, abstracts, speakers, special events, and sponsorship opportunities. Be sure to bookmark the website and visit often as content is updated frequently.



Call for Pharmacology Abstracts

We encourage submission of abstracts to ASPET topic categories in all areas of pharmacology detailing your latest work. Members can submit their own work or sponsor the work of graduate students, undergraduates, and non-members.

Travel award and poster competition eligibility is based on student and postdoc submission to ASPET topic categories.

Submit an abstract by Thursday, December 7, 2017.

www.aspet.org/eb2018

ASPET Abstract Topic Categories

We are specifically seeking abstracts in the following research areas:

- Cancer Pharmacology
- Cardiovascular Pharmacology
- Cellular and Molecular Pharmacology
- Central Nervous System Pharmacology
- Drug Discovery and Development
- Drug Metabolism and Disposition
- Pharmacogenomics and Translational Pharmacology
- Pharmacology Education
- Toxicology
- Pharmacology – Other

Special Events

- Daily datablitz of research presentations in ASPET poster hall
- Presentation of the ASPET Scientific Achievement Awards
- Nightly division mixers
- The return of the popular ASPET member lounge
- The *Shop ASPET* store open in ASPET booth #602

Members take a break from sessions in the ASPET member lounge at EB 2017.



ASPET Oral Presentation Awards from Divisions

Application Deadline: Thursday, December 7, 2017

Divisions will select finalists for their oral presentation awards from eligible abstracts submitted to their designated ASPET abstract topic categories. **No separate application is necessary.** To be considered, you must be an ASPET member, the first/presenting author, and a graduate student or postdoctoral fellow.

- Division for Cancer Pharmacology
- Division for Cardiovascular Pharmacology
- Division for Drug Metabolism and Disposition
- Division for Molecular Pharmacology (Postdocs only)
- Division for Neuropharmacology (Postdocs only)
- Division for Translational and Clinical Pharmacology

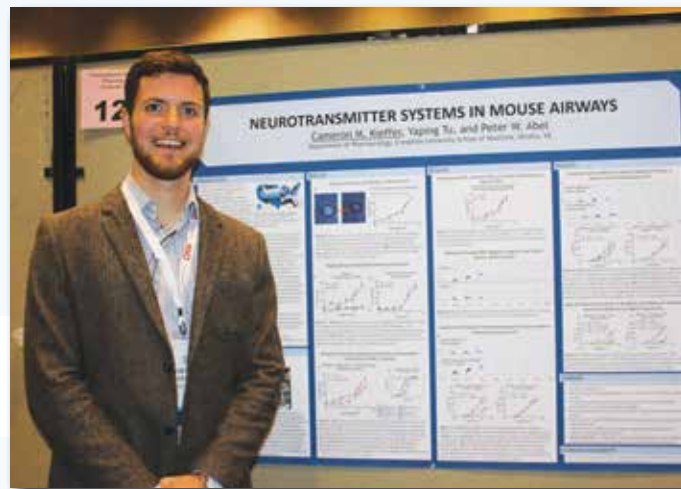
For more information and to apply, visit <http://bit.ly/2xjl1Pw>.

ASPET Student-Postdoc Poster Competition

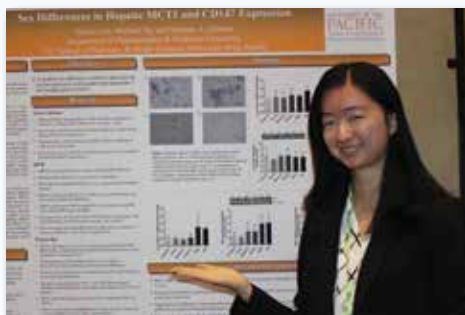
Application Deadline: Friday, December 8, 2017

The ASPET Poster Competition is open to ASPET members who are postdoctoral fellows, graduate students, and undergraduates. Those who want to participate need to submit an abstract to EB 2018 in an ASPET topic category by the EB deadline of Thursday, December 7, 2017 and they must also apply separately through ASPET's award portal by Friday, December 8. Selected finalists will present their research at the Poster Competition on Sunday evening, April 22, 2018.

For more information and to apply for the ASPET Poster Competition, please visit: <http://bit.ly/2xjl1Pw>.



Student and Postdoctoral Poster Competition at EB 2017.



ASPET Travel Awards to Experimental Biology

Application Deadline: Friday, December 8, 2017

Undergraduate students, graduate students, and postdoctoral fellows are invited to apply for a Travel Award to help defray the costs of registration, travel, and housing to attend the ASPET Annual Meeting at EB 2018. Travel awards are only open to ASPET members, and you must also submit an abstract to EB 2018 in an ASPET topic category by the EB deadline of Thursday, December 7, 2017.

For more information and to apply for a travel award, please visit: <http://bit.ly/2guBRUf>.



ASPET members received travel awards to attend EB 2017.

Preliminary Program

For additional program details, visit <https://aspet.org/eb2018>.

Lectures

Julius Axelrod Award in Pharmacology Lecture

Unraveling the Molecular and Structural Determinants of GPCR Functional Selectivity; Potential for Drug Discovery

Keynote: Michel Bouvier, Université de Montréal

Ray Fuller Award Lecture

Sponsored by the Division for Translational and Clinical Pharmacology

Keynote: George Christ, University of Virginia

Keynotes to be announced in January 2018:

- John J. Abel Award in Pharmacology Lecture
- Goodman & Gilman Award in Receptor Pharmacology Award Lecture
- Otto Kraye Award in Pharmacology Lecture
- P.B. Dews Lifetime Achievement Award for Research in Behavioral Pharmacology Lecture
- Bernard B. Brodie Award in Drug Metabolism Lecture
- Paul M. Vanhoutte Distinguished Lectureship in Vascular Pharmacology

Symposia and Special Sessions

ASPET Presidential Symposium:

Deadly Liasons: Squeezing the Life Out of Cancer

Julius Axelrod Symposium:

The Pluridimensionality of G Protein-Coupled Receptor (GPCR) Signaling

ASPET Board of Publications Trustees Session:

Journals Workshop: Hear It from the Editors

ASPET Council BIG IDEAS Initiative:

Surmounting the Insurmountable: Obstacles in Drug Discovery and Development - Real World Case Studies



In Collaboration with the British Pharmacological Society (BPS):

Computational Approaches to G Protein-Coupled Receptor Structure and Function



Mentoring and Career Development Committee Events:

- Graduate Student - Postdoctoral Colloquium
- Diversity and Inclusion Breakfast

Division for Behavioral Pharmacology (BEH)

- *Bath Salts: The Ever-changing Landscape of Synthetic Cathinones*
- *Pro-psychotic Effects of Drugs of Abuse*
- Division Programming Symposium



Division for Cancer Pharmacology (DCP)

- *The Microbiome and Cancer*
- *Can Metabolic Vulnerabilities in Tumors be Therapeutically Exploited?*
- Division for Cancer Pharmacology – Young Investigators Symposium



Division for Cardiovascular Pharmacology (CVP)

- *Update on the Gaseous Signaling Molecules NO, H₂S, and CO*
- *Cardiovascular Consequences of Metabolic Targeting in Obesity*
- *RNA Binding Proteins in Cardiovascular Disease*
- Division for Cardiovascular Pharmacology Trainee Showcase



Division for Drug Discovery And Development (DDD)

- *Epigenetics in Drug Discovery*
- *Clinical Paths for Soluble Epoxide Hydrolase Inhibitors*
- *Computational Approaches to G Protein-Coupled Receptor Structure and Function*
- *University Startups: From Invention to Commercialization*



Division for Drug Metabolism And Disposition (DMDD)

- *Tissue Free Drug Concentrations*
- *Humanized in vitro and in vivo Models in Drug Discovery and Development*
- *Transporters at the Blood-CNS Barriers*
- Division for Drug Metabolism and Disposition Awards and Junior Investigator Platform Session



Division for Molecular Pharmacology (MP)

- *G Proteins and G Protein-Coupled Receptors in Cancer*
- *Adhesion GPCRs as Neurotherapeutic Targets*
- *The Organization of Signal Transduction and its Impact on Receptor Function*
- Division for Molecular Pharmacology Postdoctoral Scientist Award Finalists



Division for Neuropharmacology (NEU)

- **Nancy Zahniser Memorial Symposium:** *The Dopamine Transporter in Health and Disease*
- *There's Always Room for Dessert: Examining the Effect of Insulin and High Fat Diet on Neurotransmission, Motivation and Cognition*
- Division for Neuropharmacology Postdoctoral Scientist Award Finalists



Division for Pharmacology Education (DPE)

- *Assessing Pharmacology in Integrated Curricula*
- *Bringing Basic Sciences into Clinical Education*
- **Teaching Institute:** *Flipping Not Flopping: Active Learning Strategies for Graduate and Healthcare Pharmacology*



Division for Toxicology (TOX)

- *Placental Xenobiotic Metabolism and Transport*
- *The Bright and Dark Side of Nrf2 for Tissue Protection*
- Division Programming Symposium



Division for Translational And Clinical Pharmacology (TCP)

- **Ray Fuller Lecture and Symposium:** *State-of-the-Art on Regenerative Pharmacology: The Future is Now*
- Young Investigator Awards Platform Session and Early Career Faculty Showcase
- *Challenges and Promises of CNS Orphan Drug Development: Stories from Bench to Clinic*



ASPET 2018 Guest Societies at EB:

Behavioral Pharmacology Society
 British Pharmacological Society
 Global GI Club
 International Transmembrane Transporter Society

Give a Day of Service at EB 2018

Since 2009, ASPET members attending Experimental Biology have given a day of volunteer service in the local communities where we convene. Volunteer activities have ranged from home construction to painting, cleaning, stocking, food preparation, and food service.

At EB 2018, we will spend the day at St. Vincent de Paul Village, helping the dedicated people at Father Joe's Villages provide assistance to San Diegans in need.

If you plan to join us, please contact Charles P. France at your earliest convenience at france@uthscsa.edu or 210-567-6969. Space is limited and further details will be provided to those who express an interest in volunteering.



ASPET volunteers donate their time at Pacific Garden Mission during EB 2017 in Chicago.



ASPET Launches New Website

Over the last year, ASPET has been working on upgrading the Society's website to provide a more user- and mobile-friendly experience for our members. As part of the upgrade, ASPET conducted a thorough review of the web contents, navigation, and user experience. Members were invited to participate in online navigation exercises to help us understand and improve their online experience on the ASPET website. We listened to your feedback and are proud to present ASPET's new and improved website. Visit the new site at www.aspet.org.

The new site features expanded menus for easier navigation, a seamless and more convenient way to access the members-only portion of the website including our awards submission portal, and responsive design, which provides a better website experience on mobile devices and tablets. It will also be easier to find pharmacology-related events, browse ASPET merchandise, keep your member account up to date, and keep up to date with ASPET's journals. Be sure to check out the new website and tell us what you think at membership@aspet.org.



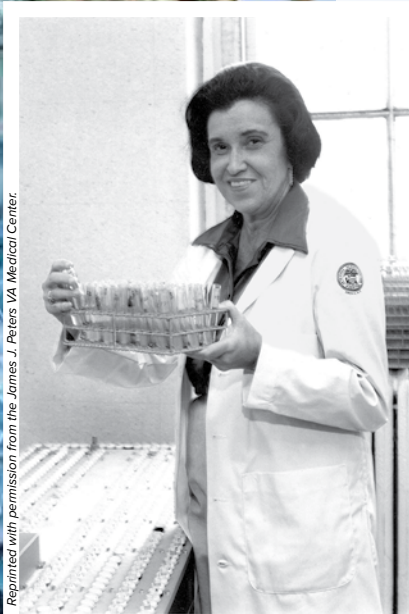
Find J.J. and Win a Prize

J.J. the ASPET donkey is hiding in 5 places around the ASPET website. Navigate through www.aspet.org to find him and email membership@aspet.org with a list of the pages (URLs) where you found him. Those who submit a list will be entered into a raffle to win a \$25 Amazon gift card! Raffle ends October 31, 2017.

Breaking Barriers:

The Life and Work of Rosalyn Yalow

Rebecca J. Anderson, PhD



Reprinted with permission from the James J. Peters VA Medical Center.

Rosalyn Yalow

Forty years ago, Rosalyn and Aaron Yalow sat across from each other at a long banquet table in Sweden. Rosalyn had been invited from among the Nobel laureates to deliver the traditional address to university students at the beginning of this royal banquet (1, 2). The young man assigned to escort the speaker had been given a seating chart, which showed two Dr. Yalows. He strode into the room wearing his crisp student uniform and confidently stood behind Aaron, assuming he was the speaker.

Rosalyn threw back her head in laughter. She rose and proceeded to the end of the long table. The red-faced student trailed along the opposite side, to the muffled amusement of the assembled notables. When he reached the end, she took his hand and whispered something that restored his self-esteem. Then, *she* escorted *him* to the podium.

This one anecdote sums up Rosalyn Yalow: researcher, mentor, spokesperson for science, and mother. Rosalyn's road to Stockholm was cluttered with obstacles, but she took no detours. She accomplished everything she set out to do, both in her career and her personal life, no matter how formidable the challenges. And she did it her way.

Driven by Ambition

Rosalyn came from a family of strong women. Her grandmother, Bertha, defied her prominent and affluent German family by marrying a tradesman. The couple immigrated to the US when their daughter, Clara, was

four years old (3). After bouncing around the US, the family settled in New York City. Bertha had been well educated in Germany, but the family's nomadic travels through Europe and the US to find a place to make a living left Clara with only a sixth-grade education (2).

Clara was the most defiant of Bertha's six children. She had boundless energy and inherited her mother's pluck. Both were tall, strong, and intelligent (2). And like her mother, Clara married a hardworking tradesman, Simon Sussman. The Sussmans lived on the Lower East Side of Manhattan, where Rosalyn Sussman was born in 1921. Even as a child, Rosalyn showed the same matriarchal characteristics as her elders. She was outspoken, supremely confident, and fearless. Her brother called her "The Queen Bee" (2).

For Rosalyn, learning shorthand was a small concession for a career in science.

Although both Simon and Clara lacked a high school education, they were voracious readers and never doubted their two children would complete college (3). Rosalyn excelled in mathematics and chemistry at Hunter College, the college for women in the New York City system. In her last semester, Hunter College added physics to their curriculum and in January 1941, Rosalyn became the first student to graduate with a major in this discipline (2, 3).

Nuclear physics was the hottest scientific field at the time, and Rosalyn wanted to be a part of it. With the encouragement of her professors, she applied to a number of graduate schools. But as a Jewish woman, her acceptance into those programs with financial support was unlikely (3).

Jerrold Zacharias, one of her Hunter professors and, later, a physicist with the Manhattan Project, recommended her to Rudolf Schoenheimer, a leading biochemist at Columbia University's College of Physicians and Surgeons. Rosalyn excelled at typing as well as chemistry, and she accepted Schoenheimer's offer

Rosalyn Yalow and Aaron Yalow in the 1940s.



as his part-time secretary. The job's fringe benefit was the opportunity to take graduate courses at Columbia, but shorthand was a job requirement (3). For Rosalyn, learning shorthand was a small concession for a career in science.

In February 1941, she was accepted in the physics graduate program at the University of Illinois, along with a teaching assistantship of \$70 per month and free tuition (2). She could hardly believe it—Illinois was the most prestigious school she had applied to. She immediately quit her shorthand course but continued the secretarial job until June (3).

Becoming a Physicist

Rosalyn always maintained that World War II, which provided opportunities for so many women, had made her career possible. But the US had not yet entered the war, and she was the only woman in the university's College of Engineering. In fact, she was the first woman there since 1917 (3).

To supplement her limited physics background, she had taken two physics courses at New York University during the summer (3). Even so, she was still at a disadvantage, compared to her first-year classmates. In the fall term, she audited two undergraduate courses, in addition to her three graduate courses (2, 3).



Rosalyn Yalow on her wedding day.

Her teaching assignment was a freshman physics course. Like the other first-year teaching assistants, she had never taught before. But unlike them, she identified a young instructor who had an excellent reputation and refined her teaching skills by observing him in his classes (2, 3).

For her thesis research in nuclear physics, Rosalyn spent long days and many nights in the laboratory. In the process, she learned to make and use apparatus for measuring radioactive substances—skills that were in high demand during the war. She earned her master's degree in 1942 and her Ph.D. in February 1945 (2-4).

Because commercial instrumentation did not exist, she made or designed much of the equipment they used

In addition, Rosalyn had met and married a physics classmate, Aaron Yalow. Although he had arrived better prepared for graduate school, she finished a full semester before him—and everyone else in their class. With the war still raging, she took a position in New York City in the Federal Telecommunications Laboratory of IT&T, a European firm. She was the lab's only female engineer (3, 4). In September 1945, Aaron finished his Ph.D. degree, joined her in New York, and accepted a position in medical physics at Montefiore Hospital in the Bronx (2).

After the war, the IT&T research group moved to Europe, and Rosalyn returned to Hunter College as a temporary assistant professor. She taught physics to the undergraduate women and to returning veterans in a pre-engineering program that had been established under the GI Bill (3, 5). But the job did not fill her time or further her research interests.

Applied Research

Researchers were increasingly being drawn to peaceful applications of radioactivity, particularly for clinical diagnosis

and therapy (4). This emerging field of nuclear medicine needed nuclear physicists who knew how to produce and handle radioisotopes (2). At Aaron's suggestion, Rosalyn met with Edith Quimby, a leading medical physicist at Columbia's College of Physicians and Surgeons, and arranged to observe Quimby's lab workers (2, 3). Everyone noticed Rosalyn, who was analytical and quickly learned clinical radioisotope tracer techniques (2-4).

One day, Quimby received a call from Bernard Roswit, Chief of Radiotherapy at the Bronx Veterans Administration Hospital. Roswit was seeking advice about starting a clinical radioisotope service (2, 4). Quimby took Rosalyn to see her boss, Giocchino Failla, a pioneer in biophysics and radiobiology. After a short discussion, Failla picked up the phone and said, "Bernie, if you want to set up a radioisotope service, I have someone here you must hire" (3).

Roswit had already launched the Radioisotope Unit at the Bronx VA Hospital, but little was done until Rosalyn arrived in December 1947 (2). She was still teaching full-time at Hunter College, but this energetic part-time consultant soon turned an old janitor's closet into a functioning radioisotope service (3, 5).

For Rosalyn's research aspirations, the timing could not have been better. Paul B. Magnuson, the new



Reprinted with permission from the James J. Peters VA Medical Center.

Old Bronx VA Hospital

Chief Medical Director of the Veterans Administration, was transforming what had been old soldiers' and sailors' homes into a progressive healthcare system of VA teaching hospitals linked to universities. He saw the synergistic value of close interactions between medical practice and clinical research (2).

In addition to producing radioisotopes for the hospital, Rosalyn collaborated on research projects with Roswit and other VA physicians. Because commercial instrumentation did not exist, she made or designed much of the equipment they used (4). These early collaborations produced eight publications describing various clinical applications of radioactive isotopes (2, 3).

In January 1950, Rosalyn left her teaching position at Hunter College and joined the Bronx VA full-time (3). The first physician under whom she worked—not seeing a career path in nuclear medicine—quit after only six months in the unit. Although Rosalyn was still navigating her way through clinical research, the open position gave her the opportunity to define his replacement. The young physicist had already gained Roswit's respect and confidence, and he approved her request to seek a physician who would complement and support her nuclear medicine research (2).

The Partnership

Rosalyn went to Bernard Straus, the Bronx VA Chief of Medicine, and asked for his recommendation. They had already met. She had attended his conferences to improve her understanding of biology and medicine, and he had been impressed by her questions. She was focused, thought quantitatively, and spoke with precision (2).

At this meeting, though, Straus discovered she had other skills. This confident woman knew how to work the system, had common sense, and understood that the new hire would be her boss (2). Her goal, which Roswit supported, was to build an independent Radioisotope Service, separate from the Radiology Department's Radiotherapy Service. She wanted someone who would be a partner in reaching that goal.

Straus recommended Solomon Berson. After Berson completed his residency in internal medicine under Straus, they had become good friends. They shared many interests beyond medicine, including music, history, and art (2). Berson was charismatic, a

violinist, and played a strong game of chess. He had been Straus's very best resident, but he had a quick temper and was impatient with those who could not keep up with his sharp mind and deep insight on medical and scientific matters. Those traits undercut his effectiveness as a private practice physician, and he was considering a job offer from the VA hospital in Bedford, Massachusetts (2, 5).

Berson complied with his friend's request and met with Yalow in the spring of 1950 (3). According to both of them, their partnership was forged at first sight. Yalow recalled, "After half an hour I knew he was the smartest person I had ever met" (2). Berson was equally impressed with Yalow, and he canceled his plans to move to Massachusetts (2, 5).

Soon after Berson joined the Radioisotope Service in July 1950, Yalow gave up her other collaborations (3). Neither of them had specialized postdoctoral training in research, but they learned from each other. Yalow's expertise spanned chemistry, mathematics, nuclear physics, and training as an engineer. Berson had vast clinical knowledge, deftly applying his biological insights of physiology and anatomy to clinical medicine (4). They also unflinchingly disciplined each other. "We were probably each other's severest critic" (3).

Clinical Problems to Solve

Their first investigation used radioisotopes to develop a satisfactory method for estimating circulating blood volume (6, 7). Their results resolved much of the confusion about blood volume measurements made with earlier and less accurate methods (2).

Berson may have been Yalow's boss, but from their first paper, which was published in July 1951, titles played no role. Authorship was determined only by their relative contributions to the work. Sometimes, Berson was first author. Other times, it was Yalow.

They next applied their technique to trace the distribution of albumin and other serum proteins tagged with ¹³¹I. They developed mathematical constructs and experimental methods for measuring protein clearance rates, as well as the rates of protein synthesis and degradation (3, 4). They also evaluated albumin versus globulin as plasma expanders (2, 3).

In parallel with these studies, Yalow and Berson began studying thyroid function. Other investigators



Apparatus designed by Rosalyn Yalow to measure thyroid uptake of radioactive iodine.

had given radioactive iodine orally to diagnose hypo- and hyperthyroidism, but the procedure took several days, and the results were difficult to interpret (2). Yalow and Berson injected ^{131}I intravenously to assess iodine uptake by the thyroid gland and plasma clearance. As she had done for their other studies, Yalow designed the instrument for measuring radioactivity over the thyroid gland (2, 8).

Their method determined plasma clearance and thyroid uptake rates of ^{131}I in a single 35-minute sitting and was independent of various extraneous factors. This direct and reliable index of thyroid function was immediately hailed as “the most important contribution to the problem of diagnostic tracer procedures” yet published (2).

The study, which incorporated data from 110 subjects, had been brilliant in concept, meticulous in design, and backed up by thorough mathematical analyses—features that became the hallmark of all their work.

Insulin

In 1954, Berson was named chief of the first independent Radioisotope Service in the VA system. Yalow and Berson had the freedom to pursue any research direction they wished, but they were still responsible for running the Bronx VA Hospital’s nuclear medicine service. This included producing radioisotopes and providing a full range of lung, brain, liver, thyroid, and bone scans, as well as running a thyroid clinic using their new 35-minute technique (2, 3).

They masterfully juggled their service and research activities and took pride in running their small mom-and-pop shop without ever submitting a grant proposal. Their research was funded entirely through their modest departmental budget and the VA Medical Research Program (2, 3).

Yalow and Berson’s experience with serum proteins and radiolabeled iodine could be applied to studies of other circulating proteins. With its great sensitivity and accuracy, a radiolabel could, potentially, measure small peptides that were present in the blood in very low concentrations, such as hormones. While they continued to investigate thyroid function, Yalow and Berson increasingly turned their attention to the small peptide hormone, insulin (1).

Neither of them had any special expertise with insulin. Berson’s internal medicine residency included a working knowledge of endocrinology. Rosalyn’s understanding was limited to personal observations of Aaron, who had been diagnosed with type 1 diabetes at the age of 12 and took insulin daily (2).

They chose insulin over other hormones because of a large unmet medical need. Next to hyper- and hypothyroidism, diabetes was the most common endocrine disorder. Yet, insulin metabolism was largely a mystery (4). Their decision was also influenced by feasibility. Insulin was the hormone most readily available in highly purified form (2, 3).

Type 1 diabetes is characterized by a lack of insulin production by the pancreas. On the other hand, the pancreatic beta cells in type 2 diabetes are normal, and no one knew why those patients’ blood sugar was too high. In 1952, I. Arthur Mirsky proposed that, in type 2 diabetes, insulin disappeared from the bloodstream faster than normal, perhaps due to aggressive degradation by an insulin-metabolizing enzyme in the liver (1, 3, 4).

Yalow and Berson could easily test Mirsky’s hypothesis by measuring the plasma clearance of radiolabeled insulin. They injected ^{131}I -labeled insulin into diabetic and non-diabetic subjects and measured the radioactive counts in blood samples collected over several hours (1, 4). To their surprise, the ^{131}I -labeled insulin remained in the blood of diabetic patients longer, not shorter, than in the blood of the control subjects (9).

This refuted Mirsky’s hypothesis, and Yalow and Berson wanted to know why. An important clue came from another puzzling observation: The rate of

disappearance of ^{131}I -insulin was the same in control subjects and in diabetic patients who had never been treated with insulin (9).

Antibody Breakthrough

Their brainstorming approach to this problem was the same intertwined collaboration that characterized all of their studies. Yalow and Berson shared an office that opened into their lab. Their desks were pushed together so that they faced each other across a large, cluttered surface of books and papers—more cluttered on his side. Speculations, new approaches, and inventive methods would fly between them, and then they would go to the lab and try it. The resulting experiments were so integrated that it was impossible to dissect who came up with which idea or technical solution (2).

They had some technical help, but they preferred to do the radiolabeling themselves. In a kind of ritual in the iodination room, they chatted about buffer ionic strengths or binding site saturation, as they pipetted and handed small vials back and forth (2).

Yalow and Berson spent more time at the lab bench than anyone else, tediously processing and analyzing radioactivity in urine, plasma, and packed red blood cells. Day and night, they did electrophoretic separations in the cold room, centrifuged and washed hundreds of protein precipitates, cut and pasted countless electrophoresis strips, and changed thousands of tubes in the radiation counter (2, 4).



Benjamin Yalow

Rosalyn Yalow working in her Bronx VA Hospital lab.

Hammering out some technical kinks took weeks. Others took months. To speed up the electrophoresis, they developed innovative methods using both paper and thin layer chromatography. In the end, they discovered that ^{131}I -insulin in the blood of insulin-treated patients was not “free” but rather was bound to a gamma-globulin (1, 9).

They immediately speculated that this gamma-globulin was an antibody. At that time, both type 1 and type 2 diabetic patients were treated with insulin extracted from animal pancreatic tissue. (Bovine insulin differs from human insulin by three amino acid residues, and porcine insulin differs by one.)

Convincing the scientific community that the isolated gamma-globulin was an antibody proved to be difficult

Further experiments in animals and testing plasma from patients supported their conclusion that patients who had been repeatedly treated with bovine or porcine insulin developed insulin-specific antibodies. Antibody binding explained the increased plasma half-life of insulin in these patients (3, 5).

Yalow and Berson’s 20-page report is so comprehensive it could pass as a doctoral dissertation. It presented the first direct proof that such a small protein (i.e., insulin) could stimulate an immune response (4).

However, convincing the scientific community that the isolated gamma-globulin was an antibody proved to be difficult. Reviewers and journal editors initially rejected their manuscript because they said insulin was simply too small to confer immunogenicity (1, 3).

Conventional wisdom at that time asserted that only large proteins could be antigenic. In addition, the only way to identify an antibody was to observe the large antigen-antibody conglomerates that form and precipitate out of solution. Soluble antigen-antibody complexes of smaller proteins were invisible and more difficult to detect. Many experts thought they simply did not exist (2).

A flurry of correspondence flew back and forth for several months (1). Finally, the two sides reached a compromise. Yalow and Berson agreed to replace “antibody” in the title of their paper with “globulin.” In the text, though, they called their binding gamma-

globulin an antibody, noting that it met the definition of “antibody” as stated in a standard textbook of bacteriology and immunity (1, 3, 9).

After the paper was published in 1956, other researchers quickly confirmed Yalow and Berson’s observations, and it caused a paradigm shift in immunology. Their sensitive radioisotopic technique detected soluble antigen-antibody complexes, which proved that even small peptides like insulin can be antigenic, and launched a new era in immunology research.

By demonstrating that animal-derived insulins trigger antibody production and that those antibodies attenuate insulin’s effectiveness, Yalow and Berson’s results led to improved diabetes treatment. It would be better for diabetic patients to take human insulin, which would not generate antibodies. Today, manufactured insulin is genetically engineered to be precisely the same as human insulin (4, 5).

Yalow and Berson’s main objective was to isolate, identify, and quantitate the gamma-globulin (i.e., the insulin antibody) that they found in the patients’ blood. But they reported another important observation in their 1956 paper. The binding of ¹³¹I-labeled insulin to a fixed concentration of antibody is a quantitative function of the amount of insulin present (9). They realized that they could reverse their procedure and use the antibody to measure the amount of insulin in a patient’s blood (1).

RIA Is Born

Yalow and Berson spent the next three years developing a practical method for measuring insulin in circulating blood. They optimized the conditions for antibody production and found that guinea pigs were the best species. Early in the morning, before anyone else arrived, Yalow would take each guinea pig from its cage and cuddle it, thinking that happy animals would produce high quality antibodies. When the animals were injected with antigen or bled for their antibody-containing blood, she would gently hold, stroke, and calm each one (2).

They systematically evaluated the species specificity of antibodies triggered by cow, pig, horse, and sheep insulins. Next, they honed their assay, first in rabbits and then with human blood samples (1). The work required meticulous studies and quantitative analysis of the interaction between insulin and

antibody. They calculated equilibrium constants and binding affinities (3).

Finally, in 1959, they reported that they could accurately measure insulin in human blood (10). Their assay, for the first time, measured a hormone in a test tube, without the need to expose the patient to radioactivity. This spectacular achievement had

Yalow and Berson recognized RIA’s broad potential, and they believed that scientific discoveries should be shared to benefit society.

combined immunology (antigen-antibody binding), nuclear medicine (tracer technique), mathematics, physics, and chemistry (4).

And the procedure was simple (1). The antibody and radiolabeled insulin concentrations are held constant. When varying amounts of unlabeled insulin are added, it displaces a corresponding amount of labeled insulin from the antibody. A standard curve is created by counting the radioactivity of bound/free insulin for each known concentration of unlabeled insulin. The insulin in a human plasma sample will also displace some of the labeled insulin from the antibody, and the amount can be quantitated by interpolation from the standard curve.

Yalow and Berson’s first application of this method, which they called radioimmunoassay (RIA), was a study that measured plasma insulin in subjects under various conditions: glucose tolerance tests in nondiabetic and early diabetic subjects, patients with functioning islet cell tumors, and patients with leucine-sensitive hypoglycemia (11).

This paper reported several important discoveries, but the most striking finding was that type 2 diabetic patients release more insulin and have higher plasma insulin concentrations than nondiabetic subjects. Yalow and Berson suggested that, in type 2 diabetes, patients are somehow resistant to the action of their own insulin (11). This concept of insulin insensitivity is now accepted as a key feature of type 2 diabetes. It also shifted the strategy for treating type 2 diabetes from insulin treatment to diet management, exercise, and treatment with glucose sensitizing drugs (4).

In a more general sense, Yalow and Berson’s carefully executed studies provided the foundation for a principle that is now central to all receptor binding

assays: the sensitivity, specificity, and competitive binding of antibodies. The radiolabeled ligand (^{131}I -insulin, in their case) provided exquisite sensitivity, detecting a substance down to 1 picogram. The antibody conferred exquisite specificity. By choosing an appropriately matched antigen and antibody, RIA could measure all sorts of substances amid a myriad of other substances that were present in a blood sample in billion-fold higher concentrations. And best of all, RIA was easy and quick. Thousands of samples could be assayed as easily as one or two (2).

Yalow and Berson recognized RIA's broad potential, and they believed that scientific discoveries should be shared to benefit society. Rather than pursuing a patent, they made every effort to get RIA into common use (2, 12). They welcomed physicians and researchers who came from all points of the globe: from Montreal to Santiago and from Brussels to Auckland. Some stayed a few days; others stayed for a month. Under Yalow's careful guidance, they acquired hands-on experience with this new method, and many left with a precious sample of guinea pig plasma containing specific antibodies that would enable them to begin work quickly in their own labs (2).

Making a Home

While Yalow and Berson were deeply immersed in their groundbreaking RIA research, the Yalows were raising two children. The VA required pregnant women to resign in their fifth month, with no expectation of returning to their jobs. Yalow and Berson ignored the requirement. Her "fifth month" lasted for four more.



(From left to right) Benjamin Yalow, Aaron Yalow, Rosalyn Yalow, and Elanna Yalow in 1977.

She worked until the day before she delivered (2). A week later, she returned to work. Two years later, she did it again.

Aaron had become a physics professor at Cooper Union's School of Engineering, and Rosalyn held traditional views of a woman's role and responsibilities as a homemaker. Fortunately for her as well as the children, their elementary school was just a couple of blocks from home. Each morning, Rosalyn would rise absurdly early to go to the VA, which was a mile away. She would return home briefly to fix breakfast and get the children ready for school. Between experiments, she met them at home for lunch and returned again to make dinner for the family. Then, back to the lab, to work late into the night (2, 12).

The Yalows employed a housekeeper who greeted the children home from school when Rosalyn couldn't, but they never had a nanny. Rosalyn did the shopping and cooking in their kosher home. Sometimes, she would take the children to the lab, so she could watch them while she worked, and they helped by feeding the animals and doing other small chores. When they grew older, she showed them her experiments and explained the scientific rationale and methods. "That's how we learned science" (12).

Rosalyn discussed her research with Aaron over dinner, and when the children could keep up, they joined in the discussion. The Yalows did not take conventional vacations. Instead, the family accompanied her on her speaking tours, and they would take an extra day to sightsee. As teenagers, the children were allowed more independence than their classmates. Rosalyn's only requirement was that they should always do their best. And they did. But when she became frustrated listening to her son's hunt-and-peck typing, she would take his handwritten report and type it herself (12).

For Rosalyn, there was no balance between work and family. She was an overachiever who wrapped time for her family around her work. Overall, though, her daughter says, "She was a pretty wonderful mom" (12).

Professional Family

Initially, Yalow and Berson were not interested in accommodating research fellows in their lab. Yalow was happy working exclusively with Berson and concentrating on their work without distraction. Yet, as their lab morphed from the janitor's closet to a

small but efficiently run research facility, it was Yalow who convinced Berson to take them on (2). The first of this revolving cadre of research fellows assisted and coauthored the “insulin globulin” paper.

To the research fellows, they were simply Sol and Ros. Sol was volatile, whereas Ros was stable and politically savvy. Sol moved seamlessly from bench to bedside—always with a firm grip on technology, science, and philosophy—but he was somewhat aloof. Ros was the research fellows’ main lab mentor. She called them her “professional children” (2, 3, 12).

Ros was unpretentious and could talk to anyone, regardless of their background. Even as a graduate student, she had a knack for explaining the most complicated concept in terms that anyone could understand. She immediately connected with the research fellows and was always ready with suggestions and guidance (2).

Rather than lecturing, she was a good role model and offered constant encouragement. But it was tough love. She judged her own success by the discoveries she made, and she measured others by the same yardstick. Ultimately, her research fellows, as well as science-oriented young women—and even her own grandson—had to make it on their own merit. She gave no free passes (12).

Ros infused the research fellows with scientific curiosity and fostered the “chain of discovery,” so that this next generation could build on her accomplishments (12). And they did. Many of her professional children became leaders in medicine and clinical research (2, 3). She took pride and, rightly, a measure of credit for their success.

Ros was comfortable around men. She earned their respect and admiration through hard, high-quality work, and she never backed down. As one of them said, “Anyone planning to argue with Rosalyn Yalow would be well advised to be properly prepared” (2).

Her relationships with women were more complex. By her own account, she was stubborn and aggressive—traits that did not endear her to many women. She refused awards for the “best woman (anything)” (2, 12). She aspired to be the best—period!

Ros proactively encouraged bright young women to pursue a career in science, as she had done. But she



First commercial radioimmunoassay kit

was critical of women scientists—even fellow Nobel Laureates—who had no children. She also criticized women who had relinquished their careers to become soccer moms. She maintained a woman could and should do both.

Successes and Consequences

The first applications of RIA were in endocrinology. Peptide hormones could be detected at 10^{-40} to 10^{-42} molar concentrations. In addition to insulin, Yalow and Berson studied the modulation of gastrin, which triggers gastric acid secretion, and their findings greatly facilitated diagnosis and treatment of thyroid, growth, and fertility hormone dysfunctions (3, 4).

In 1965, Amersham produced the first commercial RIA kit (for insulin), and by the end of the decade, RIA had become an indispensable tool. Labs around the world were using RIAs to detect and quantitate minute amounts of enzymes, drugs, and other substances, as well as hormones (1, 4). Everyone working in a biochemistry lab wore a dosimeter.

In Yalow and Berson’s lab, John Walsh developed the first RIA for a virus. This assay of hepatitis-associated antigen was a breakthrough in infectious disease management (2). Blood banks quickly adopted it to screen donated blood and prevent transfusion-transmitted hepatitis (3, 4).

RIA made Berson and Yalow famous in the scientific community. In 1957 and 1961, they received the Lilly Award of the American Diabetes Association—the first of many honors and awards.

They were intellectual equals, and their work was seamlessly integrated. But Berson was the physician. Berson belonged to the professional medical societies, which at that time included few women and no Ph.Ds. And the charismatic Berson cultivated a broad clinical network. Yalow was less flashy—the steady, analytical partner. She was more interested in the lab than developing social contacts (2).

Eloquent and genial, Berson wrote the first drafts of most of their papers and delivered virtually all of the invited lectures. But while he was willing to stand at the podium and make the acceptance speeches, he insisted that Yalow be named as a corecipient on their awards (2).

Several times, Berson had refused chairmanship offers from medical schools. Finally in 1968, he agreed to become chairman of the Department of Medicine at the new Mount Sinai School of Medicine (2). Although he continued to collaborate part-time at the Bronx

VA, Yalow assumed the leadership of their lab, in title as well as in practice. In April 1972, Berson suffered a fatal heart attack while attending the FASEB meeting in Atlantic City.



Dr. Rosalyn Yalow

Emerging Solo

For Yalow, Berson's death was devastating, but any doubts about her contributions to their partnership were soon put to rest. She assumed full responsibility for writing and speaking. Over the next five years, her lab published 60 papers. She stepped out of Berson's shadow to speak at scientific conferences, and she was good at it (2).

Frequently, she turned to Aaron for advice. He preferred teaching to research, but he read and critiqued every paper and every speech she wrote. His soft-spoken, scholarly demeanor belied a strength of character. He steadfastly supported his ambitious wife and was genuinely proud of her accomplishments (2).

Like Berson, Yalow fully acknowledged her partner's contributions. She arranged to have the lab renamed the Solomon A. Berson Research Laboratory, ensuring that every paper she published would include his name, as long as she was there (2, 3). The Berson Laboratory conducted key studies of parathyroid and gastrointestinal hormones and identified multiple molecular forms of peptide hormones (e.g., gastrin-34, gastrin-17, and gastrin-14) (1, 2).

Building on the work of other investigators, Yalow and her research associate, Eugene Straus, reported that cholecystikinin (CCK) in the brain is identical to that found in the gut (3). Then, using immunohistochemical techniques, they established



Rosalyn Yalow and Solomon Berson after receiving the Lilly Award from the American Diabetes Association in 1957.

Biosketch:



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

Dr. Anderson will share the story of Enbrel from sepsis to arthritis.

Don't miss the December 2017 issue.

that the highest concentration of CCK is in the cerebral cortex (1). These findings provided the first evidence that CCK is endogenous in the brain, suggesting its role in neuroregulation and broadening the concept of neurotransmitters (4). Subsequently, many gastrointestinal peptides, including somatostatin, substance P, and vasoactive intestinal peptide, were also found in the brain (1, 3).

Yalow had never taken a course in biology. She learned physiology, anatomy, and clinical medicine from Berson (3). Yet, her depth of understanding and clinical insight were highly regarded.

Harold Rifkin, a diabetes expert, sought her recommendations on new insulin formulations, and Morton Grossman, a leading gastroenterologist, consulted her about clinical syndromes involving gastrointestinal hormones (2).



Rosalyn Yalow receiving the Nobel Prize from Sweden's King Carl XVI Gustaf.

Benjamin Yalow

Recognition

In 1975, Yalow was elected to the National Academy of Sciences. In 1976, she was the first woman to receive the Albert Lasker Basic Medical Science Award. And in 1977, she was already working in her office at 6:45 am when the phone rang (4). She had just become the first American woman to receive the Nobel Prize in Physiology or Medicine. In her acceptance speeches, she emphasized that Berson deserved equal recognition for their accomplishments.

Yalow continued to lead her lab, accept research fellows, and make research contributions until 1991, when she became emeritus senior medical investigator at the Bronx VA. Although physical limitations increasingly restricted her laboratory activities, she regularly went to the office, read scientific literature, wrote commentaries, and continued to serve on the Bronx VA's research committee (2, 12).

Yalow and Berson's legacy is profound. RIA was one of the most important clinical applications of basic research during the 20th century. It permitted new insights in endocrinology, immunology, cardiology, gastroenterology, nephrology, neuroscience, and many other disciplines (4).

RIA was also the blueprint for more advanced immunoassay methods, notably ELISA (enzyme-linked immunosorbent assay), which incorporates enzymes in place of radioisotopes to detect the presence of substances in blood. These newer methods rely less heavily on radioisotopes and have all but replaced RIA in many applications. They are less dangerous and less

costly, but all of them are based on the fundamental concepts first worked out by Yalow and Berson (4).

And there is one other legacy. Despite the obstacles she faced, Rosalyn Yalow never complained or made excuses. Barriers were made to be broken. She just worked harder and did better, as if to say, "Bring it on" (12). The sign on her office wall read, "Whatever women do they must do twice as well as men to be thought half as good. Luckily, this is not difficult" (2).

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ASPET Celebrates the 25th Anniversary of the SURF Program

ASPET's Summer Undergraduate Research Fellowship (SURF) program has a rich network of over 2200 alumni, with some former participants serving as mentors to the next generation of researchers. In celebration of SURF's 25th anniversary, we continue to share stories from SURF programs to highlight their potential as transformative experiences. Additional stories can be found in the booklet celebrating this SURF milestone at <http://bit.ly/2ntx2vs>.



Joseph Holthoff

Participation year: 2006

Fellowship type and location: Institutional, University of Arkansas for Medical Sciences

Current title: Resident Physician, University of Arkansas for Medical Sciences

I applied to the SURF program as a junior in college in hopes of helping my medical school application. It was my first real taste of research, and I had never considered research as a career before. However, after the first week working in the lab of Dr. Mayeux, I was hooked. I knew after my 10 week SURF experience that a career in research was the right fit for me. I then shifted my focus to pursuing a combined MD/PhD degree program. I applied and was accepted to the program at the University of Arkansas for Medical Sciences and joined Dr. Mayeux's lab again, this time as a graduate student. I was blessed to have a successful time in Dr. Mayeux's lab including an NIH F-30 fellowship and several publications. After completion of the combined MD/PhD program, I entered a combined internal medicine-pediatrics residency program. I am still



actively involved in research in nephrology. I hope to pursue a clinical fellowship in nephrology at the end of residency and continue academic research.



Hanna Wetzel

Participation year: 2012

Fellowship type and location:

Institutional, University of Cincinnati

Current title: PhD candidate, University of Cincinnati

My experience as an ASPET SURF fellow completely changed my career path, and definitely for the better. Before doing the program, I had never even heard of pharmacology, much less considered it as a career path. However, the ASPET SURF program at the University of Cincinnati changed that. The program did a great job of introducing us to the graduate students in their PhD program and having them tell us their stories. This let me learn about what pharmacology

was, and what research opportunities were available. My SURF mentor was fantastic as well. He fully integrated me into his lab and made me feel welcome and included. I fell in love with the work being done in his lab, and by the end couldn't imagine doing anything else. I was even able to go to the ASPET Annual Meeting at EB on the undergraduate travel award, which was a truly amazing experience. After graduating with my bachelor's degree, I applied to the pharmacology graduate program at the University of Cincinnati and joined the same lab in which I had done my fellowship. I am currently finishing up my research in the same lab and plan to graduate this year. I am forever indebted to the ASPET SURF program, and I would not be where I am today without it.

We thank these SURF alumni for sharing what the fellowship experience meant to them. Stay tuned for more stories in the December 2017 issue of *The Pharmacologist*.

Carol Bender Discusses the SURF Program at the University of Arizona



Carol Bender

As part of our year-long series commemorating the 25th anniversary of ASPET's SURF program, Catherine Fry, Director of Education at ASPET, interviewed Carol Bender, University Distinguished Outreach Professor and Director, Undergraduate Biology Research Program and Related Programs, at the University of Arizona

(UA) about their long-standing SURF program. The University of Arizona has consistently received SURF funding from ASPET since 1992, with Carol serving as the program director since its inception.

CF: How is the SURF program integrated at your institution?

CB: Our SURF program is integrated into a suite of programs within the University of Arizona that offer research experiences broadly in the life sciences. We have a variety of funding sources that support our programs, and by including SURF under that umbrella, we are able to offer the benefits of a larger community for our undergraduate researchers. For example, we hold an annual off-campus retreat where students can interact across programs and discuss common topics with faculty such as the ethical conduct of research. We also have weekly meetings which may be a large group format with a seminar speaker or smaller group discussions where students practice explaining their research to their peers. They may be explaining their research to students who are in a different program exploring an entirely different set of research questions, so they need to think carefully about how to communicate. They learn a tremendous

amount from each other; there are about 100 total in the overall group.

CF: How does undergraduate research fit into the university culture?

CB: Undergraduate research is really central to the culture here at UA. Those of us who run the programs know one another and share information, even passing along applications from program to program. It's a very collaborative environment. One of the unique aspects of SURF here is that all of the students are UA students, and many continue their research into the academic year. I think it's a real strength of our program that they can have an intensive experience that lasts longer than a summer. Most

students work more than a year in the lab. We'll often have situations where students with more experience serve as peer mentors to those just getting started.

CF: How do you help set expectations about the summer research experience?

CB: A lot of students come in wanting a research experience, but they are not really sure what that means. Many of them think they want to be physicians because they have experience interacting with doctors and believe they understand what that means. But very few of them have experience with researchers or have an understanding of the life of a researcher. Here, they can test their assumptions about what they want out of a career in order to make a more informed decision. We hold an orientation that addresses what's expected of them, including how to be a good lab citizen and how to behave professionally. One of their first small-group meetings involves telling everyone what each person in their lab group is working on. That homework assignment gives them an excuse to talk to everyone in their lab early on. We also start setting expectations before they even come to a lab. We tell them that their place in the program is contingent on finding a mentor with whom to work. They are required to set up 2 or 3 interviews with mentors who have spots and then make a decision about who fits best with their research interests and personalities. We provide some coaching in the form of questions

they may want to ask and qualities of the lab they should consider, but they have to approach the mentors and set up the interviews. The students need to be very proactive in this process, and we consider this part of their professional development.

CF: What kind of activities and interactions are available for students outside the lab?

CB: We have a student lounge near my office called the Helicase (it's where they go to unwind), where they can gather informally. We also have an end-of-the-year picnic. We have an advisory group of students called the UBRP Ambassadors (<https://ubrp.arizona.edu/outreach/ambassadors/>) that plans events and community outreach including an annual community lecture. Last year the topic was water



SURF students Caleb Kim and Carrie Stine performing tissue extractions in Dr. John Streicher's lab.



University of Arizona SURF participant Dagoberto Robles at KXCI's weekly radio program.

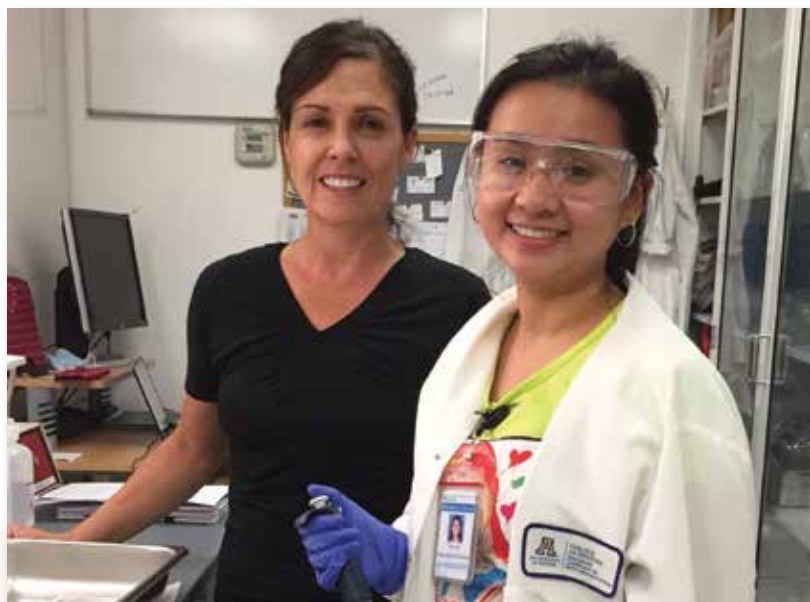
issues in the southwest, and this year it will be on the opioid epidemic. It's been really touching to me that these students, who often don't have a lot themselves, are so willing to reach out to the community. We want to capitalize on their energy and volunteerism. They've volunteered at the community food bank and worked with Beads of Courage to support terminally ill kids. This year they also worked on the African Library Project, which was started by former Peace Corps volunteers to get educational materials to African communities in need. The students have to sort through donated books and think about what's most appropriate to send, which can sometimes spark really impassioned and thoughtful discussions. They spend time thinking about those who don't have the same access and privileges they do.

CF: How do the students cap off their summer research experiences?

CB: We have an annual poster conference in January. All of our students commit to presenting a poster when they are accepted into the program. We have a participation contract that they sign, so they know exactly what's expected of them, including the presentation of their research results. We don't have the poster conference at the end of the summer because we find that many of them don't yet have sufficient material to present. This conference is open not only to the programs I direct, but to any student who would like to present research. We also have some alumni, now faculty at other institutions, who bring their students to present at our conference. It's a really nice extended community. We always invite one of our alums to give a keynote address. This year, the keynote will be given by Mohab Ibrahim, who went on to get an MD/PhD and is now back at UA as a faculty member. He worked for an ASPET member, Phil Malan, here at our medical school in the Department of Anesthesiology. We also invite the public and our elected representatives to the conference; our city councilman has attended. It's a great experience for the students.

CF: It sounds like you have a well-rounded program. What do you see as some of the strengths of SURF at UA?

CB: We have amazing mentors here. I think the science experience that our students get is really superb, and of course that's the heart of the program.



Rayna Gonzales, PhD, University of Arizona College of Medicine, with her ASPET SURF student Trinny Tat. At EB 2017, Trinny won 2nd place in the undergraduate student category of the CVP Division's Best Presentation Competition (Poster Sessions). She was also the recipient of an undergraduate student travel award.

But we don't just consider the science in isolation. We also look at the impact of government and policy on research, health care, and education. We don't want students to ignore how the broader national context affects what they are doing in the lab. We also talk a great deal about the importance of communicating their science to the general public and the local community. For the last three and a half years, we have participated in a weekly radio program with our local station, KXCI. We take a different student each week to talk about their research. It's a great experience for the students, gets the word out to the community about what the university is doing, and it's a lot of fun, too. Our students come to us thinking they will just get a research experience, but they actually get much more because they see how the science fits within the larger context of society. Even those who may not stay in research learn so much that transfers, including how to problem solve, think critically, behave collegially, work in teams, and consider the bigger picture. We're grateful to both ASPET and our institution for the support that lets these programs thrive.

We thank Carol for taking the time to share about UA's SURF program with us. Additional information can be found at: <https://ubr.p.arizona.edu/>.



Meeting News

2017 ASPET/ADDC Academic Drug Discovery Colloquium

Fueling Innovation: Public Programs Driving Drug Discovery

October 12-13, 2017



The focus of the second collaboration between ASPET and the Academic Drug Discovery Consortium (ADDC) will explore a critical domain to innovation – how to obtain funding.

Pharmaceutical companies have steadily decreased their research ranks for years. Recognizing a potential crisis in the making, governments have responded to the evolving R&D landscape by creating new mechanisms to fund research focused on identifying novel therapies for untreated patients. This phenomenon has occurred on a national scale and at the level of individual states; even some metropolitan regions now have funding instruments. A single investment can trigger the invention of a new treatment, support the education of the next generation of scientists and build economies in meaningful and lasting ways.

If you are interested in academic drug discovery and would like to build your network of collaborators, learn firsthand how other scientists have successfully developed their programs, and explore the funding options available to launch and sustain a treatment discovery program, you will want to attend.

Advance Registration Deadline:

Thursday, September 28, 2017

Colloquium Registration Rates	On or before Sept. 28	On or after Sept. 29
ASPET or ADDC Member	\$50	\$75
Non-member (non-profit)	\$65	\$90
Non-member (for-profit)	\$100	\$125
Trainees (student/postdoc)	\$25	\$35

Schedule

Thursday, October 12

8:00 am – 6:30 pm

Colloquium scientific program to include keynote presentations, short talks, and poster presentations.

Friday, October 13

8:00 am – 2:00 pm

Partnering meetings with Program Directors

SPEAKERS

Keynotes:

Bryan Roth, University of North Carolina, Chapel Hill
Illuminating the Druggable GPCR-ome

Carlos A. Zarate, National Institute of Mental Health
Experimental Therapeutics for Treatment-Resistant Depression

Speakers:

Julian Blagg, The Institute of Cancer Research
Funding Cancer Drug Discovery in the United Kingdom

Craig Crews, Yale University
Targeting Protein Degradation

Chuck Cywin, National Institute of Neurological Disorders and Stroke
First in Man: Advancing Small Molecule Academic Drug Discovery Research through the Blueprint Neurotherapeutics Network

Jon de Vlieger, Lygature – the European Lead Factory
The European Lead Factory – Boosting Collaborative Drug Discovery

Duncan Holmes, Glaxo SmithKline
Collaborating with Academic Laboratories in Drug Discovery: The GSK Discovery Partnerships with Academia (DPAc) Experience

Donna Huryn, University of Pittsburgh
p97 Allosteric Inhibitors: Partnership with the Chemical Biology Consortium

Ben Glasspoole, MilliporeSigma
New Additions to the MedChem Toolbox from Academic Collaborations

Ann Mills-Duggan, Wellcome Trust
Seeding Drug Discovery - What Next?

Amy Newman, National Institute on Drug Abuse
Translating the Dopamine D3 Receptor Hypothesis Toward Treatment of Opioid Use Disorders

Barbara Slusher and Jonathan Powell, Johns Hopkins University
Glutamine Antagonists as Novel Targets for Immunotherapy

Sriram Subramaniam, Center of Cancer Research, NIH
Frontiers in Cryo-EM

Jim Wells, University of California, San Francisco
Antibodies Targeting the Cell Surfaceome

Joe Wu, Stanford, California Institute for Regenerative Medicine
iPSCs for Cardiac Disease Modeling, Drug Screening, and Precision Medicine

SUPPORTERS (as of 8/25/2017)

ASPET and ADDC would like to thank the colloquium supporters:

Gold Level Supporters:



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(This activity is supported by an educational grant.)



Supporters:







2nd ASPET/Chinese Pharmacological Society (CNPHARS) Joint Meeting

November 2 – 5, 2017

ASPET is pleased to announce the 2nd ASPET/Chinese Pharmacological Society (CNPHARS) Joint Meeting taking place in Hangzhou, China from November 2 – 5, 2017. The first joint meeting took place at the **ASPET Annual Meeting at Experimental Biology 2014** in San Diego, CA.

The key themes of the meeting include molecular pharmacology on new drug discovery and traditional medicines and natural products in treating disease. A delegation from ASPET will be attending in an effort to foster an exchange of scientific knowledge and collaboration between Chinese and American pharmacologists.

To obtain additional information or to register for the meeting, please visit the [official meeting website](#) for detailed program information.



ASPET Delegation



Keynote Speaker: Paul Insel, *University of California San Diego*
G Protein-Coupled Receptors (GPCRs): New Therapeutic Opportunities Revealed by Unbiased GPCRomic Approaches

Traditional Chinese Medicines and Natural Products in Treating Disease Symposium



Keynote Speaker: Yongxiang Zhang, *Beijing Institute of Pharmacology and Toxicology*
Pharmacological Study on Traditional Chinese Medicine and Natural Product in China



ASPET Chair
Ben Green, *Poisonous Plant Research Laboratory ARS/USDA*

Drugs and Natural Products: From Plants and Livestock to Human Therapeutics



Jiandong Jiang, *Institute of Materia Medica, Chinese Academy of Medical Sciences*

Berberine Is New Mechanism Drug against Energy Metabolic Disorders



Mary Paine, *Washington State University College of Pharmacy*

A Systematic Approach to Select and Evaluate Natural Products as Precipitants of Pharmacokinetic Natural Product-Drug Interactions



Zhenhua Jia, *Yiling Hospital Affiliated to Hebei Medical University*

Study of Collateral Disease and Translational Medicine



Nadja Cech, *University of North Carolina at Greensboro*

New Approaches for Identifying the Biologically Active Components of Botanical Natural Products



Haiping Hao, *China Pharmaceutical University*

Reverse Pharmacokinetics Guided Target Identification and Mechanistic Understanding of Chinese Medicines

Molecular Pharmacology and Drug Discovery Symposium



David Sibley, *ASPET Chair*



Xin Xie, *Shanghai Institute of Materia Medica, Chinese Academy of Sciences*

Targeting G Protein-Coupled Receptors for the Treatment of Autoimmune Diseases



Mary-Ann Bjornsti, *University of Alabama at Birmingham*

SUMO Conjugation-A Therapeutic Target



Rick Neubig, *Michigan State University*

Identification of a Novel Target for Cancer and Anti-fibrotic Therapy



Jinpeng Sun, *Shandong University*

Arrestin Mediated GPCR Biased Signaling and Its Application in New Drug Discovery



John Tesmer, *Purdue University*

Rational Design of GRK2 Inhibitors for the Treatment of Heart Failure



Wei Wei, *Anhui Medical University*

The Direction of New Drug Research: Soft Regulation of Inflammatory Immune Responses

ASPET Leadership



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Charles France,
Past-Secretary/
Treasurer

*The University
of Texas Health
Science Center at
San Antonio*



Peggy Gnegy,
Secretary/
Treasurer-Elect

*University of
Michigan Medical
School*

Young Scientists Travel Award Winners



Brenda Gannon,
Postdoctoral
Fellow

*University of
Texas Health
Science Center
at San Antonio*



Joshua Lorenz-
Guertin, Graduate
Student

*University of
Pittsburgh*



Kenneth
McCulloch,
Postdoctoral
Fellow

*McLean Hospital/
Harvard Medical
School*



Amy Moritz,
Postdoctoral
Fellow

*National
Institutes of
Health*



Shu Wiley,
Postdoctoral
Fellow

*University of
California San
Diego*

Annual British Pharmacological Society Meeting: Pharmacology 2017

December 11-13, 2017

ASPET is thrilled to be an exhibitor at the British Pharmacological Society's annual meeting *Pharmacology 2017*, located in the heart of London. The meeting will include a selection of topical symposia, plenary lectures, workshops, and poster sessions covering all areas of pharmacology.

Stop by ASPET's booth to learn more about ASPET initiatives, programs, and member benefits.

To view the entire meeting program and register, please visit <http://bit.ly/2uWAaC7>.



WCP2018 Kyoto: 18th World Congress of Basic and Clinical Pharmacology

July 1-6, 2018

The 18th World Congress of Basic and Clinical Pharmacology (WCP2018) will take place July 1–6, 2018 in Kyoto, Japan. ASPET is pleased to participate in this worldwide pharmacology event as a platinum sponsor. As a sponsor, ASPET will be sending a delegation of members and offer travel awards to young scientists.

This year's meeting theme is *Pharmacology for the Future – Science, Drug Development and*

Therapeutics. The meeting will feature several lectures by world renowned scientists, 84 scientific symposia, oral and poster presentation sessions, and numerous networking events. For more program information and to register, visit www.wcp2018.org.

ASPET Travel Awards for Young Scientists

ASPET hopes that our members will play an active role in WCP2018 and will be providing travel awards to help offset the cost of attending the meeting. Graduate students and postdoctoral scientists are invited to apply for a travel award to help defray the cost of attending WCP2018. The travel award consists of complimentary meeting registration and travel reimbursement up to US\$3000, which may be applied toward airfare, hotel, and other eligible expenses in accordance with ASPET travel policies. Applications are due by 5 PM EST Friday, December 1, 2017. For award terms and application instructions, please visit: <http://bit.ly/2fNgbCc>.



Important Dates for WCP2018

ASPET Travel Award Deadline:
December 1, 2017

Abstract Submission Deadline:
December 14, 2017

Early Bird Registration Deadline:
March 30, 2018

2017 National Directors of Graduate Studies in Pharmacology and Physiology Meeting in Review



Attendees of the 2017 NDOGS meeting in Stony Brook, NY.

The National Directors of Graduate Studies in Pharmacology and Physiology (NDOGS) meeting was held June 28-30, 2017 at Stony Brook University in Stony Brook, NY. This three-day meeting consisted of several lectures as well as corresponding panel discussions, allowing the opportunity for participation by all in attendance. A poster session was held where Stony Brook University graduate students presented their work, received feedback and connected with attending representatives of pharmacology and physiology graduate programs from institutions throughout the U.S.

Opening remarks by Kenneth Kaushansky, MD, MACP, dean of the School of Medicine, senior vice president of Health Sciences, Stony Brook University; and Charles Taber, PhD, dean of the Graduate School, vice provost for Graduate and Professional Education, Stony Brook University, stressed the importance of a meeting of this nature to discuss the challenges facing biomedical graduate studies, especially as the fiscal environment becomes more restricting, and as

the field of biomedicine evolves to become more interdisciplinary. Here, we summarize the valuable discussions that took place during the meeting regarding the three main themes of training and curriculum, diversity in recruitment and careers, and scientific rigor and communication.

Training and Curriculum

Following along with the idea of biomedicine emerging as a more interdisciplinary domain, much of the panel discussion pertained to pharmacology and physiology graduate curricula. Panel participants included Tom Pressley, PhD, Texas Tech University Health Science Center; Robert Duvoisin, PhD, graduate program director, OHSU Portland; Jeff Osborn, PhD, University of Kentucky; Bill Jackson, PhD, Michigan State University; Joey Barnett, PhD, Vanderbilt University; and Kelly Karpa, PhD, Penn State University. The panel participants focused on the benefits and challenges of the implementation of graduate umbrella programs. Though several programs have faced some challenges in how many students chose to join a pharmacology direction within a comprehensive biomedical sciences program, such umbrella programs have generally been beneficial for graduate students (giving them more options for selection of advisor) and for collaborations in research.

Another main point on this topic included the recruitment of undergraduates from pharmacology and physiology programs into pharmacology and physiology graduate programs, which many programs struggle to do as many of these students primarily intend to go to medical school. In answer to this, it seems that several programs are creating pharmacology minors, which may help increase the number of students exposed to the pharmacology and physiology disciplines, build a strong foundation in pharmacology, and thus consider pharmacology for graduate work.

Additionally, emphasis was placed on the establishment of a rigorous didactic design that can address all the arenas of pharmacology and physiology (cellular, molecular, systems, etc.). During lectures by Robert Watson, director of the undergraduate and master's programs in pharmacology, Stony Brook University; and Miguel Garcia-Diaz, pharmacological sciences graduate program director, Stony Brook University, a major focus was placed on the introduction of courses meant to teach quantitative skills, such as a Python coding course, which will help pharmacology students in addressing further quantitative requirements of the discipline. A critical requirement is to better train students in science communication and experimental rigor, which constitutes another main theme of this meeting. These topics also stimulated discussions about individual guidance for students and the need to address future career goals and options.

The program also included a panel segment on the outcomes of BEST (Broadening Experiences in Scientific Training) programs, which included presentations by Roger Chalkey, Vanderbilt University; David Farb, Boston University; and Richard Neubig, Michigan State University. In comparing aspects of BEST programs with non-BEST programs, many programs are currently moving toward career development and training in a range of career options. However, they are lacking in external partnerships to contribute and structure career offerings and internships. This panel emphasized the commitment to the development of research skills as well as preparation for a broader range of careers, which benefit those in PhD and postdoctoral training programs. Challenges included the timing of these internships and strategies for the exploration of such nonacademic careers in depth.

Another panel session discussed methods of recruiting and retaining diverse graduate students, as well as career preparation and career development. Members of the panel included Susan Scheckel, Kathleen Flint-Ehm, and Lyl Tomlinson, PhD candidate, all of whom are members of the Integration of Research, Education, and Professional Development (IREP) Office at Stony Brook University. Panelists expressed the importance of fostering initiatives at the intersection of research and education for an

integrated experience. ScienceWorks, a new program spearheaded by Lyl Tomlinson, introduces advanced PhD students into a structured internship program within the semester. This program includes incentives for advisors for participating in the program; the commitment to the internship is minimal to allow the student to continue to be productive in the laboratory. Many points of discussion included implementation of new programs, successful recruiting techniques, and ways of changing the culture of research to better serve both the needs of the principal investigator and current/future students.

The meeting's keynote address was given by George D. Yancopoulos, PhD, president and chief scientific officer, Regeneron Pharmaceuticals, Inc., who also discussed the importance of collaborations between academia and industry. Not only does Dr. Yancopoulos believe that this will be beneficial for students/scientists in training, but it will also bring about societal benefits, with better medications and health outcomes. Regeneron is an impressive biotechnology company that has given rise to six FDA-approved drugs and several clinical trials. Furthermore, Regeneron has taken over the high school Regeneron (formerly Intel) Science Competition and is committed to fostering the education of young scientists from a young age through the post-doctoral level.

Recruitment and Diversity

Several lectures and panel discussions revolved around the theme of recruitment and diversity. Toni Sperzel, director of the Center for Inclusive Education, Stony Brook University, discussed the Center for Inclusive Education (CIE) and how it fulfills its mission by providing three aspects of student support services: academic enrichment, professional development, and community building and mentoring/advisement. Though only in existence for 15 years, the CIE now hosts 7 state, federal, and nonprofit funded programs that support 163 underrepresented scholars at all levels of training. Approximately 70-75% of scholars are in the STEM disciplines, and recruitment efforts are focused in these fields. Ms. Sperzel led a panel discussion on diversity that also included Jeff Osborn, PhD, University of Kentucky, and Evangeline Motley-Johnson, PhD, Meharry Medical College.

Scientific Rigor & Communication

The last theme of central importance to the program was scientific rigor and communication. C. Glenn Begley, chief executive officer, Biocurate Pty Ltd., the keynote speaker of this segment, provided an entertaining review of data from prominent papers published in prestigious journals in his presentation “10% of the time it works every time – recognizing sloppy science.” Dr. Begley was joined by Michael Frohman, pharmacology and MSTP program, Stony Brook University, and discussion segued into methods to successfully teach students proper scientific controls, algorithms, and principles that generate reproducible results. The take-home message was to be skeptical and critically evaluate the literature as well as one’s own experimental designs.

Shifting the focus to successful communication of science, Laura Lindenfeld-Sher, director of the Alan Alda Center for Communicating Science, Stony

Brook University, provided a mini workshop on “Communicating Your Science”. This presentation and workshop emphasized the need to demonstrate the value of science and adapt to your audience. Dr. Lindenfeld-Sher engaged the attendees in improvisational exercises to practice connecting with an audience and to recognize that communication is engagement – your message must *land* with who you are communicating with. The Alan Alda Center for Communicating Science offers SciComm workshops, graduate courses, certification, and other forms of outreach to promote effective scientific communication.

“Communication is not something you add on to science; it is the essence of science” - Alan Alda (founder)

Submitted by Kaitlyn K. Thompson and Tanya R. Victor



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Science Policy News



Bipartisan Support Will Spare Research from Dramatic Cuts in Inaugural Trump Budget Proposal; Another Appropriations Cycle without Regular Order; ASPET Second Quarter Advocacy Activities

In a year of political unrest and uncertainty, biomedical research continues to remain one of the few issues in Congress to enjoy bipartisan support. This support was tested when the president issued his fiscal year (FY) 2018 budget blueprint, which included a proposed 20% cut to the

National Institutes of Health (NIH). This was a shock to many, as the recent passage of 21st Century Cures was a clear indicator that Congress was united in their support of medical research. Immediately, legislators from both sides of the aisle issued public statements asserting their disagreement

with the president's proposed cuts. The House of Representatives backed up these sentiments when the Appropriations Committee issued their Labor, Health and Human Services, Education (LHHS) funding bill, which included a \$1.1 billion increase recommended for NIH. Additionally, the bill rejects the president's proposal with respect to facilities and administration (F & A) expenses, including a new provision requiring NIH to continue reimbursing grantee research institutions for F & A costs under the current guidelines. The bill passed with a vote of 235-192.

All of this seemed like great news as the summer recess approached, with House leaders hoping to combine all appropriations bills into a joint omnibus package to be voted on before the summer break. That plan was abandoned, however, after it became clear that a majority of the Republican Caucus was undecided about whether to support it.

As an alternative, the House voted on a smaller package that included the defense, military construction/veterans affairs, energy and water, and legislative branch measures, leaving the fate of the LHHS legislation to chance in much the same way as last year. Once again, Congress will have to adopt another "continuing resolution" (CR) to keep the government funded on a temporary basis once FY2018 begins October 1. Even if the House manages to pass a measure, it would stand almost no chance of Senate approval due to proposed cuts to domestic agencies.

Despite the current uncertainty, advocates in the biomedical research community are encouraged by the outcome of the appropriations cycle and hopeful that FY2018 will yield another year of continued increases for the NIH. ASPET has been engaged in these advocacy efforts throughout the process and will continue to be your voice in the months ahead.

The following is a summary of ASPET advocacy efforts in the second quarter (April- June) of 2017:

- ASPET released a statement on President Trump's FY2018 budget blueprint (document available [here](#)).
- ASPET joined 286 organizations in urging Congress to act on current spending and reject proposed research and development (R&D) cuts (document available [here](#)).
- ASPET released a statement applauding passage of the FY2017 omnibus spending package and \$2 billion increase for the NIH (document available [here](#)).
- ASPET responded to President Trump's FY2018 full budget request (document available [here](#)).
- ASPET submitted testimony to both legislative chambers regarding FY2018 funding for NIH and other science agencies (document available [here](#)).
- ASPET joined the Ad Hoc Group for Medical Research in *Wall Street Journal* and *Politico* ads thanking Congress for support (*WSJ* ad available [here](#) and *Politico* ad available [here](#)).
- ASPET signed onto Research!America's letter urging Congress to raise the FY2018 budget caps.

AS APPEARED IN THE WALL STREET JOURNAL AND POLITICO

When It Comes to the Nation's Health, There's One Thing We Can All Agree On: Medical Research Makes America Healthier and Stronger

As a result of our nation's bipartisan investment in medical research through the National Institutes of Health (NIH), Americans are living longer, healthier lives. We have new treatments and cures for diseases once considered death sentences. Fewer people are dying of preventable diseases. And more people with chronic conditions and disabilities are living active and productive lives. Investment in medical research also spurs economic growth by driving innovation, creating jobs, and improving America's global competitiveness.

CONGRESS: THANK YOU FOR YOUR SUPPORT FOR MEDICAL RESEARCH. Let's keep the progress going. Increase funding for NIH by \$2 billion in 2018.

Academic Consortium for Integrative Medicine & Health
Academy of Pediatric Association
Academy for Radiology and Biomedical Imaging Research
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American Association of Physicists in Medicine
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American Cancer Society Cancer Action Network
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American College of Clinical Pharmacology
American College of Nuclear Medicine
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American College of Sports Medicine
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American Gastroenterological Association
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American Institute of Ultrasound in Medicine
American Lung Association
American Pediatric Society

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American Society for Microbiology
American Society for Pharmacology and Experimental Therapeutics
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American Society of Hematology
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American Society of Neuroradiology
American Society of Radiologic Technologists
American Society of Transplantation
American Sociological Association
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American Veterinary Medical Association
Association for Clinical and Translational Science
Association for Psychological Science
Association for Research in Vision and Ophthalmology
Association of Academic Chairs of Emergency Medicine
Association of Academic Health Sciences Libraries
Association of Academic Physiatrists
Association of American Cancer Institutes
Association of American Medical Colleges
Association of American Universities
Association of American Veterinary Medical Colleges
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Association of Chairs of Departments of Physiology
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Association of Independent Pediatric Department Chairs
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Deodolter Cancer Coalition
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Dystonia Medical Research Foundation
Eastern Virginia Medical School
Elizabeth Glaser Pediatric AIDS Foundation
Elton S. Floyd College of Medicine at Washington State University
Emory University
Endocrine Society
Esophageal Cancer Action Network
Federation of American Societies for Experimental Biology
Federation of Associations in Behavioral and Brain Sciences
Feinberg School of Medicine
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Heart Rhythm Society
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Hepatitis Foundation International
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Icahn School of Medicine at Mount Sinai
Indiana University
Infectious Disease Society of America

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JDRF
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Louisiana State University Health Sciences Center, New Orleans
Lung Cancer Alliance
Lupus Foundation of America
March of Dimes
McGovern Medical School at The University of Texas Health Sciences Center at Houston
Medical College of Wisconsin
Medical Image Perception Society
Medical Imaging & Technology Alliance
Medical Library Association
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Montefiore Medicine
Muscular Dystrophy Association
National Alliance for Eye and Vision Research
National Alliance on Mental Illness
National Alopecia Areata Foundation
National Association for Biomedical Research
National Brain Tumor Society
National Coalition for Cancer Research (NCCR)
National Kidney Foundation
National Multiple Sclerosis Society
National Pancreas Foundation
New York Medical College
NICD Corporation
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Society for Investigative Dermatology
Society for Neuroscience
Society for Pediatric Radiology
Society for Pediatric Research
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University of Nevada, Reno School of Medicine
University of New Mexico School of Medicine
University of North Carolina at Chapel Hill School of Medicine
University of Oregon
University of Pittsburgh
University of Rochester
University of South Florida
Morsani College of Medicine
University of Tennessee Health Science Center
University of Texas M.D. Anderson Cancer Center
University of Toledo
University of Utah School of Medicine
University of Vermont
Lamar College of Medicine
University of Virginia School of Medicine
University of Washington
University of Wisconsin-Madison
Vanderbilt University
Vanderbilt University Medical Center
Virginia Commonwealth University
Washington State University
Washington University in St. Louis
Wayne State University
West Virginia University
Western Michigan University
Werner Striker M.D. School of Medicine
Wright State University
Yale University



The Ad Hoc Group for Medical Research

The Ad Hoc Group for Medical Research is a coalition of more than 200 patient and voluntary health groups, medical and scientific societies, academic and research organizations, and industry that support, enhance the federal investment in the biomedical, behavioral, and population-based research conducted and supported by the NIH. To read the Ad Hoc Group's full recommendation for the FY 2018 budget, visit www.aamc.org/adhocgroup.

Paid for by Association of American Medical Colleges

ASPET joined the Association of American Medical Colleges (AAMC) Ad Hoc Group for Medical Research in ads thanking Congress for bipartisan support.

Washington Fellows Program

All of the 2017 Washington Fellows have completed their trips to D.C., and are currently working on op-eds for their local newspapers, where they will discuss their advocacy experiences and reiterate the importance of biomedical research funding. Participants in the program continue to express the value they have found in the experience.

Applications are currently being accepted for the 2018 year! Apply today at <http://bit.ly/2iOomiY>.

“Thank you so much for teaching me an incredible amount of policy and advocacy work last week on Capitol Hill. Before this, I had minimal experience with advocacy but was always interested in getting involved. After all of our meetings on the hill, I felt truly inspired to get involved in advocacy as a component of my career and make this a significant part of my future.

At first, I was a little nervous for our meetings on the hill. However, the encouragement and preparation provided me took all of that away, and left me with a real love for advocacy work. Your enthusiasm and passion for science really got me excited about advocacy, and I’m very excited to continue this on both the local and national level over the next few years. Please keep in touch if there are additional opportunities to advocate on behalf of ASPET!”

- Raghav Tripathi



Douglas Smith of Virginia Commonwealth University, outside of the Capitol building before visiting with the Virginia Congressional delegation.



Jacques Nguyen of the Scripps Research Institute, at the office of Senator Dianne Feinstein (D-CA).



Megan Jo Moerke of Virginia Commonwealth University, at the Cannon House Office Building for her day on Capitol Hill.



Raghav Tripathi at office of Senator Rob Wyden (D-OR).



2018 Washington Fellows Program

Submit your application by October 20, 2017

Program Mission

The mission of the ASPET 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. Fellows will develop an understanding of how public policy decisions made in Washington help shape science policy, such as funding for the National Institutes of Health and other science agencies. Fellows will also learn how to advocate effectively on Capitol Hill and in their home districts. This program will help Fellows develop the skills and insights to become future leaders in science.

What Will ASPET Fellows Do?

- **Advocate on Capitol Hill:** ASPET Fellows will come to Washington, DC, to meet with their congressional delegation to advocate for biomedical research and increased funding for the NIH. Fellows will be well trained by ASPET and prepared with the appropriate message to deliver to Congress. ASPET will cover transportation costs, hotel, and other reasonable expenses that follow ASPET's reimbursement policy.
- **Become Advocates in their Home Districts:** ASPET Fellows will meet with members of Congress in their home district, act as a conduit to inform colleagues within their departments/institutions about federal legislative matters, write op-ed pieces to local papers, etc. All these activities will be undertaken with the support and advice of ASPET.
- **Attend the ASPET Annual Meeting at Experimental Biology 2018:** ASPET Fellows will receive complimentary registration to attend the 2018 ASPET Annual Meeting in San Diego.

Who Should Apply?

The ASPET Washington Fellows Program is open to any graduate student, postdoctoral trainee, or researcher no more than four years past the completion of his/her postdoctoral training. Applicants must be members of ASPET in good standing and have a strong interest in science and its intersection with public policy. Fellows will be selected by the ASPET Science Policy Committee.

Application Information

ASPET anticipates up to 10 Washington Fellows Program participants in 2018. Fellows serve one-year terms.

All applications must contain the following information and be submitted by **October 20, 2017**, as a single combined PDF:

- A letter (no more than two pages) from the applicant stating their interest in public policy and why they are interested in the ASPET Washington Fellows Program
- A *Curriculum Vitae*
- A letter of support from the candidate's mentor and/or department chair

Submit your application to publicaffairs@aspet.org.

Incomplete applications and/or applications received after October 20, 2017, will not be considered.



For more info:
www.aspet.org/ASPET_Washington_Fellows_Program
(301) 634-7060
publicaffairs@aspet.org

 **ASPET**
Transforming Discoveries into Therapies
ASPET.ORG



Education News

ASPET Joins Health Professions Week 2017



ASPET is thrilled to participate for the first time in Health Professions Week (HPW) on November 6-10, 2017. HPW is an exciting, free, week-long virtual event for high school and college students interested in learning more about careers in health professions.

As part of the HPW virtual fair on November 8, ASPET will have a virtual booth where students can learn more about careers in pharmacology. High school and college students will have an opportunity to speak directly to ASPET member volunteers and learn about pharmacology and its sub-disciplines, different career paths, and the steps they need to take to pursue a career in pharmacology. Other events during HPW 2017 include an online treasure hunt, TED Talks, and more community outreach events. In addition to ASPET, there are 19 other health and science associations taking part in the event.

As part of the ASPET 2017 strategic plan, ASPET plans to expand on our outreach events not only to promote society membership, but also to educate the broader health and science community and the general public, and introduce and attract pre-college and undergraduates to pharmacology and its spectrum of careers. By taking part in HPW, we hope to begin making an impact toward these strategic planning goals.

Institutions with one or more participating health professions are invited to join HPW 2017 by providing practitioners for the virtual fair, hosting a Community Connect Day, providing a speaker or panel member for "A Day in the Life" video(s), and/or marketing HPW 2017.

To learn more about HPW 2017 and how to get involved, please visit <https://explorehealthcareers.org/hpw-get-involved/>. We appreciate your help in getting the word out about this exciting event to students who may be interested in registering.

Are you engaged in outreach about pharmacology in your community?

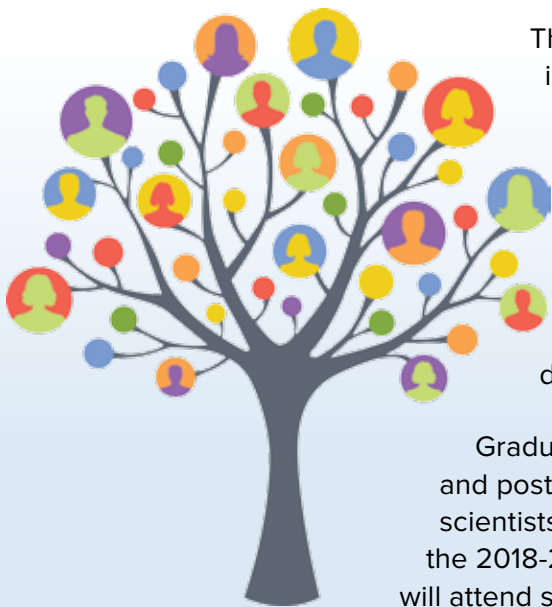
ASPET wants to hear from you!

Contact Dana Kauffman at dkauffman@aspet.org.

Your program may be featured in an upcoming issue of *The Pharmacologist*.



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



The *ASPET Mentoring Network: Coaching for Career Development* is a program designed to supplement the training that graduate students and postdoctoral trainees receive through their university programs. Now in its third year, the ASPET Mentoring Network focuses on developing skills needed to succeed scientifically, professionally, psychologically, and socially, 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.

Graduate students and postdoctoral scientists accepted into the 2018-2019 program will attend several events in association with Experimental Biology 2018 in San Diego, CA. These will include training and an informal reception on Friday, April 20; a half-day program on Saturday, April 21; and the Graduate Student-Postdoctoral Colloquium on Saturday afternoon. During this time, trainees will meet faculty coaches, other students and postdocs, and become part of a six-person coaching group.

Each trainee will also meet individually with their coach during the EB 2018 meeting and participate in virtual group meetings throughout the year, typically held as conference calls or webinars. Group events 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.

Who Is Eligible?

Graduate students and postdoctoral scientists who are members of ASPET are eligible to apply.



ASPET Mentoring Network participants at the ASPET Annual Meeting at EB 2017.

If you're not a member, it's easy to join! Please visit <https://www.aspet.org/membership/>.

What Support Is Provided?

Applicants are strongly encouraged to apply for an **ASPET travel award**. A small number of travel awards will be available through the Mentoring Network to help defray travel expenses for those with significant financial need who do not have other support. You will be able to indicate your interest in one of these special travel awards during the application process.

Applicants are encouraged to present an abstract at EB 2018, but it is not required to be eligible to apply. All participants will receive meals during the program.

What Is Required to Participate?

You must attend and participate in all Mentoring Network programming during EB 2018 and be an active participant with your coaching group for the following year. We are not able to accept participants who cannot attend EB 2018 or who are only available for a portion of the programming.

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.”

“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.”

“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.”

“ASPET's Mentoring Network program has provided me a unique lifelong opportunity to cultivate a strong mentor-mentee relationship and seek guidance on anything and everything for successful professional development. Moreover, the program has brought together trainees who face similar challenges during early scientific careers, which allows us to network with each other, along with mentors and find common solutions to any challenges we face.”

How Do I Apply?

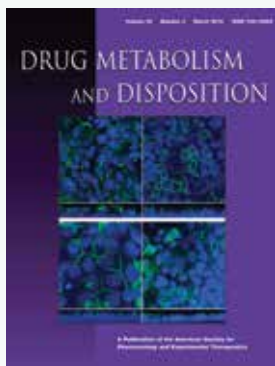
Applications for the ASPET Mentoring Network will open in late September. Please visit https://www.aspet.org/Education/ASPET_Mentoring_Network/ for additional details.

For more information contact Catherine L. Fry, PhD at cfry@aspnet.org.



Journals News

DMD Achieves Its Highest Impact Factor



Congratulations to ASPET's *Drug Metabolism and Disposition (DMD)* for earning an Impact Factor of 4.242 for 2016—the journal's highest Impact Factor (IF) ever! *DMD*'s rank among the 256 journals under pharmacology and pharmacy in the Journal Citation Report (JCR) rose from 66 for 2015 to 39 for the latest IF.

ASPET's other journals achieved respectable numbers in the 2016 JCR: *Molecular Pharmacology*'s Impact Factor is 3.922, and the journal is ranked 46th. *JPET* has an IF of 3.867 and is ranked 50th. The *Pharmacological Reviews* IF is 17.893, and it continues to be ranked second among pharmacology and pharmacy journals.

Congratulations to all of ASPET's editorial board members and authors!

Shorter Time to Deposit in PubMed Central

In June, ASPET began depositing eligible articles in PubMed Central on a continuous basis. These are articles funded by the NIH, the Wellcome Trust, and the Research Councils UK, as well as articles authored by NIH staff members.

An eligible article is sent to PubMed Central within three business days after the copyedited and formatted version goes online. Because ASPET is depositing articles on behalf of authors, PubMed Central will not accept the manuscript version that goes online as soon as the article is accepted for publication. The time for PubMed Central to process

the deposits can vary. However, ASPET articles are now assigned a PubMed Central ID much faster than in the past.

ASPET has been publishing content continuously since December 2013 so that copyedited and formatted articles appear online as soon as possible. In 2002, ASPET began publishing the manuscript version of articles upon acceptance. The Society is pleased to offer much quicker deposit in PubMed Central as our latest effort to improve our services to authors and readers.

ASPET Journals to Be Indexed by Meta/CZI



The Chan Zuckerberg Initiative (CZI), cofounded in December 2015 by Priscilla Chan, MD, and

Mark Zuckerberg, focuses on advancing human potential and promoting equal opportunity in order to “cure, prevent, or manage all diseases by the end of

the century.” CZI has initiated their efforts by working in the areas of science and education. To further their goals, CZI purchased the artificial intelligence search tool Meta in January 2017 and will make it free to all. Meta began as Sciencescape, a fee-based service.

According to the publication *TechCrunch*, Meta's artificial intelligence “recognizes authors and

citations between papers so it can surface the most important research instead of just what has the best” search engine optimization. Meta makes “it simple to discover relevant papers and prioritize which to read. It even adapts to provide feeds of updates on newly published research related to previous searches.”

Meta serves scientists and students, but has uses for funding organizations and schools as well.

The full-text HTML content from ASPET’s journals will be indexed by Meta. By inclusion in this powerful tool, the reach and usefulness of ASPET’s content will be extended—a benefit to readers and authors.

BenchSci – “Search for Proteins, Products, or Techniques”



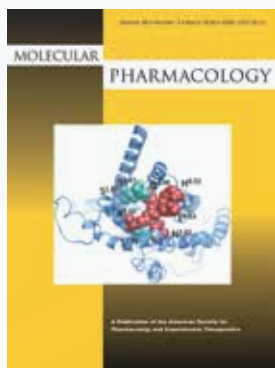
To further increase the discoverability and reach of content in ASPET’s journals, HTML articles will be included in an artificial intelligence-based search tool called BenchSci. This service, which is free to students and faculty, analyzes the text of scientific papers and extracts data to help researchers decide which biological compounds to use.

BenchSci’s power is in narrowing search results to provide only papers that have used the biological compound in question. BenchSci was created by a team of former bench scientists who spent hours and sometimes days searching for antibody usage data in the literature.

BenchSci is already in use at a number of research institutions, among them Baylor College of Medicine, Georgetown University, MD Anderson Cancer Center, Thomas Jefferson University, and the University of Toronto. Some pharmaceutical companies are using BenchSci as well.

A short video with more information about BenchSci is available at <https://www.youtube.com/watch?v=fPs5xzYYHSs>. Academics get free access to BenchSci by creating an account at <https://www.benchsci.com/signup/>. The service is available to those in industry for a fee.

Molecular Pharmacology Special Section on Receptor and Receptor Regulation: A Chinese Perspective



The September issue of *MolPharm* includes 12 articles and a commentary focused on receptors by leading Chinese scientists. Dr. Zijian Li at the Institute of Vascular Medicine, Peking University Third Hospital, served as special section guest editor.

The special section papers present impactful discoveries and insightful reviews in the field of receptors and receptor regulation, including G protein-coupled receptors, kinase-linked and related receptors, and nuclear receptors. The special section recognizes the broad range of active research and accomplishments in molecular pharmacology in China.

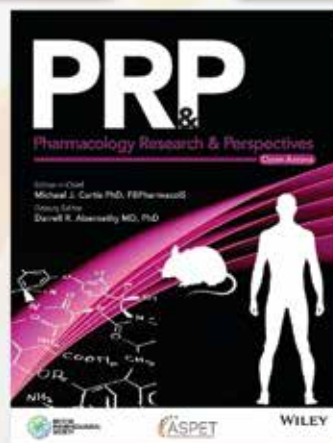
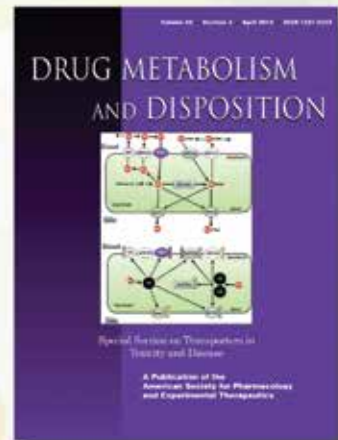
The special section papers will be freely accessible to all readers for 90 days and then again after 12 months from the date of publication. The manuscript version of each paper has been freely accessible since acceptance and remains freely accessible to all. ASPET members have access to all content in the Society’s journals as a member benefit. Please contact subscriptions@aspet.org if you need help accessing your member subscription.

New Associate Editor



The Board of Publications Trustees (BPT) is pleased to welcome Dr. Raymond Evers as a new *Molecular Pharmacology* associate editor. Dr. Evers is a director with Merck & Co. He has been an ASPET member since 2012 and served on the journal's Editorial and Advisory Board since the same year. Dr. Evers is also a member of the *Drug Metabolism and Disposition* Editorial Board. The BPT is grateful for his service to the journal in this increased capacity as an associate editor.

Submit Your Next Paper to an ASPET Journal



Visit us for more information: www.aspet.org/aspnet/journals



Membership News

Renew Your ASPET Membership For 2018

www.aspet.org/membership

The Benefits of Being an ASPET Member...

When joining any society, it's important to ask yourself: How will this benefit me personally and professionally, and how can I maximize the value of my membership?

Our Society has 5,000 members made up of researchers and students in academia, industry, and government from all over the world. We encourage career development of young scientists through the Travel Award Program. We offer our members the opportunity to become active within the scientific community. We are extremely proud to be associated with some of the world's most prominent scientists, who have made major contributions to pharmacology.

ASPET promotes networking opportunities during our annual meeting and facilitates interaction among members with similar research interests through its ten divisions. Did you know membership in our divisions is free? We offer a number of tangible benefits to our members, including free access to quality publications, reduced page charges, free manuscript submission, reduced meeting registrations, an opportunity to apply for awards, and much more.

If you are not taking advantage of your membership benefits, we encourage you to do so. It's our mission to place the necessary tools in your hands in order to promote pharmacological knowledge and its applications. **Renew your 2018 membership** and find out how you can maximize the value of your membership!



"I would like to thank you again for supporting my travel to such a great meeting. It was my first time attending the ASPET meeting, and I really enjoyed it and gained a lot. This would have not been possible without the support from ASPET."

- Dahea You, DPharm

"Thank you very much for providing the graduate student travel award for attending the wonderful EB conference this year. As this was my first-time experience, I really enjoyed the meeting and got lots of opportunity to learn pharmacological research."

- Dinesh Thapa, PhD

"Thank you again for the travel award. The conference offers a rich and engaging environment for students. I could not have made the trip without your support."

- Shannon Kozlovich

"The history of pharmacology and drugs has been the principal focus of my research over the years. For example, I am the author of *The Development of American Pharmacology: John J. Abel and the Shaping of a Discipline* (Johns Hopkins University Press, 1992). My major contribution to ASPET was to write a substantial article on the history of ASPET for *Molecular Interventions* as part of the centennial celebration (published in the December, 2007 issue). I was pleased to be proposed and accepted for membership 12 years ago, and I am delighted to know that I will continue to be an Emeritus member."

- John Parascandola, PhD

"I have a wonderful experience being a member of ASPET. It has given me the opportunity to interface and build long-lasting collaborative relationships with international peers. The beautiful administrative style, and particularly experienced and friendly administrative personnel of ASPET, made my participation in the recent EB 2017 Chicago Conference possible and extremely exciting."

- Jonah Sydney Aprioku, PhD

New Post-baccalaureate Membership Category

ASPET is pleased to announce that we have a new Post-baccalaureate category for membership. Persons who are less than 3 years past receipt of their bachelor's degree and engaged in post-baccalaureate training or professional development, and who have an interest in pharmacology are

welcome to apply for membership. Please let your colleagues and post-baccalaureates know about our new membership category and encourage them to apply. For more information, visit <https://www.aspet.org/membership/types/>.

Participate in the Member-Get-A-Member Campaign

When new members are asked, "How did you hear about ASPET?," the number one answer is through a colleague, mentor, or friend. Members, like yourself, are already recruiting new members to ASPET. Why not get credit for your efforts and possibly win prizes?

Participate in the **ASPET Member-Get-A-Member program** to be entered into a raffle to win an American Express gift card. The more members you recruit, the higher the gift card amount!

By helping us recruit new members, you will be contributing to the growth and sustainability of ASPET. 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.

How the Program Works:

1. Tell your colleagues, students, and friends about the benefits of ASPET membership. [See a full listing of member benefits.](#)
2. Encourage them to fill out an [application form online.](#)
3. Tell the applicant that they must enter your name and email address in the "Sponsor Name/Email" field on the application form.
4. Tell the applicant that they must enter the marketing code "MGM" in the field that asks, "Where did you hear about ASPET?"
5. Once they are approved for membership and their dues payment has been made, you will receive credit for your recruitment efforts.
6. The more members you recruit, the higher the prize drawing in which you will be entered.



7. Every MGM participant will be recognized for their recruitment efforts on our website and in *The Pharmacologist*.
8. Prize drawings will be picked in February 2018.

Prizes

1. Recruit 1-5 new members to be entered into the **\$25 American Express gift card** drawing.
2. Recruit 6-10 new members to be entered into the **\$50 American Express gift card** drawing.
3. Recruit 11+ new members to be entered into the **\$75 American Express gift card** drawing.

Helpful Tips

1. Student membership dues are listed on the ASPET website. Get your friends and students to apply for membership.
2. Start with your department – check to see if your friends, colleagues, and students in your department are members. If not, ask them to apply!
3. Contact the ASPET membership department if you need any recruitment materials such as membership brochures, flyers, and application forms.

If you have any questions about this program, visit <http://bit.ly/2xSgVdo> or email membership@aspet.org or call 301-634-7060.

New Members

AFFILIATE MEMBERS

Jon Fernandez, Franklin BioScience,
CO
Rosemarie A. Plaud, Alkermes, MA

REGULAR MEMBERS

Craig M. Crews, Yale Univ, CT
Dmitri R. Davydov, Washington State
Univ
Molly N. Downing, Ohio State Univ
Fan Fan, Univ of Mississippi Med Ctr
Bryan A. Flint Jr., TN
Gary A. Gudelsky, Univ of Cincinnati
Coll of Pharmacy, OH
Jianxiong Jiang, Univ of Cincinnati Coll
of Pharmacy, OH
Joshua T. Levitz, Weill Cornell Med, NY
Chioniso P. Masamha, Butler Univ, IN
Samia S. Messeha, Florida A&M Univ
Chatchai Muanprasat, Mahidol Univ,
Thailand
William Placzek, Univ of Alabama at
Birmingham
Mark M. Rasenick, Univ of Illinois -
College of Med
Nilank C. Shah, Touro Coll of
Osteopathic Med, NY
Varsha Suresh Kumar, Univ of Illinois at
Chicago

Matthew P. Torres, Georgia Inst of
Technology

POSTDOCTORAL MEMBERS

Nicole E. Frank, Coll of Western Idaho
Tomoka Gose, St. Jude Children's Res
Hospital, TN
Erica Holliday, Univ of Texas Med
Branch
Ryan P. Seguin, Univ of Washington
Kahli A. Smith, Howard Univ, DC
Luisa Torres, Cornell Univ, NY
Jared Tur, Univ of South Florida-Coll
of Pharmacy

GRADUATE STUDENT MEMBERS

Mohammed M. Alanazi, Nova
Southeastern Univ, FL
Mahmoud R. Almadhoun, Alazhar
Univ, Israel
Sandra E. Cabrera-Becerra, Instituto
Politecnico Nacional, ESM, Mexico
Adrienne B. Cromer, Kansas State Univ
Sean P. Doyle, Emory Univ, GA
Bettine E. Gibbs, Butler Univ, IN
Sterling Glass, Univ of Connecticut

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Austria
Thitikan Jirakittisonthon, Kansas
State Univ
Murad Kheder, Queensland Univ of
Tech, Australia
Kamal Kishor, Inst of Pesticide
Formulation Technology, India
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Univ, NY
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Med Science Campus
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Pharmaceutical Education & Res,
India
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Rico Med Sciences Campus
Christopher Sander, Case Western
Reserve Univ, OH
Dana J. Steffen, Univ of California
San Diego
Venkata Sure, Tulane Univ Sch of Med,
LA
Kaitlyn M. Tylor, Univ of Illinois at
Chicago

ASPET Commemorates the Following Members for Their 50 Years with the Society

H.P. Agersborg, PhD
George K. Aghajanian, MD
Burton M. Altura, PhD
Ervin E. Bagwell, PhD
Herbert Barry, PhD
William T. Beaver, MD
Hugh J. Burford, PhD
J. F. Douglas, PhD
Elinor M. Glauser, MD
William C. Govier, MD, PhD
K. R. Hornbrook, PhD
David Kessel, PhD

Harbans Lal, PhD
Robert A. Levine, MD
Keith L. MacCannell, MD, PhD
John L. McNay, MD
Michiko Okamoto, PhD
Stephen Oroszlan, PhD
John H. Peters, PhD
Doris T. Poole, PhD
Marcus M. Reidenberg, MD
Dewayne Roberts, PhD
Ronald P. Rubin, PhD
Hugues J. Ryser, MD, DrMed

Norman N. Share, PhD
N.T. Smith, MD
Roger P. Smith, PhD
Robert Snyder, PhD
Charles E. Spooner, PhD
Morley C. Sutter, MD, PhD
Hsueh-Hwa Wang, MD

Reem B. Youssef, Fac of Pharmacy
Cairo Univ, Egypt

Lillian Zerihun, Wake Forest Sch of
Med, NC

UNDERGRADUATE STUDENT MEMBERS

Kamarie Anderson, Univ of Arkansas
Viridiana Apodaca, San Diego City Coll,
CA

Samantha D. Arbour, Stetson Univ, FL
Kevin Darnell A. Atkinson, Boston Univ
Nabil Atlassy, Arizona State Univ
Yesenia Avitia, San Diego City Coll, CA
Samantha Barlock, Univ of Notre
Dame, IN

Katherine A. Bell, Gettysburg Coll, PA
Alyssa N. Bellomoc, Kean Univ, NJ
Grant M. Berland, Yale Univ, NY
Kathryn Bjornson, Hobart & William
Smith Colleges, NY

Shelby L. Blanton, Univ of Kentucky
Laura K. Blaser, Iowa State Univ
Marielle Bond, Univ of North Carolina at
Chapel Hill

Daniel R. Bota, Michigan State Univ
Kaitlin M. Budd, Oakland Univ, MI
Emily A. Carpenter, Univ of Dallas, TX
Daniela Castelblanco, Louisiana State
Univ Health Sciences

Gregory S. Chen, Cornell Univ, NY
Anna Cheng, Stony Brook Univ, NY

Yun Hwan Choi, Northwestern Univ, IL
Sammi Chung, Fordham Univ, NY
Kyra M. Clarke, Univ of Texas at Austin
Moriah M. Cobb, California State Univ -
Bakersfield

Dorothy A. Coe, Berea Coll, TN
Sarah I. Colon, Univ of Puerto Rico, Rio
Piedras Campus

Adelaide R. Cooke, Univ of North
Carolina - Chapel Hill
Samuel A. Curry, Morehouse Coll, TN
Jeanie L. Daviesc, Pennsylvania State
Univ

Christina E. Del Greco, Univ of Notre
Dame, IN
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Grant A. Fox, Thiel Coll, PA
Jerry Gao, New York Univ
Matthew L. Gehrlein, Univ of Texas -
Dallas

Rebecca A. Georgiadis, Univ of Notre
Dame, IN
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Baptist Univ, AR

Adam C. Graves, Univ of North Carolina
at Chapel Hill
Bryce A. Griffin, Univ of Arkansas Coll
of Med

Brittney L. Haynes, Michigan State Univ
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Kentucky

Antonio Hernandez, Univ of Illinois
at Chicago

Amy Hu, Rutgers Univ, NJ
Briana L. Huisken, Kalamazoo Coll, MI
Israh Ibrahim, Medaille Coll, NY
Haley N. Janowitz, Pennsylvania
State Univ

Karen Jimenez, Univ of Texas HSC at
San Antonio

Diane B. Karloff, Duke Univ, NC
Hyejin Kim, Rutgers Univ, NJ
Christian J. Kreiger, Ave Maria Univ, FL
Vinai S. Kumar, Southern Illinois Univ
Christopher B. Langer, Vassar Coll, NY
Shamara S. Lawrencec, Univ of
Arkansas at Pine Bluff

Serena Lee, Carnegie Mellon Univ, PA
Laura Lin, Univ of Arkansas for Med
Sciences

Zuiru Lin, SUNY Buffalo
Sabina R. London, Univ of Pennsylvania
Nikki McArthur, North Carolina State
Univ

Kennede C. McLeroy-Charles, Univ of
Arkansas at Pine Bluff

Shane A. Mecca, Michigan State Univ
Luke P. Miller, Michigan State Univ
Emily M. Morgan, San Diego State
Univ, CA

Devin W. Morrow, Univ of Kentucky
Rebeca Muniz Cruz, Univ of Puerto
Rico at Aguadilla

Rafae Nasim, Carnegie Mellon Univ, PA

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An Ode to Our Mentor: Professor Edward Leong Way (1916-2017)

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Eddie Way on assignment for the UCSF Alumni Magazine on May 31, 2014.

Edward Leong Way, known as “Eddie” to his friends and “E. Leong Way” to professional friends and colleagues throughout the world, former chairman of pharmacology and toxicology at UC San Francisco (1972-1978), president of ASPET (1976), and president of FASEB (1977), passed away peacefully in his sleep on June 12, 2017. He was 100 years old by the Western calendar, less than one month shy of his 101st birthday, but already 101 years old by the American-Chinese calendar that he grew up with. He will long be remembered for his contributions to drug metabolism research, opioid pharmacology including theories about opioid addiction, tolerance, and dependence, and a western understanding of Chinese traditional medicine. But he will equally be remembered for his love of golf, ballroom dancing, and the many budding scientists, postdocs, physicians, colleagues, and friends whom he mentored over a remarkable 75 years of professional life from the time that he earned the first PhD awarded in pharmaceutical chemistry from the newly formed School of Pharmacy at the University of California, San Francisco, in 1942. UCSF, at the time, was still officially part of the UC Berkeley campus.

In the simplest biographical terms, Eddie was born and grew up in Watsonville, California. His father was Leong Man Way (born in China) and his mother was

Shew Shee Leong (born in China). He lived most of his life in San Francisco, married Madeline Li (Maddy) in 1944, and had two children, Eric and Linette Leong. (In China, the family name comes first. According to Eric Leong, when his grandfather emigrated to the U.S. from China, immigration assumed that his last name “Way” was his family name; hence, “Way” became Eddie’s last name. The family name was corrected to “Leong” on Eric’s birth certificate. That is why Eric’s name is Eric Way Leong, but his father’s name was Edward Leong Way. In addition to his surviving son Eric and two grandsons (Andrew and Brian Leong), Eddie is survived by his younger brother, James L. Way (“Jimmy”), who followed in Eddie’s footsteps and also earned a PhD in pharmacology. Eddie became a member of ASPET in 1947 and Jimmy became a member in 1957.

According to recollections that Eddie provided to *UCSF Magazine* in 2014, “My father came over from China when he was eight years old, and by the time he was 18 he was the richest man in Watsonville. Over the course of 10 years, he and my mom had eight children. I was born in 1916. Originally, Watsonville was known for growing strawberries, but my dad started packing and drying apples; 1926 was a banner year, but my pop guessed wrong on the price of apples. We lost everything. That’s when we moved to San Francisco.”

In further recollections from Eddie’s son Eric, “My grandfather and grandmother settled into running a speakeasy and gambling joint in the Fillmore in San Francisco after the apple business failed and a restaurant failed. The establishment offered poker, keno, pai gow, and mahjong. Naturally, as a member of the family, he (my father) had to help out. Times were a little hard. Dad mentioned to me sometimes that they only had relish and mayonnaise sandwiches for school lunch. In high school, he was a Chinatown tour guide. At UC Berkeley, he worked odd jobs to support himself. One example was cleaning a sorority where he came to the conclusion that girls were really messy. My father was proud of his parents who managed to send him and his brothers and sisters to UC Berkeley.”

Eddie earned a bachelor's degree in pharmacy in 1938 and a master's degree in pharmaceutical chemistry in 1940 from what was then called the College of Pharmacy of the University of California. Although located on Parnassus Heights in San Francisco, the campus was at that time administered by UC Berkeley; later it became its own campus, the UC Medical Center in San Francisco, and finally UCSF. Eddie's 1942 doctoral dissertation was on "A Study of p-Sulfonamido- and p-(p-Sulfophenyl)-phenylarsonic Acids and Certain of Their Derivatives." His mentors included John Oneto, professor of

pharmaceutical chemistry, Chauncey Leake, the founding chairman of pharmacology, and Carl L. A. Schmidt, dean of the School of Pharmacy who coincidentally was my grandfather. I became Eddie's graduate student in 1972.

It was during his student days at UCSF that Eddie learned one of his most enduring traits. In his own words, as reflected in a 2014 interview with *UCSF Magazine*, "There are several professors I remember from when I was a student at UCSF: John Oneto, Troy Daniels, and Chauncey Leake. During the Depression, I worked outside jobs, and I had trouble keeping awake in Chauncey's class. He was a beautiful lecturer – powerful voice. But one afternoon, Chauncey stopped lecturing and said, "Will someone wake up that young man?" He bawled me out for being rude. After class, I sneaked out and ran away. Later, when I was at Merck, I got a letter from someone at George Washington University who wanted to recruit me to pharmacology. Well, my degree isn't in pharmacology, so I tried to brush him off. Chauncey had recommended me for the job. He's one of the few who had the greatest influence on my career."

Eddie's time at Merck & Co. was remarkably short (6 months as a pharmaceutical chemist between 1942 and 1943). Realizing that his passion lay in teaching and independent research (he had been a teaching assistant in the UCSF College of Pharmacy for two years prior to earning his PhD), he joined the faculty of the Department of Pharmacology and Toxicology at George Washington University in 1943. Eddie's transition from studying arsenicals to opioids came via a circuitous path during the time that he was a faculty member at George Washington University. As recalled in an interview with Lynn E. DeLisi in 2006, Eddie explained his transition as follows:

"I finished my studies on the biologic activity of my arsenic compounds. I found they weren't much good in their action on trypanosomes. After these negative findings I shifted my research to studying narcotic drugs. I was sort of gently nudged into the field. At that time, meperidine, Demerol, the first synthetic opiate-like analgesic was introduced. Meperidine, at the time known as isonipecaine, was designed to be a substitute smooth muscle relaxant for atropine but was serendipitously discovered to be analgesic. I asked Dr. Roth, the chairman of the department who had hired me, what we knew about the vagal inhibitory



Eddie Way and Chauncey Leake

properties of meperidine. He said, “Why don’t you study it on frogs, Doctor?” I tried to put him off but the week following Dr. Roth said, “Your frogs have arrived for your research, Doctor.” I got the message, and that’s how I got hooked on narcotics for good. When P. K. Smith succeeded Roth as chairman in 1946, he suggested I do drug metabolism studies because the field was better suited to my background and training. P.K. was interested in acetyl salicylic acid, good old aspirin, and supported me to study the biodisposition of p-amino-salicylic-acid. So, that’s how drug metabolism became my main research field. I received an NIH grant that I held for about 20 years, studying the biodisposition of opiate drugs, morphine, codeine, heroin, meperidine, methadone, and 1-acetylmethadone, LAAM.”

At Chauncey Leake’s invitation, Eddie returned to UCSF in 1948 and spent the rest of his career as a member of the UCSF faculty. He retired in 1987, and even then, as professor emeritus of pharmacology, toxicology, and pharmaceutical chemistry, he maintained his own office as he worked on several volumes detailing traditional Chinese medicine and contemporary Chinese pharmacology.

As a faculty member and mentor, Eddie was proudest of his students and postdocs, and he was never afraid to celebrate their achievements. We all can remember his admonition that his own measurement of professional success came only when his students become more successful than “The Old Man.” During his career, Eddie published over 400 papers, many with his students (of which 266 can still be accessed via PubMed as of this writing) and 4 books as editor or co-editor. He also contributed to countless other volumes that are listed in his archive collection at UCSF (1). Two of his contributions were autobiographical sketches that he published in 1979 (2) and 1992 (3).

Perhaps the best way to summarize his impact is in the words of those who were his students, postdocs, and colleagues who wrote the following messages upon hearing about his death:

James Fujimoto, PhD (graduate student in 1950s; professor emeritus, pharmacology, University of Wisconsin): Eddie’s game was golf. He took us out to the par 3 Golden Gate Park (excellent) course to relax. This tradition continued at national meetings. At the Atlantic City Golf Club, Eddie was driving our

cart down the fairway at a good clip up a small hill. We landed right in the middle of a sand trap, not hurt but very embarrassed. On another occasion there, it rained; we stopped but wanted to play on. But, the caddies quit, so we had to also. The Atlantic City FASEB Meetings were always memorable because we would have a chance to visit New York City before we caught the train to Atlantic City. One time, Eddie arranged for Jack Miller and me to stay at the YMCA Sloane House in New York City. Eddie was to pick us up at the Y to visit New York. As Jack and I waited for Eddie in front of the Y, a shiny black limo driven by a black cap and black-suited driver stopped in front of the Y. We wondered why such an elegant car would be stopping there. Out pops Eddy: it was Maddy’s dad’s limo. Eddy and Maddy loved the big bands. Favorites were Glen Miller, Artie Shaw, Tommy Dorsey, and Harry James. Songs like Moonlight Serenade, Stardust, etc. were highlights. But, most of all, Eddie and Maddy always made it point to introduce us graduate students to people they met.

Charles Inturrisi, PhD (professor of pharmacology, Cornell University): My mentor in pharmacology was Jim Fujimoto, and each year Eddie would pay at least one visit to New Orleans. This meant a meeting with Jim’s graduate students and a golf game. Jim was a very focused golfer and Eddie was certainly his equal. However, Eddie loved to “argue” about strokes throughout the match. This was even more intense when A.K. Takemori joined us. On one visit Eddie and Maddy took me and my new bride, Barbara, to Galatoire’s for dinner. This was well beyond our student budget, so we were delighted with the meal and the company. Today when we revisit New Orleans, we make a point of going to Galatoire’s and reminiscing. When introducing Eddie to fellow students at Tulane, I described Eddie as my “pharmacological grandfather.” Eddie loved the title and from then on he always greeted me as “grandson.” In many ways Eddie watched over his grandson and was always a source of support as I developed my career in opioid pharmacology. Eddie, you will always be loved and remembered by those fortunate enough to be part of your world.

Harvey Kupferberg, PhD (graduate student in 1960s; retired chief of preclinical pharmacology, NINDS Epilepsy Branch): I cried when I heard he had died. I truly loved him. His devotion to his people

who he mentored was unique. As I completed my PhD, I was depressed with a rejection letter from B.B. Brodie telling me that my application to postdoc in his laboratory was denied. Eddie found me at my desk and asked me why I was so saddened. I told him of my rejection. His immediate comment was, why I did not tell him of my post-doctoral plans? Then he said that studying under his direction, deciding on where I would post-doc was a joint decision. He took me into his office, called Dr. Brodie (calling him by his nickname "Steve") and negotiated my acceptance. As I left his office he said to me, "All I can do is open the door for you, so don't screw up." I went to the NIH Heart Institute the following year. And the rest is history. Eddie's faith in me followed me throughout my career. I was not going to let him down. He was one of a kind.

Collin Quock, MD (medical student in 1960s; internist and cardiologist in San Francisco): E. Leong Way lectured to my medical class at UCSF in 1962; that was my first exposure to him. A year later I was looking for a summer student fellowship abroad and learned he was on sabbatical at the University of Hong Kong. He interviewed me on a trip back at Parnassus. I spent that summer working the basics of thin-layer chromatography in his lab, visiting the addict wards at Castle Peak Hospital, helping with the nalorphine pupil test there, and making clinical visits he arranged for me at the medical school and with Project Concern. I am so grateful to him for this wonderful experience, my first visit to the land of my Chinese heritage. Every day he took a noon nap after dusting himself with baking soda to kill off the humid tropical perspiration. That's when I saw his gigantic, heroic sneeze; boy, could he sneeze! He loved golf, kept a ball and club in the lab, and would take a break putting into a water tumbler. In the years that followed, we saw each other on many occasions. Betty asked him to lead the dancing with her at my seventieth birthday dinner. He loved ballroom dancing! It was heart-breaking to see the vigor slip away these last few years; but Eddie must be very happy now. I can see him swaying away with his beloved Maddy to eternal melodies in Paradise. Enjoy the music, Professor, you've more than earned it!

Raymond Quock, PhD (summer student in 1960s; professor of psychology, Washington State University): To the Chief, who gave a 16-year old high

school student a chance to do odds and ends in his research laboratory at UCSF and launched him on a career in pharmacology. He was a great inspiration to me as a boss, mentor, and friend. I will remember him always.

David Smith, MD (medical student in 1960s; founder of the Haight-Ashbury Free Clinic): I had the privilege of meeting Eddie while I was in medical school at UCSF and enrolled in the master's program in pharmacology. Eddie's research and understanding of the brain's complex system for responding to opioid medication was very pivotal in my training for a career in addiction medicine. When I founded the HAFC in June of 1967, during a turbulent and controversial time, Eddie continued to be supportive of our efforts to treat addicted youth. He was a leader in so many areas, including the Committee on Problems of Drug Dependence, which he encouraged me to become involved with. I enjoyed those opportunities to play golf with him and attend his birthday parties, where he entertained the crowd with his fancy dance steps. I share the sadness with Eddie's friends and family on the passing of this wonderful man.

R. Adron Harris, PhD (postdoctoral scholar in 1970s; professor and director, Waggoner Center for Alcohol and Addiction Research, University of Texas): It is striking that so many of us who worked in the UCSF Department of Pharmacology in the 1970s - when Eddie was Chairman - have remained good friends and colleagues. For example, Bob Hitzemann and I have not been in the same institution for 40 years, but we continue to collaborate on research projects. This reflects Eddie's promotion of a scientific community where social camaraderie was key to promoting both scientific interactions and an enjoyable life. Eddie frequently organized departmental and laboratory social events, which always included dancing! These were wonderful events that in some ways influenced the rest of our lives.

Ping-Yee Law, PhD (postdoctoral scholar in 1970s; professor of pharmacology, University of Minnesota Twin Cities): Eddie had been a great influence on my career. I had just finished my two years of post-doctoral fellowship at the UCSF Cardiovascular Research Institute in the laboratory of Dr. Isidore Edelman in 1975 and was not sure of which research direction I was going to do. I somehow ended up under the umbrella of Horace Loh and

Eddie and started getting myself involved with opioid pharmacology. That was before John Hughes and Hans Kosterlitz published their seminal discovery of enkephalin. Eddie thought that there should be an endogenous opioid antagonist, and I was put in charge of isolating such entity from rodent brains. In one of the causal encounters that I had with Eddie at that time, he told me something that I always remember throughout my career. He told me: "Ping, biochemist is a dime a dozen. Learn pharmacology, and you can be a biochemical pharmacologist." His insightful advice at that stage of my career really helped me to formulate my career. I am forever grateful and privileged to be one of the people whose lives Eddie had touched.

Eddie T. Wei, PhD (graduate student in 1960s who was always called "Junior" to Eddie's "Senior" even though they had no biological relationship; professor emeritus of toxicology, UC Berkeley): What a wonderful man! Charlie Hine was my mentor

in toxicology. ELW had invented the morphine base tablet for making mice dependent, and he and Horace published in *Science* that dependence was linked to 5-HT turnover. Avram Goldstein could not repeat this experiment, and there was a bit of heat. I was also down in Stanford postdocing in Avram's lab in the first half of 1970. NIDA got started at that time and was handing out grants. Sol Snyder was starting out with Candace Pert on opiate receptor binding, and enkephalins were on the horizon to be isolated and characterized. C.H. Li had beta-endorphin, and I think he is Horace's uncle or some relative. Exciting times for the INRC meetings, culminating in a meeting in Aberdeen in 1976. Very active times for Senior. Later, when I started out as assistant professor at Berkeley in September 1970, my first "site visitor" from NIDA that December was Prof. Way. This NIH grant ran for 28 years. He also helped me get tenure. Senior, in later years, also brought over UCSF Chancellor Julius Krevans several times to discreetly play golf with me at El Cerrito. I have never seen a chancellor so pleased with himself as when he sank a long birdie putt. There was never any talk of politics or even science, just camaraderie, jokes, humor, and fun. Golf continued after his 90th birthday, with a round at Sharp Park with H.L. Wen, the neurosurgeon from Hong Kong. Thank you for the warmth, kindness, and friendship!

Berry Berkowitz, PhD (graduate student in 1960s; president and CEO, Cetek Corp.): As Barbara and I arrived in San Francisco to begin my PhD studies, Eddie and Maddy treated us as family from the start and that never stopped as long as either was alive and is forever appreciated. This was reinforced with Eddie and his brother Jim hosting networking late night "parties" at the FASEB meetings in Atlantic City at the Dennis Hotel – where students and worldwide science leaders were all brought together – as scientific family. Eddie has a claim not only as a pioneer of opiate pharmacology but also of pioneering scientific networking. Finally, who does not recall Eddie's love of and skills with dancing -- there is no doubt our Eddie Way is now truly dancing with the stars.

John Holaday, PhD (graduate student in 1970s; executive chairman, ExoCyte Therapeutics): Perhaps one memory that comes



Horace Loh, I.K. Ho, and Eddie Way in the 1970s.



Courtesy of Ed Iwamoto

Eddie Way golfing at Sharp Park, Pacifica, CA on July 11, 2005.

to mind is when I was running EntreMed and we did a licensing agreement with Celgene on thalidomide. We developed it, and they made a business out of it. Interestingly, Eddie invested in Celgene (not EntreMed) and made a killing. We always joked about that. I also recall that, when we celebrated Chauncey Leake's birthday in the auditorium at HSW, Eddie made the introductory comments. Two remarkable pioneers in pharmacology! At our 60th birthday party for Eddie, a marker that all of us passed a few years ago, we had a few libations and Eddie took a nap in the corner. More memories flash in front of me, and always Eddie is smiling and laughing. He still is....

Juan García-Huidobro, PhD (graduate student in 1970s, known as JPablo to his friends; retired professor and chairman of pharmacology, dean, Universidad Católica de Chile): Eddie was very impressed by the fact that after Isa and I were married for a few years, we were blessed by three successful pregnancies, our first three children. Based on this number, he used to introduce me to his colleagues at pharmacology meetings as "my most productive, no, no, sorry, my most reproductive student!" On another occasion while attending a Latin-American pharmacology meeting held in Santiago in 1998, I had arranged to invite Eddie, Horace, Harris, and Holaday with the scientific excuse of an opiate receptor pharmacology symposium. After the morning event, Holaday invited the speakers for a golfing afternoon. Eddie had a great time beating Horace. That night,

Isa and I organized a Latino night at our place which included plenty of Chilean wine and music. Before the music started, Eddie talked to our daughters (then 8, 7, and 5) about dancing, to which they replied the music was not as yet going. He immediately began whistling and singing with a rumba rhythm: "uno, dos, tres, cha cha cha!" My daughters were between delighted and impressed and called him since then, the "one, two, three, cha cha cha" professor. They were really sad when the word spread of his passing away last month since after 30 years they still recalled that magical moment. I really think, looking back, that in the duet of Chauncey Leake plus Eddie, we had two bon-vivant pharmacologists who spread pharmacological enthusiasm and joy of life.

William K. Schmidt, PhD (graduate student in 1970s; president, NorthStar Consulting): Eddie meant a great deal to all of us, and maybe even more so to me since he was one of my grandfather's graduate students (my grandfather, Carl L. A. Schmidt, was the Dean of the School of Pharmacy from 1937-1944). I honestly didn't know this when I applied for a summer position in Eddie Way's lab after completing my bachelor's degree in biochemistry at UC Berkeley. This was during the Vietnam War days, and I had such a low draft number that I didn't even bother applying to graduate school. At the end of the summer, my draft board sent me a note indicating that they had filled their quota for the year and I was free to do whatever I wanted. With graduate school starting only a week later, Eddie told me that I should apply. One of the check-box questions on the application was whether any of my relatives had ever worked for the university. I checked "yes" and didn't think anything more about it. Soon thereafter, the Chief came over to my desk and asked who this relative was, and when I mentioned my grandfather's name, he exclaimed, "You're in!" and clapped his hands louder than anyone I've heard before or since. I had only then realized that he had been my grandfather's first PhD graduate student in the newly formed UCSF School of Pharmacy. I became "addicted" to the pharmacology of opioids, opioid antagonists, and to non-opioid analgesics while working in Eddie's laboratory, which has carried me through a career of developing entirely new types of drugs to treat pain, opioid side effects, and narcotic addiction throughout my career.

Edgar T. Iwamoto, PhD (graduate student in 1970s; professor emeritus of pharmacology and

nutritional sciences, University of Kentucky): E. Leong Way had *Abel Number 3*, that is, he published with P. K. Smith who published with H. G. Barbour who published with John Jacob Abel, the founder of ASPET and the *Journal of Pharmacology and Experimental Therapeutics*. Many of Eddie's students, postdoctoral fellows, and scholars who studied with him continued with *Abel Number 4* including: Chen-yu Sung, Terry Adler, Jim Fujimoto, Ake Takemori, Bob George, Vee Sutherland, Nick Plotnikoff, John Kemp, Pushkar Kaul, Norio Kokka, Shi-chia Lin, Gladys Friedler, Horace Loh, Barry Berkowitz, Grant Wilkinson, Adron Harris, Ing Kang Ho, Hemendra Bhargava, Edgar Iwamoto, Ray Quock, David Brase, Eddie Wei, Larry Masten, Bill Schmidt, Stella Chao, Harvey Kupferberg, Khursheed Asghar, and Carol Glasgow. Foreign scholars included Jens Schou, Abdel Afifi, Juan Pablo Huidobro-Toro, Kaito Tsurami, Kohji Yoshimura, Hiroaki Yamamoto, Yoshio Yamasaki, Ikuo Yamamoto, David Chapman, Kang Tsou, Jean Hu, and Ahmad Rezvani. Medical students included Lloyd Old, Ken Melmon, Ron Okun, Walter Way, Collin Quock, Fu-Shiung Shen, Ben P. N. Mo, Joe Asling, Joe Young, and Dirk van Peenen.

Mary Vore Iwamoto, PhD (faculty colleague; former Chair and Professor Emerita, Department of Toxicology & Cancer Biology, University of Kentucky): Eddie Way (he was Dr. Way to me) offered me my first faculty position as assistant professor of toxicology when he was chair of the Department of Pharmacology and Toxicology, thus beginning my career. He was an outstanding chair and mentor. At my two-year evaluation, Dr. Way noted that I was "short on published remarks," which served to kick me into a higher gear! I was impressed with Dr. Way's commitment to pharmacology - he was always a staunch advocate of the discipline as a chair, as president of ASPET in 1976, and as president of FASEB in 1977. He also trained a certain Edgar Iwamoto, PhD, whom I met soon after arriving at UCSF, now my husband of 40+ years! Dr. Way then became "Eddie," a warm and gracious scientific father-in-law.

Ahmad Rezvani, PhD, PharmD (visiting scholar in 1980s; former Professor & Head of Pharmacology, University of Tehran): Dr. Way was always very kind to me. When I asked him why he is so supportive and kind he replied, 'Life is short!' Although not so short for him, his life was full of humanity and good deeds.

William L. Dewey, PhD (colleague and friend;

professor and chair of pharmacology, Virginia Commonwealth University): My memories of Eddie start with the best thing I can say about him or anyone for that matter: Eddie was a real good friend. I always sought Eddie's company when at meetings because it was always fun to be with him. I very much enjoyed visiting his lab at UCSF and was pleased to host him in my home both in North Carolina and here in Richmond. Like so many other folks I am very appreciative of the way Eddie helped my career. One example was he appointed me chair of the program committee for ASPET when he was president, and it was a real stepping stone for me. Another debt I owe Eddie had to do with his love of dancing because, as he would dance with women at receptions and other functions, it gave me the opportunity to dance with Maddy. Still another memory has to do with our playing golf together so many times, and the heckling back and forth was such fun. One summer we played in the U.S., Canada, and Mexico, and we had a great time, neither ever giving into the other who was the better golfer! Eddie had a great way of picking on you in such a way that it was most enjoyable. Did anyone ever get the best of him? I could go on and on but will end as I started: Eddie Way was a pleasure, an excellent scientist, and a friend who one could always count on.

Fred Nyberg, PhD (Uppsala University, Sweden; president of the International Narcotics Research Conference, INRC; letter of remembrance to INRC members, June 2017): Eddie Way has meant a lot for the INRC organization. He was among the group of scientists who initiated INRC, and in 1979 he acted as responsible chairperson for the INRC at the Seacrest Hotel, N. Falmouth, MA, USA. From 1984 to 1987 Dr. Way served as president for the INRC, and this activity was followed by his 10 years as treasurer of the organization. On the behalf of the INRC executive committee members, I hereby express my deep sadness but also my thankfulness to Eddie Way, thanking him for all his outstanding contributions to the INRC. The memory of his positive view on life, high quality in science, and nice personality will remain.

And finally, among the most enduring traits of our professor and mentor was his keen sense of humor. In his Chinese New Year's letter to his friends and former students in the year following his 90th birthday, where he thrilled the crowd by his still very able ballroom dancing, he penned the following:



Eddie Way and Friends, 90th Birthday Group Photo (July 9, 2005)

The old man did a jitterbug with what was intended to be with one partner but was connived to include a line-up of perhaps nearly two dozen or so gals. It was fun. One of the ladies at the occasion asked the old man, "how do you keep yourself so wonderfully fit?" I told her, "I drink one glass of wine, usually champagne, every night for dinner, golf and dance twice a week and the only drug I take is viagra, and when she's quickly add, "but only three times a day!" So after such wishful dreaming and with the sun setting, the final bit of wisdom the old man has left to impart is the moral "when you get to 90, fear not to be a smart-ass - at this age the ladies will no longer consider you a dirty old man."

As Eddie's friends and colleagues have said above, "Enjoy the music, Professor, you've more than earned it! ... There is no doubt our Eddie Way is now truly dancing with the stars."

Submitted by William K. Schmidt, PhD, and Dr. Way's many students, friends, and colleagues

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Video Oral History: E. Leong Way Oral History: Archives and Special Collections at the UCSF Library (October 21, 2014; 36 minutes; <http://archive.org/details/ELeongWayOralHistory>)

Video Interview: Ginny's... Where East Meets West: Eddie Leong Way (13 minutes; www.youtube.com/watch?v=Nbh_slfBj3Y&feature=youtu.be)

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- 1962 American Pharmaceutical Association, Ebert Prize
- 1962 China Medical Board Research Fellowship, University of Hong Kong
- 1978 Gold Medal and Cultural Citation from the Ministry of Education, Republic of China
- 1979 Nathan B. Eddy Memorial Award for outstanding research in drug dependence, College on Problems of Drug Dependence (CPDD)
- 1986 Chancellor's Award for Public Service, UCSF
- 1990 Distinguished Alumnus, UCSF School of Pharmacy
- 1992 Torald Sollman Award from the American Society for Pharmacology & Experimental Therapeutics
- 1993 Asian Pacific American Systemwide Alliance, Achievement in Leadership
- 2001 Lifetime Achievement Award, Chinese Historical Society of America

A Tribute to Dr. James Woolley Gibb (1933 – 2017)



Dr. James W. Gibb passed away on July 7, 2017. He received his BS and MS from the University of Alberta. He received his PhD from the Department of Pharmacology, University of Michigan, under the direction of Dr. Theodore M. Brody. He was the first pharmacology research associate trainee fellow at the National Institutes of Health (NIH), under the direction of Dr. Sidney Udenfriend.

In 1967, Dr. Gibb joined the University of Utah as an assistant professor of pharmacology in the Colleges of Medicine and Pharmacy. Four years later, he became an associate professor, as well as chairman of the Department of Biochemical Pharmacology and Toxicology (later reorganized as the Department of Pharmacology and Toxicology). He became a professor in 1975, and continued as chairman through 1998. Numerous graduate students were trained during his tenure as chairman, including many from his own laboratory. The students and postdoctoral fellows with whom he interacted have gone on to prominent positions in academia, industry, and government, and are a testimony to the outstanding, nationally recognized pharmacology program that flourished under his direction.

Dr. Gibb served on numerous ASPET committees including the Nominating, Educational Affairs Executive, Long Range Planning, Neuropharmacology Executive, Program, and Investment Finance Committees. He was secretary-treasurer of ASPET from 1992–1995. He served ASPET as a specific field editor for the *Journal of Pharmacology and Experimental Therapeutics*. His national service was not restricted to ASPET, as he served on numerous panels including as chair of an NIGMS Pharmacological Sciences Study Section. He also served as a member of the publication committees of the College on Problems of Drug Dependence and the American Society of Clinical Pharmacology and Therapeutics. He was president of the Catecholamine Club. For many years, Dr. Gibb was an associate in the Corporate Office of Science and Technology, Johnson and Johnson.

Dr. Gibb was committed to local community outreach, as exemplified by his long-term service as an associate director of the Utah School on Alcoholism and Other Drug Dependencies. He also served as a member and chair of the Utah State Board of Substance Abuse.

Dr. Gibb oversaw a highly productive research program that was funded continuously by the NIH for many years. In recognition of his distinguished career, Dr. Gibb was awarded the 2006 Outstanding Alumnus Award from the Department of Pharmacology at the University of Michigan. He was a member of ASPET since 1972.

Submitted by Annette Fleckenstein, PhD



Members in the News

Achievements, Awards, Promotions, and Scientific Breakthroughs



Margaret Gnegy, PhD

University of Michigan Medical School

The Center for the Education of Women (CEW) at the University of Michigan has announced the endowment of the Margaret E. Gnegy Scholarship. This fund will support women graduate

students in life and medical sciences who have additional barriers to their education compared to traditional students. These barriers include returning to school after a 5-year gap, and/or being a primary caregiver to dependents.

This award is a testament to Dr. Gnegy's incredible expertise in mentoring, as well as to her extensive contributions to graduate education, both locally and nationally.

Dr. Gnegy is a professor in the Department of Pharmacology at the University of Michigan Medical School, and a past chair of the Division for Neuropharmacology of ASPET.

Dr. Gnegy is ASPET's Secretary/Treasurer-Elect. She has been a member of ASPET since 1981 and is a member of the **Divisions for Neuropharmacology,**

Behavioral Pharmacology, and **Molecular Pharmacology.**

Palmer Taylor, PhD

University of California, San Diego

At the July annual meeting of the American Association of Colleges of Pharmacy,

Palmer Taylor, PhD, received the 2017 Ernest Volwiler Research Achievement Award in Pharmacy.

The late Ernest Volwiler, for whom the award is named, was a chemist and director of research and CEO at Abbott Laboratories for many years. He was the developer of nembutal and thiopental as sedative and anesthetic pharmaceuticals and oversaw the development and commercialization of several antimicrobials for Abbott.

Dr. Taylor has been on the faculty at the University of California, San Diego (UCSD) since 1971. He has served as Founding Chair of the Department of Pharmacology from 1987 until 2002, the first basic science department to emerge in the School of Medicine at UCSD. In 2002, with the establishment of the second school of pharmacy in the University of California system, he became Founding Dean of the Skaggs School of Pharmacy & Pharmaceutical Sciences on the Health Sciences Campus in La Jolla, holding that position until 2015. Dr. Taylor received his BS and PhD in physical pharmacy at the University of Wisconsin. He completed his postdoctoral studies at the National Institutes of Health (NIH) and at the then newly established Medical Research Council Molecular Pharmacology unit, under Sir Arnold Burgen in Cambridge, England.

Dr. Taylor's research is directed to molecular recognition using physical-chemical methods to understand drug interactions with their protein recognition sites, concentrating on the cholinergic nervous system, with acetylcholinesterase and the nicotinic acetylcholine receptor being the primary targets. His investigations, which include several collaborations with faculty at UCSD and the neighboring Scripps Research Institute, encompass the development of agents of potential use in



aberrations of nervous system development, such as schizophrenia and autism, and aging disorders of neurodegeneration and dementias. Investigations with cholinesterase structure and function are now directed to mechanisms of reactivation following organophosphate pesticide or nerve agent exposure. He has served on several ASPET committees and boards and as president of ASPET in 1995.

Dr. Taylor has been a member of ASPET since 1973 and is a member of the **Divisions for Molecular Pharmacology, Neuropharmacology, and Toxicology.**



Bruce Hammock, PhD

University of California, Davis

Bruce Hammock, PhD, Distinguished Professor of Entomology, holds a joint appointment with the University of California, Davis, Department of Entomology and

Nematology, and the UC Davis Comprehensive Cancer Center. He will receive the Eicosanoid Research Foundation (ERF) Outstanding Achievement Award in the area of Epoxy Fatty Acids, which is sponsored by Avanti Polar Lipids. He will receive this award during the 15th International Bioactive Lipids Conference, taking place October 22-25, 2017 in Puerto Vallarta, Mexico. This award is given for a lifetime of research in the lipid field. In 1970, Dr. Hammock and his colleague Sarjeet Gill, PhD, discovered the enzyme that degrades fatty acid epoxides and its inhibitor. This led to over 1800 peer reviewed publications on the enzyme target just last year and 8000 since their first paper in 1972.

Dr. Hammock's laboratory currently studies the control of acute and neuropathic pain by inhibiting the hydrolysis of epoxy fatty acid chemical mediators. He and his colleagues have developed non-addictive pain relieving agents, which are being moved into human testing for pain relief.

Dr. Hammock is a fellow of the National Academy of Inventors, which honors academic invention and encourages translations of inventions to benefit society. He is a member of the U.S. National Academy of Sciences, a fellow of the Entomological Society of America, a Burroughs Wellcome Toxicology Scholar, and the recipient of ASPET's Bernard B. Brodie Award

in Drug Metabolism. He directs the campus-wide Superfund Research Program, the National Institutes of Health Biotechnology Training Program, and the National Institute of Environmental Health Sciences (NIEHS) Analytical Laboratory.

Dr. Hammock has been a member of ASPET since 2003 and is a member of the **Divisions for Toxicology, Neuropharmacology, Cardiovascular Pharmacology, Drug Metabolism and Disposition, and Molecular Pharmacology.**



Jenny Lamberts, PhD

Ferris State University

Jenny Lamberts, PhD, assistant professor at Ferris State University, College of Pharmacy, received the American Association of Colleges of Pharmacy (AACP) New Investigator Award (NIA), which provides start-up funding

to early-career pharmacy faculty. Dr. Lamberts also recently became chair-elect of the Basic Sciences Section of the American Pharmacists Association – Academy of Pharmaceutical Research and Science (APhA-APRS)

Dr. Lamberts joined the faculty at Ferris State University in 2014. Her research interests include defining the cellular mechanisms responsible for Parkinson's disease pathogenesis, including (but not limited to) inflammation, protein aggregation, transport defects, and energy dysregulation. She greatly enjoys working with students in the lab, and she is proud to serve as the advisor to a recipient of a 2016 American Foundation for Pharmaceutical Education (AFPE) Gateway Research Scholarship. Dr. Lamberts is active in several professional societies, including ASPET and the American Pharmacists Association. Dr. Lamberts also enjoys facilitating student learning in the classroom. She is currently Course Director of Pathophysiology 1 and 2, and teaches several topics in Drug Action.

Dr. Lamberts has been a member of ASPET since 2009 and is member of the **Divisions for Behavioral Pharmacology, Neuropharmacology, and Molecular Pharmacology.**



Peter Wells, PharmD

University of Toronto

Peter Wells, PharmD, professor in the Department of Pharmaceutical Sciences, Faculty of Pharmacy, at the University of Toronto, received a top citation distinction from Web of Science. The distinction

was assigned in the fall of 2016 for a 2009 review paper published by his laboratory group. The review paper titled “Oxidative stress in developmental origins of disease: teratogenesis, neurodevelopmental deficits and cancer” received enough citations to place it in the top 1% of the field of Pharmacology & Toxicology based upon a highly cited threshold for the field and year of publication.

Dr. Wells’ laboratory studies how reactive oxygen species contribute to cancer development, neurodegeneration, and drug toxicity. They also focus on understanding the “mechanisms of drug-induced embryonic death, birth defects and postnatal functional deficits”, as well as understanding how “embryonic conditions contribute to cancer risk in childhood and later in life.”

Dr. Wells has been a member of ASPET since 1984 and is a member of the **Divisions for Toxicology, Neuropharmacology, Translational and Clinical Pharmacology, Drug Metabolism and Disposition, and Molecular Pharmacology.**



Samba Reddy, PhD, RPh

Texas A&M College of Medicine

Samba Reddy, PhD, RPh, is a professor in the Department of Neuroscience and Experimental Therapeutics at Texas A&M College of

Medicine. He has been named a Fellow of the American Epilepsy Society (FAES) in recognition of his professional accomplishments in the field of epilepsy. Dr. Reddy has obtained three major fellowship awards from three major national professional societies in three consecutive years: the American Association

of Pharmaceutical Scientists in 2014, the American Association for the Advancement of Science in 2015, and now the American Epilepsy Society in 2016. Dr. Reddy has over 160 scientific publications and the National Institutes of Health has continuously funded his research for over 12 years. He currently receives funding from the Department of Defense to find treatments for seizures after traumatic brain injury.

Dr. Reddy has been a member of ASPET since 1999 and is a member of the **Divisions for Neuropharmacology, Behavioral Pharmacology, and Translational and Clinical Pharmacology.**



Stephen H. Koslow, PhD

University of Miami, Miller School of Medicine

Stephen H. Koslow, PhD, was recently awarded the 2017 Distinguished Service Award from the University of Chicago Alumni Association.

The Distinguished Service Award recognizes University of Chicago alumni who have brought honor and distinction to the University and the Division of the Biological Sciences by demonstrating excellent leadership in, and making substantial contributions to, the biological sciences or medicine.

Dr. Koslow has been a member of ASPET since 1972 and is a member of the **Divisions for Neuropharmacology, Behavioral Pharmacology, and Translational and Clinical Pharmacology.**



Beverley Greenwood-Van Meerveld, PhD

University of Oklahoma Health Sciences Center

Beverley Greenwood-Van Meerveld, PhD, professor of physiology at the University of Oklahoma Health Sciences Center (OUHSC) and director of

the Oklahoma Center for Neuroscience, has received the President’s Associates Presidential Professorship at OUHSC.

Dr. Greenwood-Van Meerveld is actively involved in research, mentoring, and teaching. She is currently serving as the PI on two active Veterans Affairs (VA) grants and numerous contracts, as well as serving as a co-investigator on a recently completed NIH P20 grant. In 2014, she was inducted into the OUHSC College of Medicine Academy of Teaching Scholars. Her research expertise is the neuropharmacology of visceral pain of gastrointestinal origin. She received the 2004 Janssen Award for Basic Research in Digestive Diseases and the 2012 Oklahoma University Reagent Award for Superior Research and Creative Activity.

Dr. Greenwood-Van Meerveld has held the Presbyterian Health Foundation Endowed Chair in Neurosciences since 2004. She is also an associate editor for the *Journal of Pharmacology and Experimental Therapeutics*, chair of the Editorial Board of *Neurogastroenterology & Motility*, and chair of the Neurology B VA Merit Review Board. She served as the chair of the Neuropharmacology Division of ASPET from 2015-2017, and is currently the president-elect of the American Neurogastroenterology and Motility Society.

Dr. Greenwood-Van Meerveld has been a member of ASPET since 2000 and is a member of the **Divisions for Neuropharmacology, Drug Discovery and Development, and Translational and Clinical Pharmacology.**



John Traynor, PhD

University of Michigan Medical School

John Traynor, PhD, is the Edward F. Domino Research Professor and associate chair for research in the Department of Pharmacology at the University of Michigan Medical School. Dr. Traynor is also chair of the Division for Neuropharmacology of ASPET. He was awarded the Founders Lectureship at the International Narcotics Research Conference held in Chicago in July 2017. This award honors individuals who have made a substantial contribution to the science upon which the International Narcotics Research Conference is based on.

Dr. Traynor has been a member of ASPET since 1997 and is a member of the **Divisions for Neuropharmacology and Molecular Pharmacology.**



William (Bill) E. Fantegrossi, PhD

University of Arkansas for Medical Sciences

William (Bill) E. Fantegrossi, PhD, is the new director of the ASPET Summer Undergraduate Research Fellowship (SURF) program at the University of Arkansas for Medical Sciences.

Dr. Fantegrossi has been a member of ASPET since 2006 and is a member of the **Divisions for Behavioral Pharmacology, Pharmacology Education, and Neuropharmacology.**



Ellen A. Walker, PhD

Temple University School of Pharmacy

Ellen A. Walker, PhD, has been appointed chair of the Department of Pharmaceutical Sciences at Temple University.

Dr. Walker has been a member of ASPET since 2001 and is a member of the **Divisions for Behavioral Pharmacology, Pharmacology Education, and Neuropharmacology.**



Michael A. Rogawski, PhD

University of California, Davis, Department of Neurology

Michael A. Rogawski, PhD, has been a professor in the Department of Neurology at University of California, Davis since 2007. He was recently appointed as professor in the Department of Pharmacology at that same institution, and now holds a joint appointment. Until 2006, he was senior investigator and chief of the Epilepsy Research

Section at the National Institute of Neurological Disorders and Stroke, and served as chair of the University of California, Davis, Department of Neurology until 2012. Dr. Rogawski's research encompasses cellular neurophysiological studies of ion channels (with a focus on the mechanisms of action of antiepileptic drugs), animal models of epilepsy, and clinical studies on new treatments for seizures and epilepsy. His research on AMPA receptors and neurosteroids has led to new treatment approaches. Dr. Rogawski has served continuously on the editorial board of *Molecular Pharmacology* since 1994.

Dr. Rogawski has been a member of ASPET since 1982 and is a member of the **Division for Neuropharmacology**.



Erin Bobeck

Utah State University

Erin Bobeck, PhD, started a tenure-track assistant professor position in the Biology Department at Utah State University. She completed her PhD at Washington State University Vancouver in 2013, studying molecular mechanisms of opioid analgesia and tolerance. She then went on to do a 4-year postdoc at Icahn School of Medicine at Mount Sinai, evaluating a novel neuropeptide-receptor system called BigLEN-GPR171 in stress and reward. Dr. Bobeck will continue both projects in her new lab.

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

Share your achievements, awards, promotions and scientific breakthroughs with fellow ASPET members. Send your news to your division's communications officer:

Behavioral Pharmacology: Brenda M. Gannon, PhD at GannonB@uthsca.edu

Cancer Pharmacology: Jack C. Yalowich, PhD at yalowich.1@osu.edu

Cardiovascular Pharmacology: David B. Averill, PhD at daverill@tcmc.edu

Drug Discovery and Development: Przemyslaw Radwanski, PharmD at Przemyslaw.Radwanski@osumc.edu

Drug Metabolism and Disposition: Aarti Sawant-Basak, PhD at aarti.sawant@pfizer.com,

Lindsay M. Henderson at lmhender@uw.edu

Molecular Pharmacology: Kathryn E. Livingston, PhD at kathrynlivingston@gmail.com,

Amy E. Moritz, PhD at amy.moritz@nih.gov

Neuropharmacology: Luisa Torres, PhD at lft9@cornell.edu

Pharmacology Education: Catherine M. Davis, PhD at cdavis91@jhmi.edu

Toxicology: Alison H. Harrill, PhD at harrill.alison@gmail.com

Translational & Clinical Pharmacology: Naeem K. Patil, PhD at naeem.patil@vanderbilt.edu



Division News

Division for Behavioral Pharmacology

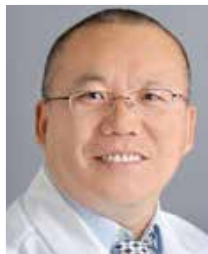


As of July 1, 2017, there are some changes to the Division for Behavioral Pharmacology (BEH) Executive Committee. Katie Serafine, one of our postdoctoral representatives, has rotated off. Thank you, Katie, for your service on the committee over the past two years! New members of the committee are Jun-Xu Li, our chair-elect; Susan Wood, our secretary/treasurer-elect; and Julie Finnell, a new student representative. Welcome aboard and we look forward to working with you. A full list of the BEH roster can be found on our [divisional leadership webpage](#).

In other moves within the Executive Committee, Brenda Gannon, a former student representative, is now a postdoctoral representative. In addition to representing the interests of postdocs within the division, Brenda is also inheriting the role of communications officer from Kevin Murnane. (Thank you, Kevin, for a job well done!). If you have any news or queries that you would like to share with the division, please contact Brenda. Also, please consider

joining LinkedIn. If you do this via the [ASPET website](#), you will immediately be invited to join the ASPET-only members group.

The division is financially in good standing. The division executive committee voted to use some of our division activities budget to establish a Young/Independent Investigator Travel Award to attend the ASPET Annual Meeting. Details regarding the award amount and eligibility are still being determined, so be on the lookout for that information.



Jun-Xu Li, PhD



Susan Wood, PhD



Brenda Gannon, PhD

Division for Neuropharmacology



John Traynor, PhD, professor of pharmacology and associate chair for research at the University of Michigan Medical School, and Styliani-Anna (Stella) E. Tsirka, PhD, professor in the Department of Pharmacological Sciences at Stony Brook University,

are now leading the Neuropharmacology Division as chair and secretary/treasurer, respectively.



Luisa Torres, PhD

Luisa Torres, PhD, post-doctoral researcher in the Department of Microbiology and Immunology at Cornell University, is the newly appointed communications officer for the Neuropharmacology Division. You can reach Luisa with questions or comments at lft9@cornell.edu.



John Traynor, PhD



*Styliani-Anna
(Stella) E. Tsirka, PhD*



Chapter News

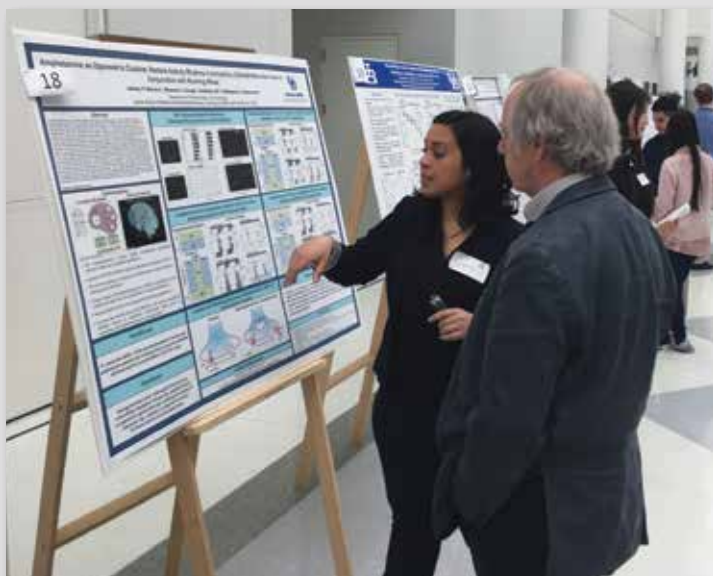
2017 New York Pharmacology Society Annual Meeting in Review

The sixth annual New York Pharmacology Society (NYPS) meeting called *Functional Selectivity: From Theory to Reality* held at the University at Buffalo, Center for Arts, NY on Saturday, May 6, 2017 continued the great success of the chapter! There were over 75 attendees including students, faculty, and industry scientists representing Albany College, SUNY Binghamton,

D'Youville College, University at Buffalo, University of Rochester, and industry research organizations.

The plenary symposium included talks from Richard Mailman, PhD, professor of pharmacology, Penn State University, on *Bias in Science: It's OK with Functional Selectivity*; William P. Clarke, PhD, Maharaj Ticku Professor of Pharmacology, University of Texas Health Sciences Center San Antonio, on *Functional Selectivity of Ligands at Kappa Opioid Receptors (KOR) Expressed in Peripheral Pain-Sensing Neurons In Vivo and Ex Vivo*; and Jonathan A. Javitch, PhD, Lieber Professor of Experimental Therapeutics, Columbia University Medical Center, on *Old Dogs with New Tricks: G Protein-Coupled Receptors in Depression and Motivation*. This session was immediately followed by a panel discussion on pharmacology education, facilitated by Lauren Purington, PhD, Albany College of Pharmacy and Health Sciences. This panel discussion highlighted the importance of bringing research, especially key concepts in functional selectivity, to the classroom.

Keeping up with the tradition of previous NYPS chapter meetings, the morning session included the Graduate Student Presidential Symposium,



Poster review during the 2017 NYPS annual meeting.



Dr. Jun-Xu Li (on left) with the winners of the poster competition at the 2017 NYPS annual meeting.

which involved talks from three advanced graduate students: Justin Siemian, University at Buffalo; Tyler McCulloch, University of Rochester; and Kerri Pryce, University at Buffalo. This symposium was moderated by Rajendram Rajnarayanan, PhD, NYPS secretary/treasurer. The morning session also included the Early Career Scientist Symposium, which had talks from Ying Xu, PhD, research assistant professor of the School of Pharmacy and Pharmaceutical Sciences, SUNY at Buffalo; Stewart Clark, PhD, assistant professor of the Department of Pharmacology and

Toxicology, SUNY at Buffalo; and Yao-Ying Ma, PhD, assistant professor of psychology, SUNY Binghamton. This session was moderated by Paul Kammermeier, PhD, NYPS past president. There were more than 35 graduate students in attendance and 19 graduate students presented original research posters.

NYPS President Jun-Xu Li, PhD, distributed prizes to the winners of the poster competition (undergraduate, graduate and postdoctoral) and delivered the final remarks. Further details can be found at <http://bit.ly/2x0VWV6>.

2017 Great Lakes Chapter Annual Meeting in Review



Scientific discussions during the 2017 GLC poster session.

In June 2017, the Great Lakes Chapter (GLC) hosted its annual meeting to foster interactions among pharmacologists in the Great Lakes region and to provide a forum for undergraduate and graduate students, as well as post-doctoral fellows to present their research. The meeting had a very exciting program, including an afternoon scientific symposium focused on *Advances in Pharmacimmunology* that featured five nationally and internationally recognized researchers in the area of immunology.

Stephen Miller, PhD, Judy Gugenheim Research Professor of Microbiology-Immunology and director of the Interdepartmental Immunobiology Center, Northwestern University Feinberg School of Medicine, discussed *From Bench to Bedside: Translation of a Novel Nanoparticle Approach for Tolerogenic Therapy of Autoimmune and Allergic Diseases*. Dr. Miller described the mechanisms underlying the induction of antigen-specific immunological tolerance for the treatment of autoimmune and allergic diseases using a PLGA nanoparticle antigen delivery system.

Anne Sperling, PhD, associate professor of medicine, director of the Respiratory Biology Training Grant, and director of the Cytometry and Antibody Technology Core Facility of the Biomedical Sciences Cluster, University of Chicago, presented her research and exciting new findings related to “Induction and regulation of hematopoietic and non-hematopoietic IL-33”. Recent genome-wide association studies have shown that IL-33 and its receptor are in the top five genes involved in asthma. Dr. Sperling’s lab has studied the sources of IL-33 in various Th2 inflammatory models of the respiratory tract. Her studies have found that IL-33 production is essential for Th2-mediated inflammation in models of respiratory inflammation and allergy.

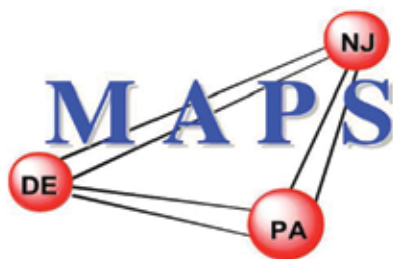
Jochen Salfeld, PhD, vice president of Global Biologics, AbbVie Bioresearch Center in Worcester, MA presented on *Biologics to Treat Immunologic*

Diseases: The Anti-TNF Success Story and the New Challenges Ahead. The difference in the clinical response pattern of TNF antagonists has added to the interest in understanding TNF biology and the mechanisms of each of the TNF antagonists at an even deeper level. Dr. Salfeld presented data from studies that allow for a better understanding of some of these clinical differences and discussed how these deeper insights can shape new drug discovery.

Dolly Mehta, PhD, professor of pharmacology, University of Illinois in Chicago, discussed *New Mechanistic Insights for Resolving Lung Vascular Injury*. In particular, Dr. Mehta presented data on transient receptor potential canonical channel 6 (TRPC6) and its role in mediating endothelial cell permeability and inflammatory events. In her presentation, Dr. Mehta positioned her experimental

findings to provide a rationale for TRPC6 as a potential therapeutic target for pulmonary edema.

Gustavo Martinez, PhD, assistant professor of microbiology and immunology, Chicago Medical School, Rosalind Franklin University, summarized his research on *Requirement of Partnerless NFAT in the Transcriptional Control of T Cell Exhaustion*. CD8+ T cell exhaustion is a dysfunctional hyporesponsive state found in various disease states, especially cancer. Current oncology therapeutic strategies aim at targeting exhaustion-associated inhibitory cell surface receptors, using “checkpoint inhibitor” therapies (anti-PD-1/anti-PD-L1). Other therapeutic alternatives need also be considered, and this is why exhaustion needs to be better understood. Dr. Martinez presented elegant studies supporting a role for NFAT in T cell exhaustion.



Mid-Atlantic Pharmacology Society 2017 ASPET Regional Chapter Annual Meeting

“Pharmacology of Metabolic Diseases”

October 26, 2017

Temple University Health Sciences Campus
Philadelphia, PA

Online registration and additional information can be found at :
www.aspet.org/maps/2017_annual_meeting/

The MAPS Annual Meeting will include a keynote presentation, invited speakers, research poster competition with awards for postdoctoral, graduate and undergraduate categories, two trainees selected for oral presentations and a Biotech roundtable discussion with local companies. A networking reception/award ceremony will be held at the end of the formal talks.

KEYNOTE SPEAKER: Shelia Collins, PhD Sanford Burnham Prebys Medical Discovery Institute

INVITED SPEAKERS:

Mitchell Lazar, MD/PhD University of Pennsylvania

Walter J. Koch, PhD Lewis Katz School of Medicine, Temple University

Maria Trujillo, PhD Merck Research Labs



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Members: \$15.00 + Shipping



6-Pack Cooler Lunch Bag

Gray cooler bag - use as a lunch bag or fit up to six 12 oz beverage cans
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Cooligraphy T-shirt

Black cotton with stylized ASPET design in red and gold
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Upright Lunch Bag

Gray and black upright lunch bag with side mesh pocket
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Explore Pharmacology T-shirt

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



Mug

Gray mug with ASPET logo
Members: \$10.00 + 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



Travel Mug with Lid

Tall khaki travel mug with silicone lid
Members: \$12.00 + 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



Men's Tie

Gray silk tie with ASPET logo
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Women's Scarf

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- Post to just ASPET or to entire NHCN network
- Sign up for automatic email notifications of new résumés that match your criteria
- Job activity tracking

ASPET is committed to your success:

The ASPET Career Center is the best resource for matching job seekers and employers in the pharmacology and related health science fields. Our vast range of resources and tools will help you look for jobs, find great employees, and proactively manage your career goals.



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