

PharmTox Frontiers

Drug discovery starts here

Volume I, Issue I

September 2022

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From the Chair's Office

As I walk through the medical sciences building to my office each morning, I pass by laboratories that are alive with activity. In one lab, a graduate student is testing an experimental new drug to see if it will shrink tumors in mice. In another lab, a postdoctoral fellow is mapping brain pathways that will illuminate the causes of drug and alcohol addiction. In the next lab I pass, a newly hired assistant professor is trying to understand how malaria parasites divide so new therapeutics can be developed that will save millions of children each year. I also pass lecture halls packed with passionate students who are being handed a torch to carry the light of scientific discovery another generation.

The Department of Pharmacology & Toxicology has a rich history that dates to its founding in 1915 at the Indiana University School of Medicine. Over the last century, our department has produced a diverse array of discoveries in biomedicine that have enhanced lives and rewritten textbooks. All of us know someone who is suffering from cancer, pain, infection, or neurodegenerative disease. These are complex

puzzles to solve, but every day our faculty, staff, students, and postdoctoral fellows rise to the challenge. With pipets and determination, step by step, we march toward victory.



Bill Sullivan, Jr, PhD
Showalter Professor &
Interim Chair

Scientific discovery is the bedrock upon which humanity's future is built. We're in the business of unveiling the secrets that Nature so stubbornly hides, secrets that can save lives and ameliorate suffering. Most people think that the thrill of scientific discovery belongs to the researchers and physicians, but this is a belief we'd like to change. Everyone can play a part in furthering our knowledge and everyone should be able to

reap its benefits.

We invite you to join our quest for knowledge by following along. Enjoy reading about the remarkable feats that our faculty and students have achieved this past year. We've also made it possible for you to donate a gift to the department that will directly contribute to our goal of fighting disease (see back page of newsletter).

There's one more room that I notice on the way to my office. It is an empty one. With heavy hearts, we said farewell to our latest chair, Dr. Bryan Yamamoto, who retired in May. As interim chair, I will honor Dr. Yamamoto's tradition of excellence and work to support our faculty in their academic missions of research, teaching, and service. An exciting new chapter is ahead, and I can't wait to see what we discover next.



Sabrina Absalon, Ph.D.
Assistant Professor of
Pharmacology &
Toxicology

“Sabrina’s efforts in DEIJ are unparalleled and demonstrate her commitment to DEIJ and in being an advocate for underrepresented individuals in Science.”

Pharmacology & Toxicology DEIJ

AJ Baucum

The Pharmacology and Toxicology Diversity, Equity, Inclusion, and Justice (DEIJ) committee was started in 2022 with the goal of detailing ongoing efforts by the department and identify potential ways for committees within the department to enhance DEIJ and highlight diversity within the department. To that end, here we highlight Dr. Sabrina Absalon, co-chair, along with Dr. A.J. Baucum, of the DEI committee.

Sabrina’s efforts in DEIJ are unparalleled and really demonstrate her commitment to DEIJ and in being an advocate for underrepresented individuals in Science. This commitment in part comes from Sabrina’s multicultural background with

Algerian and French heritage and the Brazilian multicultural heritage of her husband and son.

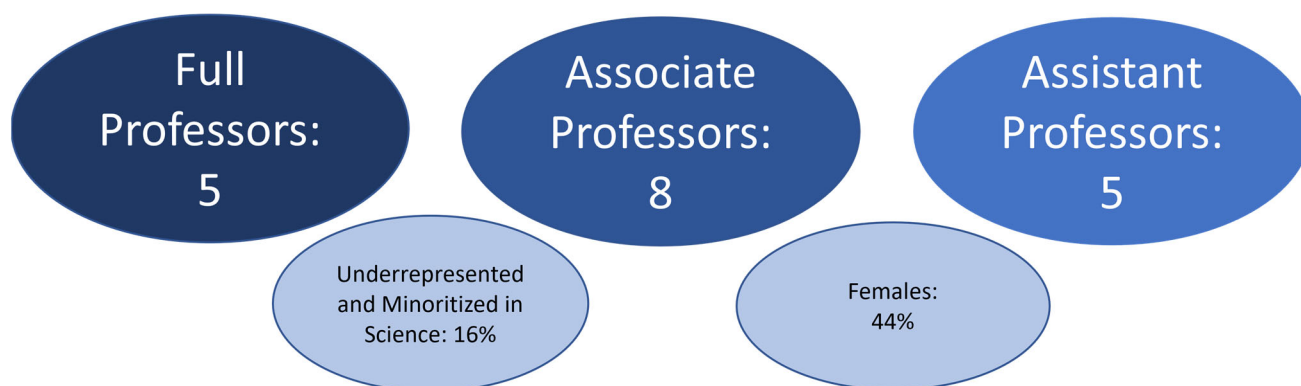
Sabrina is highly involved in groups that promote diversity within her area of research, parasitology, and she was a keynote speaker and co-chair and co-organizer with Dr. Giulia Bandini of two DEI sessions at the British Society for Parasitology Spring meeting.

Sabrina presented on “BIPOC (Black, Indigenous, People of Color) in Parasitology (BiP): an anti-racist, equitable, and inclusive community of parasitologists.” Sabrina, along with Dr. Pascale Guiton, has worked to build a BiP community and their work was highlighted in an article in the

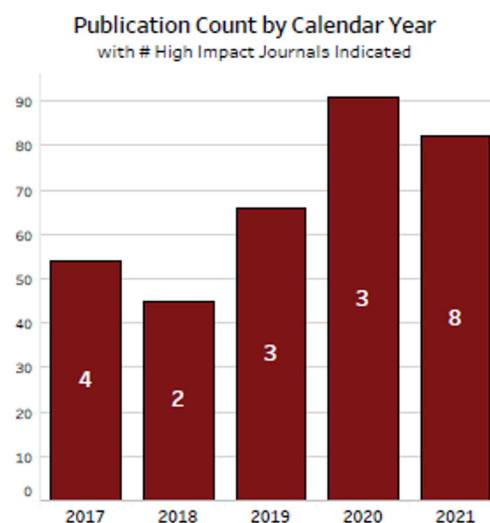
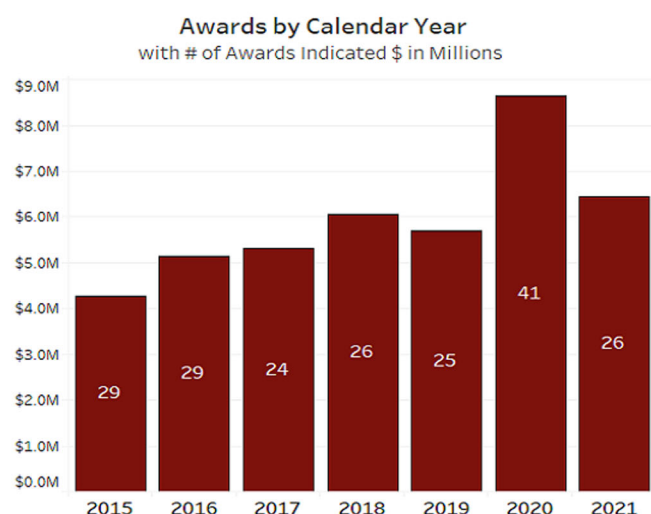
[American Committee of Molecular, Cellular and Immunoparasitology newsletter.](#)

Sabrina also pushes to invite seminar speakers from diverse backgrounds to present at department seminars and is always sharing ideas and data-driven ways to help increase diversity and enhance diversity training within the department. Sabrina is not only a great science colleague, her passion for DEIJ has greatly enhanced the culture, collegiality, and compassion of our department and has helped position our department as a leader on DEIJ issues.

Department of Pharmacology & Toxicology Composition By the Numbers



Department Research Funding and Publications



Former Chair Dr. Bryan Yamamoto Retires

Bryan Yamamoto, PhD, retired as chair of the Department of Pharmacology and Toxicology on May 31, 2022, after seven years in the role. Yamamoto was appointed chair and the Robert B. Forney Professor of Toxicology in 2015. His research focused on how drugs of abuse affect the neurochemistry of the brain.

Under Dr. Yamamoto's leadership, the Department of Pharmacology and Toxicology expanded its faculty by more than 30 percent, increased faculty diversity, and nearly doubled its federal grant funding in 2020.

As a collaborative lead-

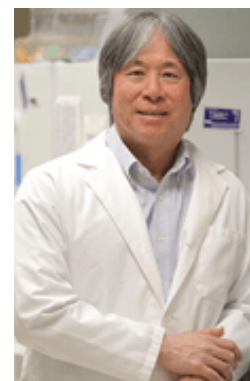
er, Dr. Yamamoto directed a statewide pharmacology curriculum expansion and implemented new initiatives in graduate education and interdisciplinary pharmacology research, which positioned the department to be at the forefront of research and education.

Dr. Yamamoto was honored with a Career Achievement Award from the Toxicology Division of the American Society for Pharmacology and Experimental Therapeutics (ASPET) in 2020.

Regarding his plans for retirement, Dr. Yamamoto will be spending time with his family, fishing and

biking, and volunteering at a local university and in the community. "I will always cherish the time with my colleagues in the department. My sincerest thanks for the friendship and support I received from the faculty and staff and their commitment and dedication to department," Dr. Yamamoto commented.

Bill Sullivan, PhD, Showalter Professor of Pharmacology and Toxicology, is currently serving as interim chair until the school completes a national search for the next chair.



Bryan Yamamoto, PhD
Robert B. Forney
Professor and Chair



Jennelle Durnett Richardson, PhD
Vice Chair of Education

Medical Student Education: Pre-Clerkship Medical Education

Jennelle Durnett Richardson coordinates the pharmacology curriculum for the first and second year medical students across the state.

In 2016 Indiana University School of Medicine moved from discipline-based to organ-based organization of pre-clerkship courses necessitating that the Medical Pharmacology course be

converted into pharmacology-focused sessions across 7 organ-based courses. In addition, the courses became statewide courses administered at each of the nine campuses but run as single courses.

Another major curricular change has been the shift from locally-delivered lectures to pre-recorded

statewide lectures with a large portion of the curriculum delivered in locally-delivered small group active learning sessions. The statewide pharmacology faculty work closely to develop and deliver a cohesive, high-quality pharmacology curriculum. These efforts have been well-received by students.

Health Professional Pharmacology Education By The Numbers

Medical Student – Year 1:

350 Students Statewide
150 Students Indianapolis
Pharmacology In 3 Organ-Based Courses

Medical Student – Year 2:

350 Students Statewide
150 Students Indianapolis
Pharmacology In 4 Organ-Based Courses

Medical Student – Years

3/4:

35 Students
Pharmacology Electives

Physician Assistant:

44 Students
1 Semester Pharmacology Course

Masters of Medical Science:

10 Students
1 Semester Pharmacology Course

Anesthesiology Assistant:

18 Students
1 Semester Pharmacology Course

Medical Student Education: 4th Year Pharmacology Electives



Life Saver Olfactory Experiment with medical students

During the COVID19 pandemic, departments were encouraged to develop electives for fourth year medical students that could be run virtually.

We answered the call with 6 new two-week electives: Drugs A History, Step 1 and Clerkship Preparedness, Pharmacology Exam Question Writing, Pharmacology Case Development, Small

Group Best Practices, and Basic Science Research in Pharmacology Elective.

We have been averaging about 35 students across all of our electives each year. The students have developed numerous creative projects that are used to enhance teaching and learning about pharmacology.

New Master of Science in Translational Toxicology Program

The Department of Pharmacology and Toxicology is proud to announce the development of a novel Master of Science in Translational Toxicology (MSTT). Toxicology encompasses a wide array of disciplines that include biology, chemistry, physics and pharmacology and spans professions that evaluate the adverse effects of toxicants on the environment to how therapeutics and experimental medicines affect human physiology. Toxicologists are also significantly involved in the drug approval process and risk assessment.

This intensive, one-year non-thesis-based program meets an emerging need in toxicology education to provide a foundation for understanding the complex inter-

actions between toxicants or pharmaceutical leads and biological systems from an industry perspective. The MSTT also includes an internship that will allow the graduate to utilize knowledge gained in their academic toxicological studies and incorporate them in a professional work environment.

This new program complements the existing Master of Science in Toxicology by providing hands-on skillsets and experiential learning activities in their toxicological field of interest and is designed to relatively rapidly expose students to toxicology-based careers while gaining relevant experience and professional connections. The MSTT program also upholds IUPUI's strategic

objectives and actions to increase capacity for graduate education while giving students experiential learning opportunities.

The program further supports IUSM's strategic plan of Enhancing the Quality of IU School of Medicine Educational Programs, while conforming to the mission statement of the Department of Pharmacology and Toxicology for graduate education to train future scientist in the discipline of "toxicology to support the economic development of the State of Indiana and the nation" as well as to educate our students to pursue successful careers "in the pharmaceutical industry, and broader healthcare industry".



Richard Nass, PhD
Associate Professor
Pharmacology & Toxicology

"The MSTT program also upholds IUPUI's strategic objectives and actions to increase capacity for graduate education while giving students experiential learning opportunities."

For more information on the MS Translational Toxicology Program, please visit <https://medicine.iu.edu/pharmacology-toxicology/education/ms> or contact the Program Director, Dr. Richard Nass at ricnass@iu.edu.

Department Education Focus

PhD in Pharmacology and Toxicology:

- Travis Jerde

Medical and Other Health Professionals:

- Jennelle Durnett Richardson

Masters in Translational Toxicology:

- Richard Nass

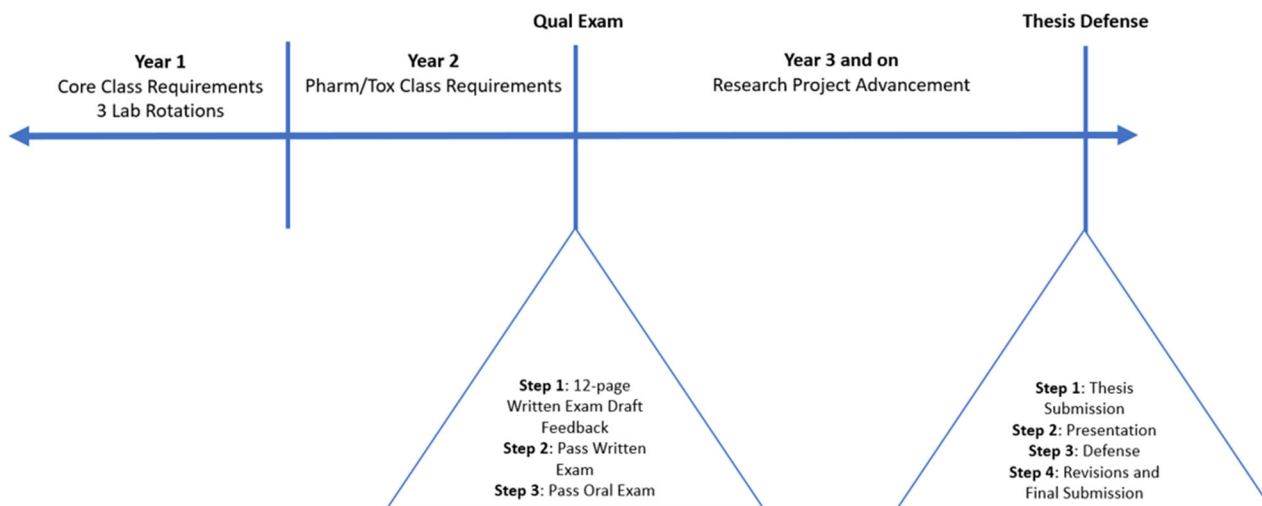
Pharmacology & Toxicology Department PhD Progression

PhD Program Changes

Many things have changed within the past couple of years in the Pharmacology and Toxicology Department. The core class requirements have been shortened to a full semester; the med/pharm course is no longer required. In addition, not only can students keep the same committee members for their academic committees as their qual/research committees, but they are also allowed to choose who is on

their committees instead of being assigned members. Most notably, the COVID-19 pandemic caused a dramatic shift in the way the department was forced to handle classwork and even social events. It was in the middle of second semester pharmacology and toxicology classes that students were forced to switch to an online format for taking tests. Classes and article discussions were completed through Zoom. Even social events for prospective pharmacology and toxicology students were

offered through video chat, where current students could chat informally with prospective students in the comfort of their own homes. Recently, the department just held its first in-person meeting at St. Joseph's Brewery to discuss student roles and introduce new members of the department. We anticipate many more social events and welcoming more students in person in the near future!



Current Student Roles

- *Representative:* Hanyu Xia
- *Faculty Liaison:* Jade Harkin
- *Social Event Planners:* Tinslee Dilday, James Blauwkamp
- *Host for Guest Speakers & Journal Review Leader:* Aishat Motolani
- *Student-Student Mentors:* Amanda Krueger, Aishat Motolani
- *Seminar Scheduler:* Nicole Ramos
- *Recruiters:* Jade Harkin, James Blauwkamp
- *Newsletter:* Tara Fuller

Post-Doctoral Fellow Spotlight

Ben grew up in a small steel-making town in south Australia. Although he didn't know many scientists, he became interested in microbes and the causation of disease after chatting with a friend.

After honing his science interests, he began working for a professor who studied malaria during a research-intensive year post-undergrad. Due to Ben's excellent grades during this time, he was able to enter a PhD program at Aberdeen University while working in the same lab doing the same research that he loved.

Ben wrote his PhD thesis during the height of COVID-19, and it was during this

time that he successfully interviewed with Dr. Sabrina Absalon. He began working in her lab at the beginning of 2021 as a post-doctoral fellow, and within this short period of time, has received many awards and publications.

Throughout his educational journey, Ben has come to realize that his motivation to study science has changed over the years, with a shift from trying to solve the world's big problems to ***"focusing on tangible evidence of success that one is able to accomplish on a daily basis."*** This logic requires scientists to determine how their work fits into a grander scheme.

Ben came from a department that studied mainly malaria or bacterial pathogenesis, leading to significant overlap among research themes. The research within the Pharmacology & Toxicology Department is extremely varied, ranging from *Plasmodium* and *Toxoplasma* to neuroscience and cancer research. Therefore, the scope in which to learn about Ben's love of fundamental biology is much greater and diverse. Techniques can be applied to many different fields – Ben's microscopy skills can be broadly applied to a scientific field outside of *Plasmodium* and microbial pathogenesis.



Ben Liffner, PhD

"Ben has come to realize that his motivation to study science has changed over the years with a shift from trying to solve the world's big problems to "focusing on tangible evidence of success that one is able to accomplish on a daily basis."



Graduated from the University of Adelaide in Australia in 2020



Studies mitosis in the malarial parasite *Plasmodium* as a post-doctoral fellow in Dr. Sabrina Absalon's lab



Won Best Oral Presentation and Outstanding Postdoc of the Year through IU School of Medicine in 2021



Received over 10 publications

Recent Graduates 2021-2022

Carmen Deveau, PhD

Thesis: A New Mechanism of Serotonin Transporter Regulation by Simvastatin and the Isoprenylation Pathway

Mentor: Bryan Yamamoto, PhD

Future Steps: Global Scientific Communications, Publications Associate Consultant at Eli Lilly and Company, Indianapolis, IN

Bomina Park, PhD

Thesis: Targeting Soluble Epoxide Hydrolase to Treat Choroidal Neovascularization

Mentor: Timothy Corson, PhD

Future Steps: Visiting Scientist Fellow at Eli Lilly and Company, Indianapolis, IN

Noopur Dave, PhD

Thesis: Function of a Unique Dually Localized EF Hand Domain-Containing Protein, TgEFP1, During the Lytic Cycle of the Human Parasite *Toxoplasma gondii*

Mentor: Gustavo Arrizabalaga, PhD

Future Steps: Industry



Jennifer Martynowicz,
MD, PhD

2022 K.K. Chen Award Winner Jennifer Martynowicz MD, PhD

Dr. Jennifer Martynowicz joined Dr. Bill Sullivan's laboratory in 2017 to complete her Ph.D. studies. Her work focused on *Toxoplasma gondii*, a single-celled parasite that people can catch from their cats or contaminated food and water. Billions of people carry this parasite in their brain as its latent form is impervious to the immune system and all currently available drugs. Latent toxoplasmosis induces behavioral changes in mice and has been linked to increased risk of schizophrenia in people.

Dr. Martynowicz studied an experimental therapeutic

capable of sharply lowering the number of parasitic cysts in the brains of mice. She discovered that the drug reverses the behavioral changes caused by latent infection by reducing neuroinflammation.

Dr. Martynowicz authored or co-authored seven papers published in notable journals including mBio, Antimicrobial Agents and Chemotherapy, and Molecular & Biochemical Parasitology. Her findings have been featured in high-profile science news sites including ScienceDaily, R&D magazine, and The Conversation. Dr. Martynowicz was the recipient of the Joseph

and Lucille Madri Scholarship from 2016-2019 and was selected to be supported by an NIH T32 training grant.

Dr. Martynowicz had the honor of presenting her work at the Annual MD/PhD National Student Conference in 2019. She was also awarded both the 2019 Erica Daniel Kepner Award for Scientific Achievement as well as the 2019 Harold Raidt Graduate Student Teaching Award. Dr. Martynowicz was received the 2022 K.K. Chen Award for excellence in Pharmacology by a medical student.

Paradise Travel Award

Raymond Paradise was Professor of Pharmacology and of Anesthesiology at Indiana School of Medicine from 1962 until February of 1986. Dr. Paradise's research focused on effects of general anesthetics on cardiopulmonary function.

In addition to his own research, Dr. Paradise was devoted to graduate student

education and worked diligently with and on behalf of our graduate students.

In 1986, Dr. Paradise died suddenly of cancer. He was 52 years old. Colleagues in the department came together to develop a fund in Dr. Paradise's name. This fund was to be used exclusively for activities that benefitted the graduate students of the

Department of Pharmacology and Toxicology.

Today this fund is used to provide grants up to \$400 which are awarded to students to assist in expenses for travel to present data at a regional, national or international meeting. Students submit applications for these grants, which are awarded in the fall and spring each year.

2022 Paradise Travel Award Winners

Rashmita Basu
[Jonathan Flak Lab]

Nayela Chowdhury
[Melissa Fishel Lab]

Jade Harkin
[Jason Meyer Lab]

Nicole Ramos
[Elizabeth Yeh Lab]

Tara Fuller
[Travis Jerde Lab]

Amanda Krueger
[Gustavo Arrizabalaga Lab]

Recent Alum Spotlight: Bomina Park, PhD

What led Dr. Park to join the Pharmacology & Toxicology Department at IU School of Medicine?

- The interdisciplinary nature of research within the department
- The opportunity for funding and scholarly achievements
- The strong support system both inside and outside of the lab, including senior graduate students within the department

In addition to the many awards and publications Dr. Park received as a graduate student, it was during her summer internship at the FDA through the Office of Clinical Pharmacology Drug Evaluation and Research Team that allowed her to gain insight into various roles that scientists play. For those who seek alternative career paths to the traditional route of academia, Bomina advises students to be proactive in looking for opportunities outside of academia.

“Be the biggest advocate for yourself.” It is important to communicate the value of internships and fellowships for career advancement and not to be intimidated to take the first steps toward your career interests. Those with little experience in their career goals are challenged the most to grow as independent scientists, and taking those first steps to network and be visible to industries is critical to their futures



Bomina Park, PhD
2021 KK Chen
Fellowship Winner,
2021 Graduate



Graduated from the
Pharmacology & Toxicology
Department in 2021



Studied the pharmacology of
small molecule compounds
that target eye disease
under Dr. Timothy Corson



Received 11 awards and 12
publications, including the
prestigious K. K. Chen Award



Accepted as a Visiting
Scientist Fellow at Eli Lilly &
Company in Indianapolis in
2022

K.K. Chen Award and Fellowship

K.K. Chen was an internationally prominent pharmacologist who received a Ph.D. at the University of Wisconsin in 1923, and an M.D. at Johns Hopkins University School of Medicine in 1927.

After 34 years at Eli Lilly and Company, Dr Chen retired in 1963 as Director of Pharmacological Research. Also in 1963, Dr. Chen

came to Indiana University as a full-time professor (without pay.)

Dr. Chen exemplifies a scientist as a person who energetically contributes to research, education, and the scientific community at large. In his honor, each year the Department of Pharmacology awards the **K.K. Chen Fellowship in Pharmacology and Toxicology**. This

award is presented to the graduate student deemed by the faculty to exhibit the qualities of outstanding scholarship, innovative research, and dedication to the spirit of scientific investigation.

The K.K. Chen Award is presented to the medical student deemed by the faculty to exhibit outstanding scholarship in pharmacology.



K.K. Chen, MD, PhD
(left) with Raymond
Paradise, PhD (right)



Noopur Dave, PhD

Noopur Dave Named One of IUPUI's Elite 50

Each year, IUPUI honors 50 graduate and professional students who demonstrate excellence beyond the classroom—in areas such as campus leadership, scholarly work, and community engagement. These IUPUI Elite 50 represent the best of the best among IUPUI's graduate and professional

students and capture everything that makes IUPUI exceptional.

This year, Pharmacology and Toxicology PhD graduate Noopur Dave [Arrizabalaga Lab] was named one of IUPUI's Elite 50.

Noopur also received the departmental KK Chen Fel-

lowship. Each year, the Department awards the K.K. Chen fellowship to the Pharmacology & Toxicology graduate student who best demonstrates the qualities of outstanding scholarship, innovative research, and exemplary dedication to the spirit of scientific investi-

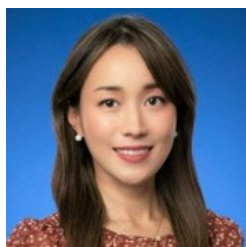
PhD Student Awards and Milestones

Bomina Park (Tim Corson Lab) defended her thesis and will be joining the Visiting Scientist Fellowship program with Eli Lilly as a US Immunology Medical Affairs Fellow.

Jade Harkin [Jason Meyer Lab] was awarded the Cagintas Research Scholarship.

Tinslee Dilday [Elizabeth Yeh Lab] received a Blue Ribbon Pick at ASPET for top abstract and Podium Presentation from ASPET.

Hannah Kline [Bryan Yamamoto Lab] defended her thesis.



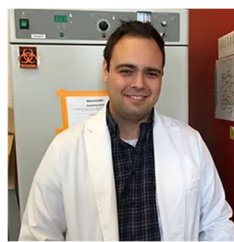
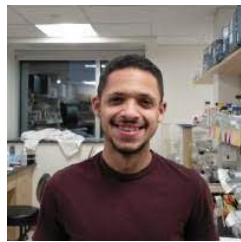
Postdoctoral Fellow & Research Professor Awards

Ben Liffner, PhD (Sabrina Absalon Lab) received an Indiana CTSI Postdoc Challenge Program MNID2022 (Midwest Neglected Infectious Disease) Poster Award and a Pharmacology and Toxicology career development award.

Rudolpho Ornitz, PhD (Gustavo Arrizabalaga Lab) received a Best Poster Award from Toxo Congress.

Michael Holmes, PhD (Bill Sullivan Lab) received the Pharmacology and Toxicology award for Mentorship.

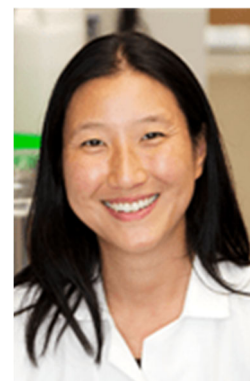
Braulio Munoz, PhD (Research Assistant Professor, Atwood Lab) received a Project Development award from CTC.



Faculty Awards

Dr. Elizabeth Yeh recently received a Women's History Month Award in recognition of her significant leadership, achievement, advocacy and support of gender

equity, women's empowerment, women's history and cultures of inclusion. She also received a Research Support Funds Grant. The Research Support Funds Grant (RSFG) program enhances the research mission of IUPUI by providing seed funding for research projects and scholarly activities that are sustainable through external funding.



Elizabeth Yeh, PhD



Tao Lu, PhD

Dr. Tao Lu received a **National Leadership Award** for supporting the development of Asian American professional communities. She also received a Collaboration in Translational Research (CTR) Award, and obtained a patent for use of PRMT5 inhibitors in cancer.

Dr. Michelle Block received The National Institute of Occupational Health **Alice B. Hamilton** award.

Dr. Block also received a new RO1, "The Role of Peripheral Immune Cell Trafficking in Ozone-Induced Alzheimer's Disease Neuropathology."



Michelle Block, PhD

Gustavo Arrizabalaga received a **2022 IUSM Trustee Teaching award**. Each year the Indiana University Board of Trustees recognizes faculty excellence in teaching through a program known as the Trustees' Teaching Awards. Excellence in teaching is the primary factor for selection.

Gustavo is an Assistant Dean for Faculty Affairs Professional Development Diversity and holds an academic appointment in Pharmacology and Toxicology as a Professor. He also holds an appointment in the Department of Microbiology and Immunology. He is also the Director of Trainee Recruitment, Development and Diversity in the Department of Pharmacology and Toxicology. Dr. Arrizabalaga is co-chair of the IU School of Medicine Diversity Council.



Gustavo Arrizabalaga, PhD

Dr. Jennelle Richardson was appointed to the Executive Committee for ASPET's Division for Pharmacology Education, which facilitates the development of pedagogical skills in pharmacology educators and promotes educational research in pharmacology.

Dr. Bill Sullivan received a **Showalter Professorship**.

Dr. Yao-Ying Ma received a **Pre-Clinical Neuroimaging Pilot Grant** from CTSI, and **Integrative Artificial Seed Fund** from iAI Institute at IUPUI.

Dr. Brady Atwood was promoted to Associate Professor with Tenure.

Dr. Jill Fehrenbacher received a new R21: "The Role of Calcitonin Gene-Related Peptide in rapidly progressive osteoarthritis induced by anti-nerve growth factor."

Department of Pharmacology and Toxicology Faculty

William J. Sullivan, PhD

Showalter Professor and
Interim Chair, Department of
Pharmacology & Toxicology

The Sullivan laboratory studies how parasitic infections persist in the body and produce chronic disease. His group is developing new drugs that target gene regulation in these persistent pathogens.

Sabrina Absalon, PhD

Assistant Professor of
Pharmacology & Toxicology

The Absalon team aims to understand how *Plasmodium falciparum*, the most virulent human parasite, replicates in the human liver and red blood cells.

Gustavo A. Arrizabalaga, PhD

Professor of Pharmacology &
Toxicology
Assistant Dean for Diversity Affairs

The Arrizabalaga lab focuses on the molecular and cell biology of the pathogenic parasite *Toxoplasma gondii*, with the objective of discovering new targets for treatment.

Brady K. Atwood, PhD

Associate Professor of
Pharmacology & Toxicology

The Atwood laboratory studies how addictive drugs like alcohol and opioids affect brain cell communication and how prenatal exposure to opioids affects neurobehavioral outcomes in children with an emphasis on therapeutic discovery.

AJ Baucum, PhD

Associate Professor of
Pharmacology & Toxicology

The Baucum laboratory aims to understand how the brain biochemically adapts to allow us to learn every-day tasks or in response to drugs of abuse and how these adaptations are perturbed in different neurological disorders.

Michelle L. Block, PhD

Paul Stark Professor of
Pharmacology

The Block Lab's research team strives to understand how different environmental exposures and unique peripheral immune responses result in both disease-specific and common mechanisms responsible for microglial driven CNS pathology.

Nickolay Brustovetsky, PhD

Professor of Pharmacology &
Toxicology

The Brustovetsky lab studies the mechanisms of neurodegeneration related to Huntington's and Alzheimer's diseases. Particularly, we are interested in neurodegeneration-associated mitochondrial abnormalities and alterations in calcium signaling.

Jill C. Fehrenbacher, PhD

Associate Professor of
Pharmacology & Toxicology

The Fehrenbacher lab investigates the mechanisms by which drugs and diseases alter the function of sensory neurons to alter pain in an effort to find novel drug targets to treat neuropathic and inflammatory pain. We also examine how sensory neurons affect peripheral tissues, such as the prostate, bone and joints.

For more information about our faculty: <https://medicine.iu.edu/pharmacology-toxicology/faculty>

Department of Pharmacology and Toxicology Faculty

Kathryn D. Fischer, PhD

Assistant Research Professor of Pharmacology and Toxicology
Director, Behavioral Phenotyping Core

The Fischer lab studies the role of glutamate signaling in dopamine neurons in addiction behavior. Specifically, we are interested in how glutamate uptake in dopamine neurons is affected by acute and chronic psychostimulant administration

Jonathan N. Flak, PhD

Assistant Professor of Pharmacology & Toxicology

The Flak lab investigates the neural mechanisms that control glucose homeostasis and energy balance. Currently, our focuses are on understanding the neural systems that initiate hypoglycemic counterregulation and tissue thermogenesis.

Travis J. Jerde, PhD

Associate Professor of Pharmacology & Toxicology and
Graduate Program Advisor

The Jerde lab researches how inflammation communicates with and affects signaling in tissue cells resulting in changes in the tissue that cause chronic diseases such as benign prostatic hyperplasia, prostate cancer, and bladder disease.

Tao Lu, PhD

Associate Professor of Pharmacology & Toxicology, Showalter Scholar

Research in Lu lab centers on the multi-functional transcription factor nuclear factor κ B (NF- κ B) signaling, epigenetics, and drug discovery in cancer.

Yao-Ying Ma, MD, PhD

Assistant Professor of Pharmacology & Toxicology

The Ma Lab explores neuronal communication under different psychiatric and neurological conditions, including drug/alcohol use disorders, Alzheimer's disease, Huntington's Disease, etc.

Richard M. Nass, PhD

Associate Professor of Pharmacology & Toxicology

Our studies examine the molecular and genetic basis for dopamine neuron vulnerability in the context of Parkinson's disease, environment-associated toxicants, and infection.

Jennelle D. Richardson, PhD

Assistant Professor of Clinical Pharmacology & Toxicology, Vice Chair of Education

Jennelle focuses on the education mission of the department specifically for medical students, physician assistant students, anesthesiology assistant students, and principles of pharmacology for graduate students.

Ahmad R. Safa, PhD

Professor of Pharmacology & Toxicology

My research focus has been on studying several mechanisms including overexpression of multidrug resistance transporters and upregulation of the anti-apoptotic protein, c-FLIP in resistance to chemotherapeutic drugs in CSCs.

Patrick L. Sheets, PhD

Associate Professor of Pharmacology & Toxicology

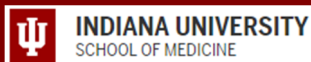
The goal of the Sheets lab is to produce new insight into how the brain produces sensory, affective, and emotional dimensions of pain, which can contribute to novel strategies for therapeutic intervention and improvement of clinical guidelines.

Elizabeth S. Yeh, PhD

Associate Professor of Pharmacology & Toxicology

Research in the Yeh Lab focuses on the study of a protein kinase called HUNK, which stands for Hormonally Upregulated Neu-associated Kinase. Studies indicate a role for HUNK in refractory HER2-positive breast cancer as well as in the development of metastatic breast cancer.

**DEPARTMENT OF
PHARMACOLOGY &
TOXICOLOGY**



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Lisa King
Jennelle Durnett Richardson
Tara Fuller

Drug discovery starts here



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A gift to the department helps faculty, students, and postdoctoral trainees advance key areas of biomedical research aimed at the development of new drugs and therapeutics to treat a wide spectrum of diseases and disorders.

Major research areas include cancer, neuroscience (including addiction, pain,

and neurodegenerative disorders), infectious disease and more.

Financial gifts to the department support faculty research programs, augment the research conducted by trainees, provide travel fellowships to leading scientific conferences, and purchase shared laboratory equipment.

Contributions of any size are appreciated to help support the department's mission in biomedical research, teaching, and community service.

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Department Research Focus

Infectious Disease:

Absalon, Arrizabalaga, Jerde,
and Sullivan

Cancer:

Fehrenbacher, Jerde, Lu, Safa,
and Yeh

Neuroscience:

Atwood, Baucum, Block,
Brustovetsky, Fehrenbacher,
Flak, Ma, Nass, Sheets