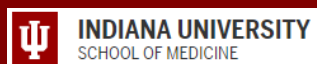


# PharmTox Frontier

Department of Pharmacology & Toxicology

*Drug discovery starts here*

~ 60<sup>th</sup> Anniversary of the Toxicology Program ~



Volume 2, Issue 1

September 2023

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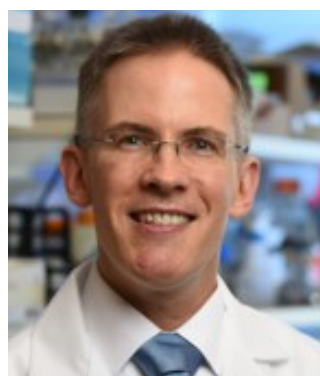
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## From the Chair's Office

It's back-to-school season in Indiana and parents, students, and teachers are excited for the challenges and opportunities ahead. In the Department of Pharmacology and Toxicology, this time of year is no different. An outstanding group of new PhD students have recently joined our labs, excited to launch their research. New students entering the MS in Translational Toxicology and PhD program are about to learn what a supportive training environment we offer. And we are gearing up to teach new medical and other health professional students key content. Meanwhile, our research activity doesn't take a summer vacation; it breathes in and out with the cycle of NIH grant deadlines rather than with the seasons. But it's been a great year in this domain, with exciting new grants and impactful publications across the department's research focus areas of neuroscience, cancer, and infectious disease.

You'll read about all of this in the newsletter you're holding. As we celebrate the 60<sup>th</sup> anniversary of the Toxicology PhD program, we're featuring this storied aspect of the department. You'll find a fasci-

nating timeline to provide context along with interviews with two illustrious Toxicology alumni and current faculty member Michelle Block, who holds amongst the most NIH grants of anyone at IU due to



Tim Corson, PhD  
Chair

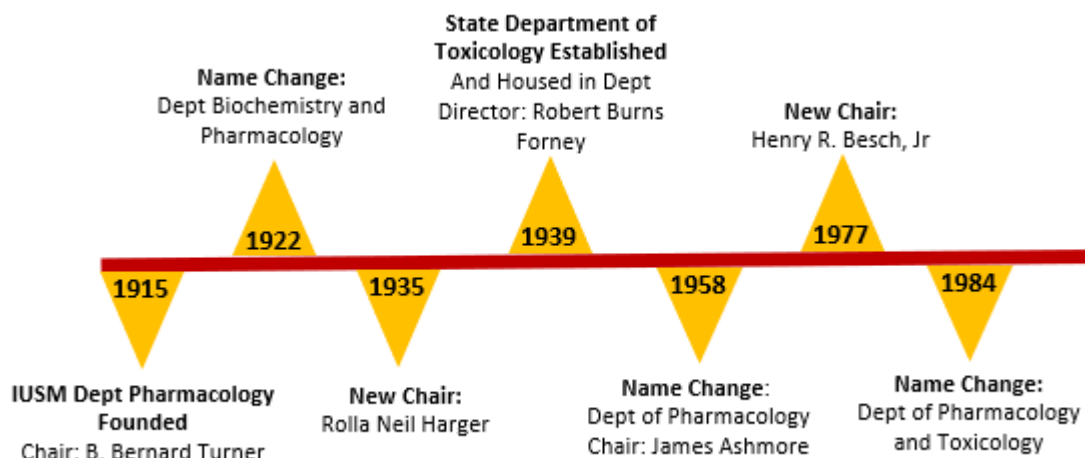
her groundbreaking work on the effects of environmental toxins on microglia, the brain's resident immune cells. You'll also learn more about our MS in Translational Toxicology, entering its second year of operation to provide well-trained toxicological scientists for industry and government.

I joined the department this year as Chair, from not too far away: I was previously in the IU Department of Ophthalmology. My own research focuses on drug discovery and mechanistic studies for

blocking abnormal blood vessel growth in the eye. I was drawn to Pharm/Tox by the collaborative culture, outstanding research and teaching, and potential for growth in this department. Interim Chair Bill Sullivan built on a great legacy, and I'd like to thank him for his leadership plus congratulate him and Nick Brustovetsky on 20 years as faculty in the department (see p. 11).

My goal as Chair is simple: to make Pharm/Tox *the* place for drug discovery, drug mechanism, and toxicology research and education at IU and a national powerhouse, with the aim of being in the top 25 departments in NIH funding within five years. We will do this through recruitment of outstanding, diverse scientists in the department's focus areas; opportunities for engagement with clinical departments; plus seed funding for current faculty to pursue high-impact projects. I hope that you will join us for a Zoom open house on September 12 to learn more about what we're doing (see p. 18), and I look forward to sharing further exciting updates in next year's newsletter.

## Department Timeline: 1915-2001



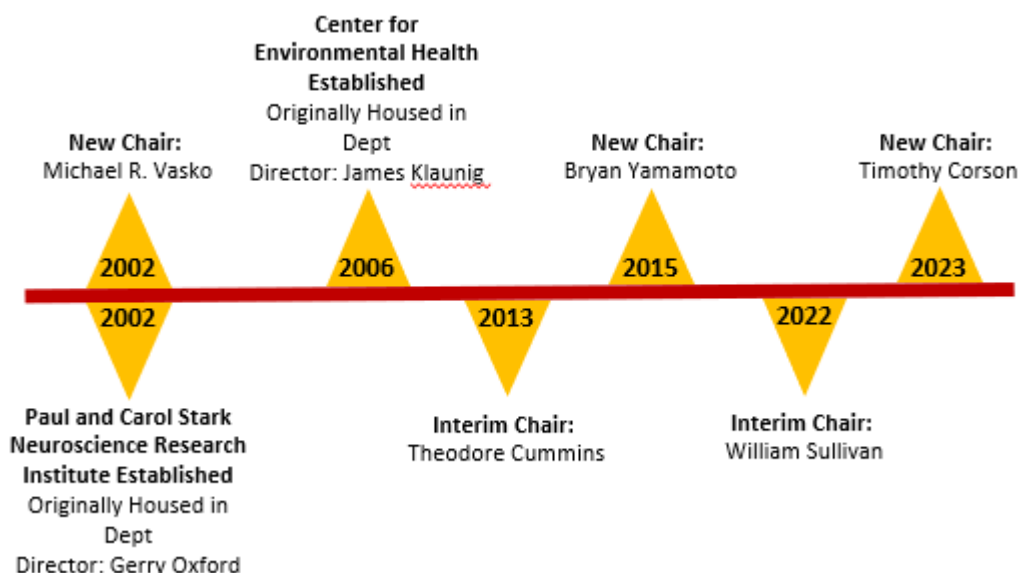
The Department of Pharmacology of the Indiana University School of Medicine was first established in 1915 under the chairmanship of B. Bernard Turner. Dr. Turner was recruited from the laboratory of John Jacob Abel. Dr. Abel is often called the "father of American pharmacology" since he started the first Department of Pharmacology at the University of Michigan.

Dr. Henry R. Besch, Jr., renamed the department the Department of Pharmacology and Toxicology to formally recognize the five decades of leadership in Toxicology by Rolla N. Harger, the inventor of the Drunkometer, precursor to the modern breathalyzer, and his prominent student, Robert B. Forney, Sr. Dr. Forney was instrumental in working with the state in implementing breath testing for alcohol and was named Distinguished Professor for his work in forensic toxicology.



**Dr. Rolla Harger  
and the Drunkometer**

## Department Timeline: 2002-Present



**Dr. Michael R. Vasko** became Chair of the Department of Pharmacology and Toxicology in 2002.

In that same year, the **Paul and Carol Stark Neuroscience Research Institute** was formed with Department faculty member, Dr. Gerry Oxford as the director.

In 2006, the **Center for Environmental Health** was formed with Dr. James Klaunig as the director. Both these research centers were administratively housed in the department but before becoming independent.

Dr. Vasko resigned as Chair of the Department in 2013 and was succeeded by **Dr. Theodore Cummins** as interim Chair for 2 years.

In 2015, **Dr. Bryan Yamamoto**, former Chair of the Department of Neurosciences at the University of Toledo College of Medicine was recruited to Indiana University as Chair and the Robert B. Forney Professor of Toxicology.

Showalter Professor and parasitologist **Dr. William J. Sullivan** served as interim chair after Dr. Yamamoto's retirement.

Ocular pharmacologist **Dr. Timothy W. Corson** joined the department as chair in 2023.



**Dr. Michael Vasko**



**Dr. Ted Cummins**



**Dr. Bryan Yamamoto**



**Dr. William Sullivan**



**Dr. Timothy Corson**

## Toxicology in the Early Years: Martin Bernstein, PhD (1968)

Martin “Marty” Bernstein was a recent graduate with a Bachelors in Pharmacy when he heard of a new program in Toxicology at Indiana University in Indianapolis (not yet IUPUI).

Not only was the program new to the school, it was the first toxicology program in the world. The program was initiated by Department of Pharmacology faculty Dr. Robert Forney. Sr., head

***Our department had the first Toxicology doctorate program in the world.***

of the State Toxicology lab at the time, and Dr. Francis

Hughes in response to the 1961 thalidomide tragedy. Drs. Forney and Hughes met with Congress and eventually received a training grant in toxicology from the US Public Health Service with the goal of increasing toxicology training and preventing further tragedies.

The program officially began in 1963, Marty was one of five students in the initial cohort and received his doctorate in 1968. He studied the anti-inflammatory effects of tetrodotoxin on the cardiovascular system. He then went on to a post-doctoral position at the University of Southern California under Dr. Findlay Russel, a famous physician and toxicologist known for his work on toxins of natural origins.

After his post-doc, Marty moved to New York and spent twenty years at Ciba-Geigy before retiring. However, his work did not stop there. He volunteered with high school students and also consulted, particularly on the mutagenicity and teratogenicity of triclosan – an antimicrobial that was used in Colgate toothpaste, providing expert testimony on the toxicological science.

Marty is now fully retired and enjoys reading, traveling, and exercising. He

has been married to his wife for 48 years. Being a part of the first Toxicology PhD cohort from the Pharmacology and Toxicology department is a great accomplishment, and Marty is proud to have helped open the doors to successive generations of pharmacologists and toxicologists. The early stages of the department and the students that graduated have helped to set the standards for our program. In addition, Marty notes the close student and professor relationships they developed along the way. Among them is renowned scientist K. K. Chen, known for his work with epinephrine, digitalis, and developing an antidote for cyanide.

Despite his expertise and success, Marty keeps a humble attitude: “The more you learn, the less you know.” – a sentiment with which most scientists can agree.

## Toxicology Alumna Jessica Pellman, PhD (2015)

Dr. Jessica Pellman entered the graduate program in 2009. Her interest in toxicology and neuroscience led her to Nick Brustovetsky’s lab. “The strong relationships between pharmtox and Stark Neuroscience Research Institute were a great opportunity to participate in both. I also felt there was a great community in the department and appreciated the interactions between students and faculty.” In 2015, she defended her thesis “Regulation of Neuronal Calcium Homeostasis in Huntington’s Disease.”

She is currently a manager and Toxicology Study Director at Labcorp, a

CRO (Contract Research Organization), responsible for conduct of nonclinical studies with novel compounds supporting IND (Investigational New Drug) applications and NDA (New Drug Applications). “I utilize my training in toxicology to work with clients to design regulatory studies, ensure appropriate study conduct, and interpret data.”

When asked what she found useful about studying toxicology, Jessica replied, “Studying both Toxicology and Pharmacology within the department and having exposure to a wide array of therapeutic areas was a huge asset to appre-

ciate the nuance of on target and off target mechanisms. Working at a CRO means that I get to work on a variety of indications and having that breadth of knowledge and background has been a huge asset.”

When she’s not working, Jessica enjoys exploring Indy, reading, walking, camping, and craft beer.



## Toxicology Faculty Michelle Block



Dr. Michelle Block's path to toxicology is unconventional. Having graduated with a Ph.D. in Genetics from Penn State

University, her interest in toxicology specifically had not yet developed. She knew she was to pursue a career in neuro-degenerative research, so she accepted a joint position with the National Institute of Environmental Health Sciences (NIEHS) and Environmental Protection Agency (EPA) as a post-doctoral fellow upon graduation.

Dr. Block, who joined the Pharmacology

and Toxicology department in 2019, describes the world of toxicology as "wildly environmental and biologically relevant. It's an important way to discover mechanisms that impact human disease." According to Dr. Block, toxicology research not only affects markers, mechanisms, and therapeutics, but also environmental policy.

But intertwining the fields of neuroscience and toxicology can have a dual purpose. During her post-doctoral fellowship, she was asked whether her focus was neuroprotective or neurotoxic? In other words, "Do you like things that blow up or do you want to save them?" However, her mentor

doubted her environmental work, claiming it was "dirty" and that she would never be able to elucidate a mechanism for her work in central nervous system pathology. "He was wrong."

The Block lab is now very successful in its field and in addition to environmental toxicology, is known for work in Alzheimer's disease, how the peripheral nervous system affects the central nervous system, and what she is best known for – the lung-brain axis. However, she is particularly proud of her trainees. "The reason I went into academia is to train my mentees to be better researchers than I am."

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## Toxicology Faculty Richard Nass:

### **Worms, Yeast, and Toxicology: Insights from Mentors & Nobel Laureates**

*An invited talk at the 2023 Society of Toxicology in which Dr. Nass talks about challenges and lessons learned during his career.*



Watch Dr. Nass' talk here: <https://www.youtube.com/watch?v=noxDI1MEhDs>



## Master of Science in Translational Toxicology

The Master of Science in Translational Toxicology began in 2022. The program meets an emerging need in toxicology education for graduates to have workplace experience.

This intensive, one year, non-thesis-based program includes an internship that allows the graduate to utilize knowledge gained in their academic toxicological studies and incorporate them in a professional work environment. The

MSTT program provides hands-on skillsets and experiential learning activities in their toxicological field of interest and is designed to relatively rapidly expose the student to toxicology-based careers, including in the pharmaceutical/chemical industry, non-government organizations (NGOs), and/or research/educational institutions while gaining relevant experience and professional connections.

The program has developed a

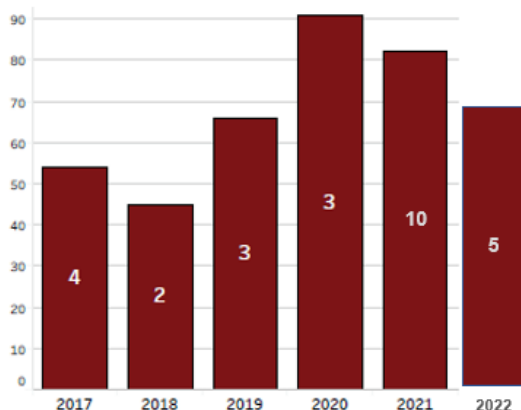
novel curriculum and requires the completion of a minimum of 30 credits that includes 14 credits of Foundational Courses in biochemistry, pharmacology, toxicology, statistics, and science writing. The Specialization Core courses include three courses of 13 credits, and include the novel MSTT courses "Principles of Pharmaceutical Toxicology in the 21<sup>st</sup> Century" and "Internship in Toxicology".

For more information, visit <https://medicine.iu.edu/pharmacology-toxicology/education/ms>

## Department Research Funding and Publications

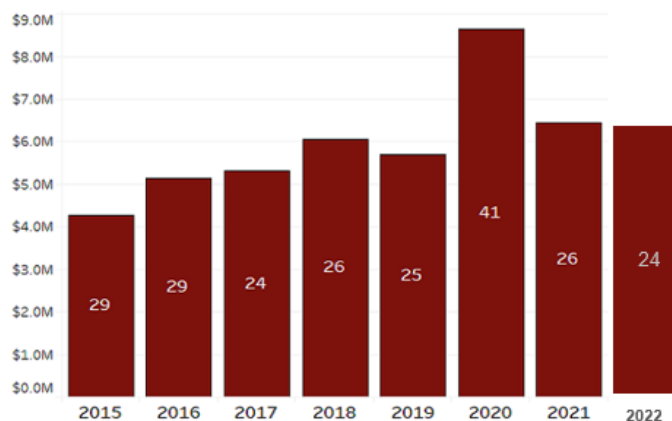
### Publication Count by Calendar Year

With # High Impact Journals Indicated

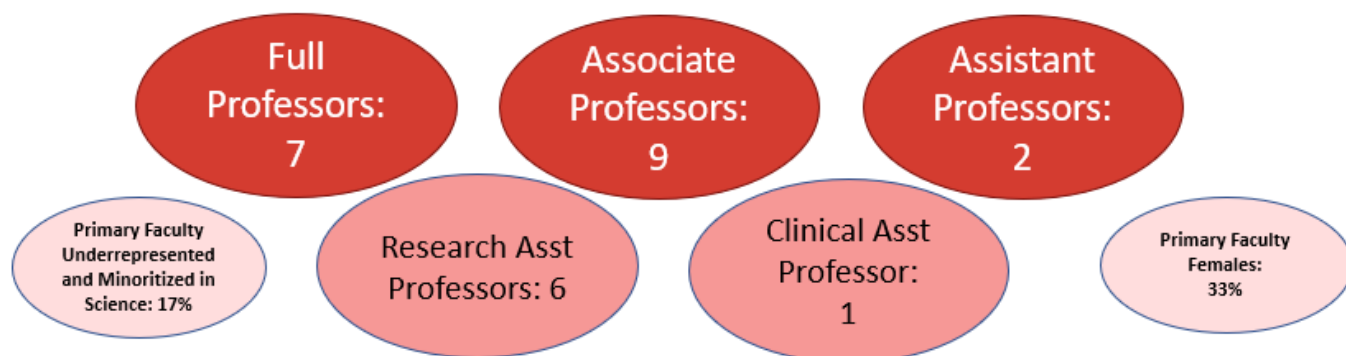


### Awards by Calendar Year

With # of Awards Indicated in \$ in Millions



## Department of Pharmacology & Toxicology Composition By the Numbers



Teaching Faculty at IUSM  
Regional Campuses:  
11

Medical Student Body  
9 CAMPUSES, ALPHABETICAL ORDER

1	BLOOMINGTON	89
2	EVANSVILLE	85
3	FORT WAYNE	84
4	INDIANAPOLIS	843
5	NUNCIE	56
6	NORTHWEST GARY	67
7	SOUTH BEND	74
8	TERRE HAUTE	81
9	WEST LAFAYETTE	57
<b>TOTAL</b>		<b>1,436</b>

Adjunct  
Faculty:  
28

From departments such as:

- Medical and Molecular Genetics
- Ophthalmology
- Pediatrics



## Health Professional Pharmacology Education By The Numbers

### Medical Student – Year 1:

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

### Medical Student – Year 2:

365 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

### Master of Science

Medical Science:

2 Students  
1 Semester Pharmacology Course

### Anesthesiology Assistant:

21 Students  
1 Semester Pharmacology Course

## 2023 K.K. Chen Award Winner Aishat Motolani

K.K. Chen was an internationally prominent pharmacologist who came to Indianapolis in 1929 to help organize Lilly Research Laboratories. He was appointed



**Dr. Corson presenting to Aishat Motolani**

part-time Professor at Indiana University School of Medicine in 1937, and upon his retirement from Eli Lilly and Company in 1963, he became a full-time professor at Indiana University. His research includes

early contributions of the drug ephedrine and its introduction into clinical medicine in 1924, outstanding achievements still in use

today in the treatment of cyanide poisoning, cardiac glycosides, and analgesic

drugs including methadone.

The **K.K. Chen Fellowship**, which began in 1995 with an endowment established by the Chen family, is presented each year to the graduate student who the faculty of the Department of Pharmacology and Toxicology deem to exhibit the qualities of outstanding scholarship, innovative research, and dedication to the spirit of scientific investigation.

This year's winner of the KK Chen fellowship is Aishat Motolani, a PhD candidate in Dr. Tao Lu's lab.

### Aishat Motolani

- 12 publications, 1 patent application
- Presentations at AACR, ASPET, ABRCMS
- Several travel awards
- Wells Graduate Fellowship and IUSM leadership award
- F99/K00 IUSM nominee
- VP of Biomedical Graduate Student Advocacy Association, Director of Communications for Graduate and Professional Student Government, peer mentor
- Thesis: Characterization of a post-translational modification of NF- $\kappa$ B and effects on signaling and PDAC growth in vitro and in vivo .

## 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.

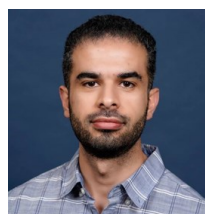
## 2023 Paradise Travel Award Winners



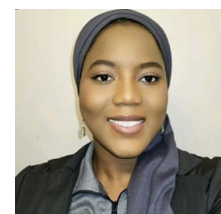
**James Blauwkamp**  
[Sabrina Absalon Lab]



**Nicole Bodi**  
[Tasneem Sharma Lab]



**Nikan Riyahi**  
[Karen Pollok Lab]



**Aishat Motolani**  
[Tao Lu Lab]



## 2023 Mentoring Award Winners

In 2022, we established mentorship awards to recognize and appreciate trainees' great contribution to mentor junior scientists in the PI's labs. This year, we selected two outstanding postdocs to receive this award. They are Dr. Rodolpho Souza, from Dr. Gustavo Arrizabalaga's lab, and Dr. Benjamin Liffner, from Dr. Sabrina Absalon's lab. Here we quote what their mentors describe about their contribution and why they are chosen to receive this award.



**Dr. Lu presenting to Dr. Souza**



**Ben Liffner, PhD**

Dr. Absalon wrote "We are fortunate to have successfully recruited Ben to our laboratory and IUSM. It's important to note that Ben is a passionate advocate for promoting wellness and maintaining a balance in mental health within the academic environment."

Dr. Arrizabalaga wrote "Since joining my lab, Rodolpho has trained four rotations students, co-mentored our work-study lab assistant, and trained numerous individuals in my lab and that of others in a variety of techniques and methods. Rodolpho is always willing to answer questions, help other design experiments, and mentor graduate students in career related matters. He is a bright example of a scientific mentor and has had a great positive influence on those around him."

## Recent Graduates



<b>Tianhan Dong</b>	<b>Thesis:</b> "A Machine Learning-Based Histopathological Image Analysis Reveals Cancer Stemness in TNBCs with 17P Loss"
	<b>Mentor:</b> Kun Huang/Xiongbin Lu
	<b>Future Steps:</b> Research Scientist at Takeda Pharmaceuticals in Boston MA
<b>Omal El Jordi</b>	<b>Thesis:</b> "The Role of Inflammation In Mediating Different Cognitive and Behavioral Functions"
	<b>Mentor:</b> Brady Atwood/David McKinzie
	<b>Future Steps:</b> Postdoctoral Fellow in Clinical Pharmacology at IUSM
<b>James Baek</b>	<b>Thesis:</b> "Treatment During Abstinence from Methamphetamine in a Rat Model of Methamphetamine Use Disorder"
	<b>Mentor:</b> Bryan Yamamoto, PhD
	<b>Future Steps:</b> Neurosurgery Resident at University of Minnesota



## 25 Graduate Students

- Pharmacology Doctorate Students
  - 6 Pre-Candidacy including 5 new students
  - 19 Candidate
- 2 Master of Science in Translational Toxicology
- 1 Masters of Science in Pharmacology



## 2023 Student Roles

- *IBMG Department Representative:* Jade Harkin
- *Faculty Liaison:* Logan Bedford
- *Student Secretary:* Katie Thibodeau
- *DEI Committee Student Representative:* Ivana Daniels
- *Student Coordinator for Departmental Speaker:* James Blauwkamp
- *Student Seminar Coordinator:* Nicole Ramos
- *Recruiters:* Tinslee Dilday, Basant Hens, Sarah Morrow, Nicole Ramos
- *Trainee Event Coordinator:* Amanda Krueger, Jamie Malley, Rashmita Basu, Tinslee Dilday
- *Student Mentoring:* Amanda Krueger, Nicole Bodi, Ivana Daniels, Sarah Morrow, Logan Bedford
- *Newsletter Editors:* Tara Fuller, Basant Hens
- *Social Media Representatives:* Aishat Motolani, Sarah Morrow



## New Director of Graduate Studies



**Jennelle Durnett  
Richardson, PhD**

In June, Dr. Travis Jerde stepped down as Director of Graduate Studies and Dr. Jennelle Durnett Richardson accepted the role. Dr. Jerde worked tirelessly to update the curriculum and introduced new courses such as Fundamentals of Intracellular Signal Transduction and Advanced Concepts in Cytosolic and Nuclear Signal Transduction. He will continue to serve as a resource and guide students.



**Travis Jerde,  
PhD**

## Recent Alum Spotlight: Tianhan Dong, PhD

Although Dr. Tianhan Dong transferred her fourth year in the IBMG program to the Pharmacology and Toxicology department due to lab relocation, she quickly came to appreciate the basics of pharmacology. She notes that her coursework helped her in project design, considering the pharmacology and side effects of small molecular inhibitors as a treatment for breast cancer. "It's easier to understand your project once you learn the basics [of pharmacology]."

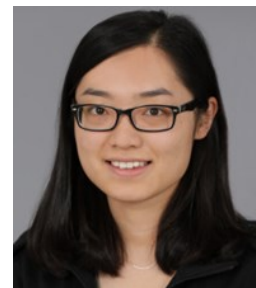
In addition to coursework, Tianhan notes that the journal clubs have helped her to expand her

viewpoints in science to avoid missing key points that may occur when reading alone. This logic can also be applied to her collaborative work she shared with two mentors. Being a part of two labs requires joining different aspects of science together into one project. Initiating a collaborative research environment has helped her when applying for jobs post-graduation.

This knowledge and the skills that Dr. Dong developed during her time in the Pharmacology and Toxicology department have carried over into her current career path as a scientist at

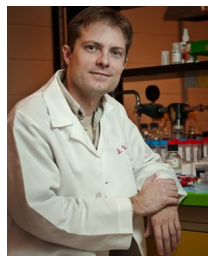
Takeda Pharmaceuticals in Boston. Her current position in industry allows her to see a more direct impact of her work developing therapeutics for cancer patients – one of the reasons she decided to enter industry directly without seeking a post-doctoral fellowship. "I don't want my work to stop at the paper level."

According to Tianhan, another advantage of working in industry is work-life balance. In her time away from work, she enjoys traveling and hiking at nearby parks. However, she also enjoys relaxing at home, giving her a chance to rejuvenate from her work week.



## Anniversaries and Transitions

### 20 Years as Department Faculty!



**Bill Sullivan**

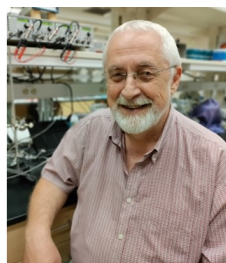


When reflecting of his time here, Dr. Sullivan noted, "I feel incredibly lucky to have found such a wonderful place to do science—with such great people and resources, you're really only limited by your imagination."

Dr. Brustovetsky shared, "20 years ago when I just came to Indianapolis and visited Department of Pharmacology and Toxicology at IUSM for the first time, I was thinking about major factors that attracted me to this place and I came to this: good people in the Department, opportunity to satisfy my scientific curiosity, excellent working/living conditions. 20 years later I was thinking what kept me here so long and I came to this: good people in the Department, opportunity to satisfy my scientific curiosity, excellent working/living conditions. So, as you can see nothing changed in my opinion about PharmTox and Indianapolis and I am still very happy with my choice made 20 years ago. Advice to students. First, understand what do you want in your life/career. Then, find the place where you can accomplish what you want. And, finally, stay at this place and treasure it."



**Nick Brustovetsky**



### Update from Bryan Yamamoto, 1 year into retirement:

Time surely flies! The past year has been very busy with traveling, visiting family and friends, 3 snorkel trips to Hawaii, Napa valley wine tours, barbecuing, reading, woodworking, and even a bit of grant writing. I miss you all so please drop me an email and let me know how you are doing!

### Newly Tenured!



**Dr. Yao-Ying Ma**

## Post-Doctoral Fellow Spotlight

Growing up in Brazil, Rodolpho Souza aspired to become a chemical engineer. In Brazil, the only university to offer such a major was the capitol, Rio de Janeiro. However, with little money, he found teaching to be the most straightforward method to achieving this dream. Although Rodolpho entered university as a chemistry major, he graduated as a biology major with a teaching focus.

He describes his path to graduate school as unconventional; while in college, he took a class that was relatively new. One of his classmates recruited him to Sao Paulo

for an internship, where he subsequently entered the Department of Parasitology at the University of Sao Paulo to study metabolomics and metabolism of the parasite *Trypanosoma cruzii* under Dr. Ariel Silber.

It was fate that he met Dr. Gustavo Arrizabalaga through Dr. Silber at a conference where Dr. Arrizabalaga gave a presentation on the unicellular parasite *Toxoplasma gondii*. Although Dr. Souza was not looking for a post-doctoral fellowship, he subsequently joined the Arrizabalaga lab in August of 2020, where he currently studies the morphody-

namics, division and inheritance of *Toxoplasma* mitochondria.

Dr. Souza's career goals have changed over time – he now seeks to become a principal investigator, combining his love of teaching and research with his knowledge of the parasite world. And he is open to staying at IU. He notes that one of the advantages of being in the Pharmacology and Toxicology department at IU is its evolving diversity, both culturally and scientifically.

Outside of the lab, Dr. Souza enjoys his downtime watching movies and TV shows, trying new beers, and playing with his dog Farofa.



**Rodolpho Souza PhD**



Graduated from the University of Sao Paulo



Advice for seeking a post-doctoral position: "Research the lab. Don't be afraid of changing fields. And negotiate your salary."

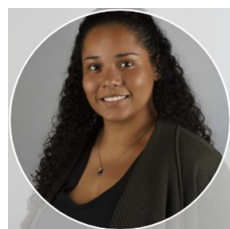


Won: Best Poster – International Congress on Toxoplasmosis and at the Molecular Parasitology Meeting; Postdoc Challenge Award Grant Recipient from CTSI; Pharmacology and Toxicology Department's Excellence in Mentorship Award



Studies *Toxoplasma* mitochondrial function in the lab of Dr. Gustavo Arrizabalaga

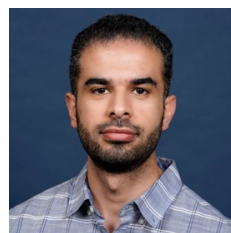
## IU Simon Comprehensive Cancer Center Cancer Research Day Awards



**Nicole Ramos**  
1<sup>st</sup> Place for  
Translational  
Research



**Sarah Morrow**  
3<sup>rd</sup> Place Poster  
Award for Basic  
Science



**Nikan Riyahi**  
3<sup>rd</sup> Place for  
Translational  
Research



**Hanyu Xia**  
4<sup>th</sup> Place Poster  
Award for Basic  
Science



## Recent Major Grants Awarded to Pharm/Tox Faculty

Faculty	Grant Award Title
Sullivan (R01)	Translation initiation factors driving persistence of <i>Toxoplasma gondii</i> bradyzoites in neurons
Flak (R01)	Defining the neurocircuit activated by the VMH to control energy expenditure
Sullivan (R21)	m6A mRNA reader proteins in the AIDS-opportunistic pathogen <i>Toxoplasma gondii</i>
Arrizabalaga (T32)	IMSD at Indiana University School of Medicine through Inclusive Biomedical Research Training Program
Yeh (R01)	Tumor cell -TAM Paracrine Signaling in Breast Cancer
Corson (NIH-STTR)	Novel dual-action compounds to treat type 1 diabetes by protecting and enhancing beta cells
Atwood (R21)	A novel proteomics approach to identify alcohol-induced changes in synapse-specific presynaptic protein interactions.
Absalon (Showalter)	MCMCBP: a guardian of genome integrity during <i>P. falciparum</i> asexual replication.
Corson (R01)	Long-acting formulations of griseofulvin for ocular neovascularization therapy
Atwood (R01)	Impact of prenatal opioid exposure on corticostriatal circuits that modulate alcohol-related behaviors
Corson (F31)	Ref-1 in Retinal Neovascularization
Fehrenbacher (R21)	The role of a lysosomal mechano-sensitive ion channel in pain

## Spring End-of-Year Celebration



Dr. Corson presents Heather Conner, department grants specialist, an award for her help in getting grants submitted. Dr. Corson also expressed appreciation to Dr. Sullivan for serving as Interim Chair and Dr. Jerde for serving as Director of Graduate Studies.





## More PhD Student Awards



**Rashmita Basu** (Flak lab) received a Graduate and Professional Student Government (GPSG) Travel Award.



**Nayela Chowdhury** (Fishel Lab) received an IU Simon Comprehensive Cancer Center Fellowship.



**Ivana Daniels** (Gaston Lab) received the Underrepresented Trainee Award and Student Scholar-American Thoracic Society (ATS) Conference and a NASA-Indiana Space Grant Consortium Fellowship.



**Jade Harkin** (Meyer Lab) received an Outstanding Oral Presentation at MERS, 1st Place Oral Presentation at Stark Neuroscience Research Symposium and 1st Best Poster Award at Big Ten Neuroscience Annual Meeting



**Amanda Kreuger** (Arrizabalaga Lab) received an IBMG Travel Award



**Tara Schmidt** (Jerde and Arrizabalaga Lab) was the departmental nominee for the IUPUI Chancellor's Scholar Award for Academic Excellence

## Tinslee Dilday: First Place Female Finisher: Rock for Riley 5K



Tinslee competed as part of "The Mighty Chondrias" team which raised the most money to support Riley Children's Hospital.

## More Postdoc Awards

**Dr. James Johnson**, Postdoc in Michelle Block's lab, won a Postdoc Travel Award.

## Faculty Awards



**Dr. AJ Baucum** won the **ASPET Division of Neuropharmacology Diversity, Equity, and Inclusion Recognition Award** for his comprehensive commitment to and success in mentoring students from underrepresented communities at all training levels (high school through postdoc) and advocating for DEI awareness at the local institutional as well as national levels.

**Dr. Tao Lu** won the **2022 Outstanding Community Engagement Award** from the Indiana University School of Medicine.



**Outstanding Teacher of Basic Science on the Indianapolis Campus**



Jennelle Durnett Richardson

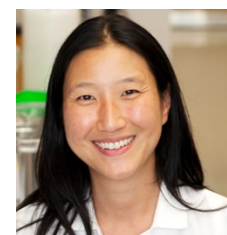
## Trustees' Teaching Award



Jonathan Guerrero  
(Northwest Campus)

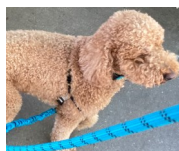


Lynn Roy  
(South Bend Campus)



Liz Yeh  
(Indy Campus)

## Inaugural PharmTox DEI Committee Sponsored Picnic



## Department of Pharmacology and Toxicology Faculty

**Timothy Corson, PhD**

Chair, Department of  
Pharmacology & Toxicology

The Corson Lab studies neovascularization (abnormal blood vessel growth) in the eye and how to block it to treat retinal neurodegenerative diseases like neovascular age-related macular degeneration, proliferative diabetic retinopathy, and retinopathy of prematurity. We also work on the pediatric tumor, retinoblastoma.

**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.

**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

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  $\kappa$ B (NF- $\kappa$ B) signaling, epigenetics, and drug discovery in cancer.

**Yao-Ying Ma, MD, PhD**

Associate 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

Dr. Richardson 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. She is also the Director of Graduate Studies for the department

**Ahmad R. Safa, PhD**

Professor of Pharmacology & Toxicology

Dr. Safa's 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.

**William J. Sullivan, PhD**

Showalter Professor 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.

**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  
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TOXICOLOGY



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Newsletter Editors:  
Jennelle Durnett Richardson  
Tara Schmidt  
Amy Lawson

*Drug discovery starts here*



Faculty and administrative staff gather for a science and planning retreat in August of 2023.

### Support the Department of Pharmacology & Toxicology at the Indiana University School of Medicine

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,

ocular, 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.

[Make a donation:](#)



### Alumni Virtual Open House - Join Us!

We are pleased to invite you to a Zoom meet-and-greet with Dr. Corson and select faculty and students who will expand on current initiatives and research in the department. This drop-in event will be on **September 12, 2023, 5:30-6:30 p.m EST.**

Please register [here](#) or type in <https://tinyurl.com/pharmtox>