

IPPH NEWSLETTER

June 2019



The Future of Industrial and Physical Pharmacy
The 2019 Garnet E Peck Symposium



Dr. Elizabeth Topp
is part of a grant
to develop better
rescue kits for
hypoglycemia



GREETINGS FROM THE HEAD



Dear Alumni and Friends,

It has been a whirlwind of a spring semester here at Purdue. For me it has been about learning to be a new department head. Fortunately, the department has been extremely supportive, including faculty, staff and students, as well as upper-level administrators and other department heads. I have also had the privilege of teaching a course to our graduate students on solid-state NMR spectroscopy with two of our adjunct faculty, Drs. Joseph Lubach and Yongchao Su, this past May. This is also a great time to thank our adjunct faculty who do an excellent job of teaching in many of our classes. I hope that you consider this as fabulous an opportunity as we do!

I want to highlight some of our faculty and student achievements, including Dr. Lynne Taylor's selection for the 2018-19 Provost's Outstanding Graduate Faculty Mentor Award, and Dr. Elizabeth Topp's contribution to a NIH SBIR Phase I/II award to Monon Bioventures, LLC, for work done in her laboratory. Our students have also received national recognition, including Lia Bersin who received a PhRMA Predoctoral Award in Pharmaceutics and our student winners (Sugandha Saboo, Siddhi Hate, and Andrea Chambers) of the Three Minute Thesis Competition. Please make sure to check out the rest of the faculty and student updates that are found in the newsletter!

We have successfully launched (but not yet filled) a search for a new faculty member in the area of Pharmaceutical Biotechnology. I would like to thank the search committee as they have been actively pursuing candidates to fill the position, and as the search is still open, would encourage you to suggest any good candidates to apply.

We held the 16th annual Peck Symposium on May 8th at Purdue University. The symposium was entitled "The Future of Industrial and Physical Pharmacy," and we spent an entire day discussing future directions for the department. In particular, we had small roundtables that provided feedback and suggestions on both the research focus for the department and education focus for our graduate program. My intention is to digest this feedback over the summer and provide some actionable items to the departmental faculty in the fall, which I will relay in our next newsletter. Finally, none of this would have been possible without your support. I want to thank all of the attendees, including speakers, moderators, alumni, students, and faculty. I would also like to thank Jennifer Gray for her outstanding work in organizing the symposium. Thanks, Jen!

We have a few upcoming events this fall, including the Varro E. Tyler Distinguished Lecture in early September, which will be presented by Dr. William Charman from Monash University, the introduction of six new graduate students to our program in mid-August, and the celebration of Purdue's 150 years of Giant Leaps in the College of Pharmacy in October. Please contact Jennifer Gray if you would like additional information about these items.

As I mentioned in the last newsletter, being a strong department is all about establishing and maintaining relationships. I have been honored with the outpouring of support that I have heard from our alumni and friends. I want to thank all of you who have reached out to me and/or have spent time talking with me during the past several months. I have found our alumni to be extremely passionate about Purdue and the department, and my hope is that we can continue to develop these strong relationships over time. I know many of you already, but for those that I don't know, or haven't seen in a long time, I hope to connect with you soon. I am still waiting for those emails and calls about your great times at Purdue, and am always interested in your thoughts and suggestions!

Boiler up!

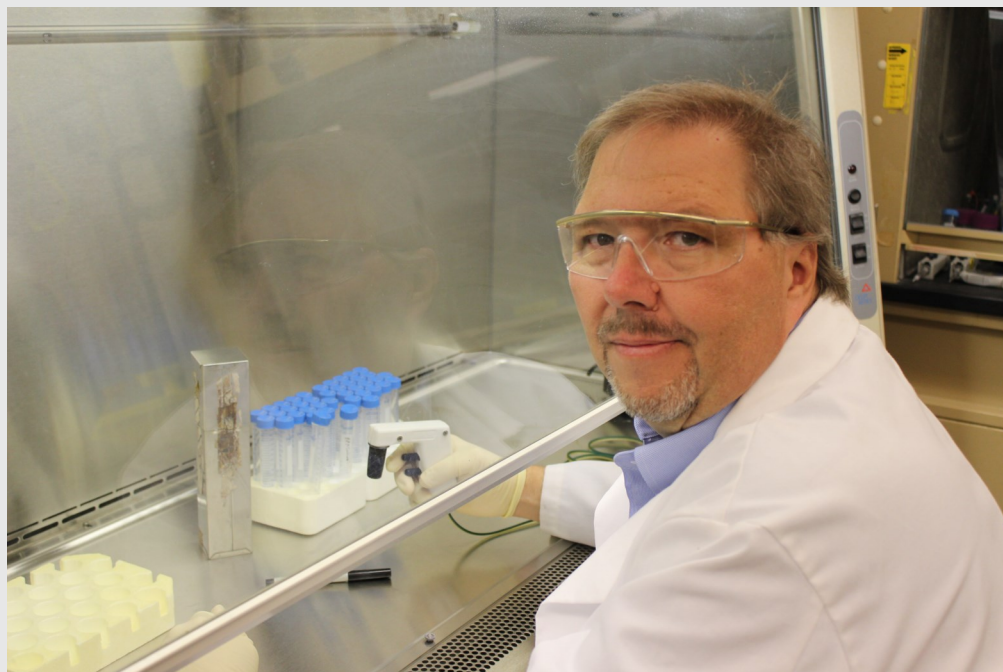
Eric Munson
Dane O. Kildsig Chair and Department Head

Faculty Spotlight, Dr. Greg Knipp

Greg Knipp, Ph.D. grew up in Hoboken, NJ, the birthplace of Sinatra, and arguably baseball. As a young boy, he dreamed of growing up to be an astronaut after watching the lunar landing at the age of 3; however, a γ -globulin deficiency, a deficiency in the formation of antibodies, from birth resulted in frequent hospital stays until he was about 8. This experience led Dr. Knipp away from dreaming about space and into the field of pharmaceutical sciences based on his significant desire to improve healthcare for children and adults.

He became enthusiastic about doing research after participating in a Cooperative Education position performing solids characterization at E.R. Squibb & Sons with Dr. Harry Brittain, as a junior studying Biochemistry in college. Continued Cooperative Education work as a senior in the physical pharmacy group within the Pharmaceutical R&D department at Bristol-Myers Squibb with Drs. Ken Morris and Abu Serajuddin accelerated Dr. Knipp's passion for understanding how formulations were developed and how they perform in the body. During this time, he was afforded the opportunity to perform basic research, which included publishing his first paper in *J. Pharm. Sci.* in 1992, entitled "Structural properties of polyethylene glycol—polysorbate 80 mixture, a solid dispersion vehicle" (<https://onlinelibrary.wiley.com/doi/abs/10.1002/jps.2600811212>).

In 1991, Dr. Knipp became interested in the work of Dr. Ronald Borchardt in the Department of Pharmaceutical Chemistry at The University of Kansas and his work growing Caco-2 cells and bovine blood brain barrier microvessel endothelial cells. Shortly afterwards, Dr. Knipp joined the Borchardt research group to investigate pathways by which peptides traverse biological barriers to



reach their sites of action. Following his Ph.D. research, he performed postdoctoral research at the University of Kansas Medical Center with Dr. Michael Soares developing an understanding of the role of nutrient transport across the placenta and the influence on fetal development.

After working as an Assistant Professor at Rutgers, Dr. Knipp saw a “significant opportunity to perform translational research” at Purdue University and accepted a position in the Department of Industrial and Physical Pharmacy in 2006. His research goal when coming to Purdue was to “try to understand the effects of formulation and solid state properties of chemicals on bioavailability and performance in animal models such as rodents and pigs.” He still sees a tremendous opportunity to delineate the effects of formulation composition and API properties on bioavailability and distribution in animals as a surrogate for conventional dissolution methods to better understand human exposure. Specifically, Dr. Knipp strongly advocates for porcine research as he is quick to point out the close similarities between the porcine and human gastrointestinal physiology and functional properties.

One of the most rewarding aspects of Dr. Knipp’s work is the ability to work with students, enjoying their enthusiasm, and being a part of the tremendous growth which occurs during the years of graduate study. “During graduation, the hooding process is one of the most gratifying experiences as it recognizes the significant efforts the student has made to your laboratory and is very emotional for a professor,” says Dr. Knipp. On his own life journey, Dr. Knipp’s most profound life lesson came from one of Nobel laureate Peter Debye’s last graduate students’, Ulrich Strauss at Rutgers University. Dr. Strauss said that his brain had a finite capacity which is re-

served only for science, which is why he could not remember trivial facts, such as his home address. Dr. Strauss conveyed that he was taught this in his formative years through observing Dr. Debye and his contemporaries. To Dr. Knipp, “I grew more as a scientist after hearing Dr. Strauss’s testimony, than ever before in my life.”

Dr. Knipp serves as Associate Site Director for the Dane O. Kildsig Center for Pharmaceutical Processing Research (<https://cpr.uconn.edu/>), a consortium which affords him the opportunity to work closely with industry partners and

converse with colleagues at other schools, learning about research and what academia needs to do in order to react to emerging industry challenges. He also co-founded and serves as the faculty Director for the Purdue Translational Pharmacology CTSI Core (<https://www.purdue.edu/discoverypark/bioscience/facilities/core/pharmacology/index.php>), where he works closely with investigators and Mrs. Robyn McCann to perform innovative preclinical research aimed at addressing critical factors for translation.

Dr. Knipp’s current research interests include the development of a novel, directly layered Blood-Brain Barrier *in vitro* assessment model to improve neurotherapeutic screening and to triage neurotoxic compounds (<https://patents.justia.com/patent/20180067103>). He also has ongoing collaborative projects for the preclinical screening and formulation development of new chemical entities developed by collaborators in the Medicinal Chemistry and Molecular Pharmacology program (Dr. V.J. Davisson) and others across the campus. Lastly, he still has an ongoing interest in the development and preclinical assessment of pediatric formulation in the juvenile porcine model, an area that has long been underserved by the field yet has been gaining significant regulatory attention. He states that Dr. Harry Shirkey’s proclamation in 1962 that “Children are therapeutic orphans” remains a prevalent concern to the field to this day.

When not teaching or researching, Dr. Knipp enjoys spending time with his wife, Sue and their three active sons who are all experienced swimmers. In addition, he also is an avid football fan (both at the professional and college levels) and tries to watch as many games as possible.



Faculty Updates

Dr. Stephen Byrn is the recipient of the Pharmaceutical Sciences Teacher of the Year Award from the College of Pharmacy, as well as the LSAMP Faculty Mentor of the Year from Purdue University. Dr. Byrn was awarded a grant from the National Center for Advancing Translational Sciences for his project, "Synthesis, Polymorph Screen, and Stability Assessment for Non-GMP Manufacture of and Associated Analytical Activities," as well as a grant from the National Institute for Pharmaceutical Technology & Education for the project "NIPTE Education OLDP Pilot Project."

Dr. Tonglei Li and his student, Clairissa Corpstein have been awarded a research grant from the Purdue Research Foundation (PRF) for their proposal entitled: "Development of pediatric long-acting ART with nano-crystallization and polymer engineering informed by multiscale pharmacokinetic modeling."

Dr. Sandro Matosevic and his student Andrea Chambers have been awarded a research grant from the Purdue Research Foundation (PRF) for their proposal entitled: "Immunotherapy of solid tumors with immunometabolically-retargeted natural killer cells." Dr. Matosevic was appointed to the editorial board of the *Journal of Clinical Medicine*. The *Journal of Clinical Medicine* is an international peer-reviewed open access journal published monthly online by the Multidisciplinary Digital Publishing Institute (MDPI). The Matosevic lab was awarded a CTSI Collaboration in Translational Research Grant to develop a cell-based immunotherapy for glioblastoma, the deadliest brain cancer, in collaboration with the in vivo GBM therapeutics lab at Indiana University under the direction of Dr. Karen Pollok, Associate Professor of Pediatrics at the Indiana University School of Medicine.

Dr. Kinam Park was honored by the Controlled Release Society Foundation with the 2018 Kinam Park Student Travel Grant Program. These grants are aimed to promote connectivity by providing travel grants to promising students in the field of delivery science around the world to attend the CRS Annual Meeting.

Dr. Lynne Taylor has been selected for the 2018-19 Provost's Outstanding Graduate Faculty Mentor Award. The Provost selects two faculty members annually for this honor. Being selected for this award puts Dr. Taylor into an elite class of faculty. The Graduate School solicited nominations from across the Purdue University – West Lafayette Campus for the Provost's Award for Outstanding Graduate Faculty Mentor Award. Nominees come from any current graduate faculty member in all colleges/schools. The selection process included demonstrated sustained and significant contributions to graduate education at Purdue University through activities such as:

- Well-structured relationships with students that lead to successful completion of masters and doctoral degrees. These relationships include service on committees, mentoring, funding, intellectual and creative support, advocacy, and respect for students;
- Innovative graduate teaching;
- Significant administration of graduate programs

Dr. Elizabeth Topp is a part of an NIH SBIR Phase I/II grant worth \$1.4MM that was awarded to Monon Bioventures, LLC, to develop better rescue kits for hypoglycemia. This grant will support the pre-clinical development of novel derivatives of glucagon, the drug used in diabetes rescue kits. The grant was driven by the innovative research done in the Topp lab. Read the full article at <https://www.purdue.edu/newsroom/releases/2019/Q2/effort-to-improve-rescue-kits-for-people-with-diabetes,-hypoglycemia-gets-1.4-million-boost-with-sbir-grant.html>. Dr. Topp also received a "Partnership for Innovation in Lyophilization" award from the National Science Foundation and two awards from Merck Sharp & Dohme Corp for her projects, "Protein-protein interactions in high concentration formulations" and "Peptide Fibrillation". She has also received (2) grants from NIIMBL for the projects, "Lyophilization Short Course" and "Improving Lyophilization of Recombinant with ssHDX-MS."

Dr. Yoon Yeo received an award from the National Cancer Institute for her project, "Chemotherapy delivery with nanoparticles for targeted induction of immunogenic cell death."

Dr. Qi (Tony) Zhou earned the distinction of being an Outstanding Reviewer for the *Journal of Pharmaceutical Sciences* from the JPharmSci editorial team. He received this recognition due to the quantity and quality of the reviews he has conducted over the past year. Dr. Zhou joined the editorial board in June of 2018. Dr. Tony Zhou has also been selected to serve as an Editorial Board member for *Pharmaceutical Research*. *Pharmaceutical Research*, an official journal of the American Association of Pharmaceutical Scientists, is committed to publishing novel research that is mechanism-based, hypothesis-driven, and addresses significant issues in drug discovery, development, and regulation.

Graduate Student Highlights

Lia Bersin (Topp group) is the recipient of a PhRMA Pre-Doctoral Fellowship in Pharmaceuticals. This prestigious two-year fellowship is sponsored by the Pharmaceutical Research and Manufacturers of America Foundation (PhRMA).

Sonal Bhujbal (Zhou group) was selected to attend Purdue's 2019 Krannert Applied Management Principles program. This six-day "mini-MBA" program allows participants to sharpen their skill set in the areas of strategy, marketing, finance, negotiations, problem solving, and more. She is also the recipient of a Purdue Graduate Student Government Travel Award. This award will allow her to attend the Gordon Conference this June.

Andrea Chambers (Matosevic group) has been awarded a research grant from the Purdue Research Foundation (PRF) for the proposal entitled: "Immunotherapy of solid tumors with immunometabolically-retargeted natural killer cells." Andrea also received a Chaney Graduate Student Travel Award to attend the 2019 American Society of Gene and Cell Therapy Conference.

Clairissa Corpstein (Li group) has been awarded a research grant from the Purdue Research Foundation (PRF) for the proposal entitled: "Development of pediatric long-acting ART with nano-crystallization and polymer engineering informed by multiscale pharmacokinetic modeling."

Ahmed Elkhazab (Taylor group) was selected to receive a Bilisland Dissertation Fellowship.

Dana Moseon (Taylor group) was awarded a College of Pharmacy Graduate Travel Award to attend the 2019 Gordon Research Conference in June.

Nivedita Shetty (Zhou group) competed as a finalist in Purdue's 3MT competition on April 16, 2019. She also won 2nd prize in the 6th Annual ABE Graduate Industrial Research Symposium held at Purdue on March 25, 2019. The symposium offers students the opportunity to present their research and mingle with industry representatives at a variety of events throughout the day. Nivedita also received a Chaney Graduate Student Travel Award to attend the International Granulation Conference in Montreaux, Switzerland.

Rishabh Tukra (Topp group) was the recipient of a Purdue Teaching Academy Graduate Teaching Award. Rishabh was nominated by the faculty in the Department of Industrial and Physical Pharmacy for his excellent work as a teaching assistant for Principles of Pharmacokinetics (Fall 2018), Drug Discovery & Development II (Spring 2018), Principles of Pharmacokinetics (Fall 2017), Dosage Forms II (Spring 2017), and Dosage Forms I (Fall 2016).

Nathan Wilson (Topp and Zhou groups) was selected to provide an oral presentation at the 2019 Gordon Research Seminar – Preclinical Form and Formulation for Drug Discovery, which will be held in Waterville Valley, NH, in June. This is an opportunity for Nathan to share his research with his peers, as well as distinguished leaders from academia and industry.

Simseok Yuk (Yeo group) was the recipient of a Purdue College of Pharmacy Graduate Student Travel Award. This award will allow him to attend the American Association of Pharmaceutical Scientists (AAPS) PharmSci 360 this November. Simseok was also honored with a Bilisland Dissertation Fellowship.

POST DOC NEWS:

Yihua Pei (Yeo group) has been selected to give an oral presentation at the 2019 Gordon Research Seminar – "Preclinical Form and Formulation for Drug Discovery in June 2019.

Winners of the 2019 Peck Symposium
Three Minute Thesis Competition

1st place: Sugandha Saboo

2nd place: Siddhi Hate

3rd place: Andrea Chambers

Congratulations to AAPS officers for the 2019-2020 School year:

- **Chair 2019-2020:** Lia Bersin
- **Vice-Chair 2019-2020 & Chair-Elect 2020-2021:** Tarun Mutukuri
- **Secretary 2019-2020:** Rishabh Tukra
- **Treasurer 2019-2020:** Alexandru Deac



2019 Peck 3MT Thesis Competitors

Graduate Student Spotlight



Ahmed Elkhabaz

Fifth year graduate student, Ahmed (Taylor group) grew up in Ismailia, Egypt which according to

Ahmed is "very famous for great seafood and the best mango you can ever find." His Dad is an endocrinologist and his mom a pharmacist. His parents taught him "to always work hard for the things we want, to be kind to people, and to be grateful for the blessings we have."

In high school, Ahmed had a strong interest in physical chemistry, organic chemistry, and biochemistry which led him to pharmaceutical sciences and a passion to enter the healthcare field. His research interests focus on understanding the impact of different bio-relevant media on the dissolution behavior of amorphous drug formulations. At the time of joining Purdue for graduate school, he was very interested in working in the preclinical development of small molecules. "I always get a lot of great influence and motivation from my advisor Dr. Taylor. I hope that my research and results will contribute towards designing better formulations for amorphous dispersions."

A three-month internship at Genentech in San Francisco offered a "great experience and an opportunity to learn more about the work environment inside a research-driven pharmaceutical company like Genentech."

When asked about his experience here at Purdue, Ahmed's experience has shown him that "Purdue has a wonderful welcoming atmosphere with its large diverse student body. The campus is always lively with plenty of academic, athletic, and social activities that bring everyone together."

When not researching, Ahmed enjoys working out, cycling, swimming, and reading with more interest in subjects like politics, philosophy, and history. He also enjoys traveling, exploring, and sightseeing whenever time allows. In summer, he heads out to camp, taking in the great outdoors to destinations in Indiana, Michigan, and Wisconsin.



Chailu Que

Chailu is a fifth year graduate student in the Taylor lab who grew up in China playing piano and violin. She was a curious child, and after reading

the Encyclopedia of Nature and Science, she became so inspired that she decided to become an astronomer. "In the summer time, I used to carry my little telescope with me to observe the stars. I still wish that someday in the future I can have the opportunity to perform science experiments on the space station."

Chailu chose to focus her research on amorphous solid dispersions due to a strong interest in physical chemistry. Today, most of the newly discovered drug molecules have low aqueous solubility. In order to deliver them as an oral dosage form, which is the preferred form, formulation strategies are required to solve this problem. Converting drugs into amorphous solid dispersion (ASD) is one of the most popular formulation strategies to address this low aqueous solubility problem. However, our knowledge about this formulation is still limited. As a result, this research area is very important to the drug product development process. She hopes that her research will significantly improve the bioavailability of amorphous drugs and provide new insight into new drug molecule candidate optimization and excipient selection when designing ASD formulations.

Her first industrial experience came from a summer internship at AbbVie. "As a scientist, sometimes I am so focused on solving one specific problem, often times I forget about the big picture. From this internship, I learned that in drug development we often have to consider more aspects than just research. For example, we have to consider regulations, product timelines, cost effectiveness, etc."

The diverse background and culture of her lab mates, representing five continents in Dr. Taylor's group, interests Chailu especially when she sees how people with different educational and cultural backgrounds can address the same problem from different angles. "It really inspires me to think outside the box. In addition, it's fun to hear how life is in other countries. But, the best part is that I can try a lot of authentic delicious snacks from all over the world!"



Nathan Wilson

Nathan is finishing his fifth year working in both the Zhou and Topp labs. He grew up in Chandler, Indiana, which is a small

town next to Evansville spending his childhood reading and playing, working and volunteering in a recreational basketball league.

At Purdue, he started out in pre-pharmacy but didn't enjoy the rotations learning about working in retail. After an internship at BMS, he discovered that he enjoyed doing research and switched to pharmaceutical sciences, eventually joining IPPH.

His area of research focuses on the effects of formulation and manufacturing conditions on protein structure and physical stability. In particular his work focuses on the stresses induced by lyophilization and spray drying on proteins. One way his work characterizes these effects is by a technique called hydrogen/deuterium exchange, which provides information on inter- and intramolecular interactions that occur for proteins in the formulation matrix. He hopes that his research will be applied to the formulation development process as an approach to reduce screening and development time while still producing stable drug products.

Since joining IPPH, he has had the opportunity to do a six-month co-op at Merck in New Jersey in their sterile formulation group. "I learned a lot about working in industry from that experience. It was also my first time living outside of Indiana."

Nathan appreciates that Purdue has lots of facilities dedicated to different aspects of research, and the ability to go and work in different labs on campus if there's an experiment needed to run on an instrument which his lab doesn't have. He also enjoys working with his lab group. "It's a very friendly environment where it's easy to discuss research and provide and get feedback on projects."

Nathan plans to graduate later this year.

Alumni and Friends Focus

Dr. Karen Nagel-Edwards



Since graduating from IPPH in 1999, Dr. Nagel-Edwards has been at Midwestern Chicago College of Pharmacy where she loves teaching. “The faculty at Purdue all knew that (teaching) was my goal and I gave several guest lectures for them when they would be out of town. I have a pretty open-door policy and find that a lot of students end up in my office for advice, even when it doesn’t relate to my classes or one of the groups I’m advisor for. And really, that is a big part of why I do what I do.”

She has had a book on Biologics published as

part of AAPS’s Introductions in the Pharmaceutical Sciences series and is involved in educational research. “I really want to be a positive influence on future pharmacists, and hope that they see my passion for educating them, and for the profession as a whole.”

Of her time at Purdue, she fondly remembers lots of wonderful potluck dinners with other graduate students and learning to cook Indian food by having a fellow classmate who didn’t cook (Vidya Swaminathan) tell her when things smelled right. “She was always correct on that!”

In her spare time, she is a runner on a quest to do a half-marathon in all 50 states (12 accomplished) and teaches yoga. She was just recently certified to teach aerial restorative yoga.

To current IPPH students, Dr. Nagel-Edwards suggests finding a way to do what you love. “You might not get 100% of that at your first job, though I was very lucky and did. I was actually lucky enough to be able to take a couple of teaching classes while at Purdue, and would recommend searching out opportunities like that if you are interested in academia. And be sure to network. Your faculty members know people in all areas of pharmacy, and can help you make important contacts in areas you might be interested in after graduation.”

Dr. Amiji teaches in both the professional pharmacy program and in the graduate programs of Pharmaceutical Science, Biotechnology, and Nanomedicine at Northeastern University as a University Distinguished Professor, Professor of Pharmaceutical Sciences, Professor of Chemical Engineering. “As a faculty member, the most enjoyable part of my position is to educate and train the next generation of pharmaceutical scientists. In the past 26 years, I have had the privilege of training over 100 graduate students and postdocs and I am so proud of their successes.”

His research interests include development of biocompatible materials, drug and gene delivery systems, and nanomedical technologies for diagnosis, imaging, and treatment of diseases. His research has received over \$28 million in sustained extramural funding from the National Institutes of Health (NIH), National Science Foundation (NSF), private foundations, and industries. “My PhD thesis at Purdue was on development of biocompatible materials and I have continued



Dr. Amiji in his lab at Northeastern University

this work. My interest in the development of targeted drug and gene delivery systems was influenced by the critical need in this area and specifically by applying nanotechnology solutions. My lab has received significant support from the National Cancer Institute’s Alliance for Nanotechnology in Cancer.”

While at Purdue, Dr. Amiji was a part of Dr. Park’s first graduate student group. “Both he (Dr. Park) and his wife, Dr. Haesun Park, made us feel like family. We had birthday celebrations, lunches on special occasions, and Thanksgiving dinners at their place. The memory of their incredible generosity has remained engraved in me.” Dr. Amiji also enjoys remembering weekly basketball games with fellow IPPH students and Dr. Nail.

To current IPPH students, Dr. Amiji recommends taking advantage of all of the opportunities available with a Purdue education and training experience. He also encourages all students to be holistic problem solvers, undefined by disciplinary boundaries.

Dr. Mansoor Amiji



Dr. Amiji, 2019 Purdue College of Pharmacy Distinguished Alumni Awardee. Congratulations!

Alumni and Friends Focus

Dr. Ortyl completed his undergraduate work in pharmacy at Purdue and continued on to receive his Ph.D. from IPPH in 1988 under the guidance of Dr. Peck.

While studying at Purdue, Dr. Ortyl played on the Pharmacy softball and basketball teams which offered a great break from the labs. "Once, in the summer basketball championship game, I was guarded by Ricky Hall. Not long after, Ricky was named Big Ten defensive player of the year. Needless to say, I didn't score many points that game but at least I did pass the ball more than usual!" He also tells a funny story about his research time here at Purdue and chocolate! "A portion of my graduate student research involved working with chocolate. One of the biggest challenges was the constant stream of 'quality inspectors' from neighboring labs 'sampling' my raw materials. Fortunately, I had a more than ample supply of chocolate. I didn't want to have to tell Dr. Peck that graduate students ate my project!"

Dr. Ortyl always wanted to work in the pharmaceutical industry and after a couple of days in IPPH 362, he knew that IPPH was what he wanted to do. That led to a career which included 10 years in Production Development at Marion Labs/Marion Merrell Dow/Hoechst Marion Roussel and 20 years in Product Development and Manufacturing-Technical Services at Eli Lilly. He played a key role in the development of products for a number of product lines including Allegra, Cardizem, Cymbalta, Strattera, and Zyprexa which he is

grateful have resulted in the improved quality of life for many patients globally.

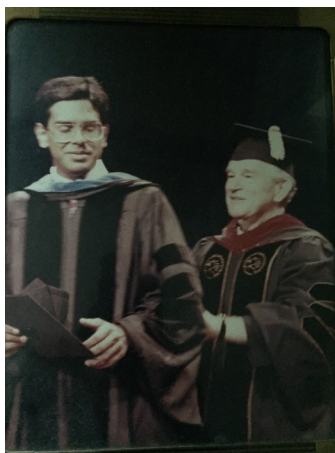
Dr. Ortyl advises students to "have a vision for what you want to accomplish and a plan for where you see yourself in the next 5-10 years. Be flexible as it is certain that today's assumptions will change with time and it is likely that your plan will need to change as well. Also, don't be afraid to pursue something that might go against conventional wisdom. If something looks good, makes scientific sense, and is supported by the data, go for it. That's how breakthroughs are made."

Dr. Ortyl is currently "working hard at being retired" and spending lots of time with his family.

Dr. Thomas Ortyl



Above, A lesson from Dr. Nagel-Edwards. On a graduate student trip to Omaha, no one in her party noticed that the parking garage that they parked in was closed on Sundays. As shown above, they sat on their luggage waiting a long while for the garage to open. ALWAYS READ SIGNS!



Above, Dr. Amiji receives his Doctorate hood and Diploma at Purdue in 1992.



Above, IPPH Alumni, Scott Hostetler with Professor Pinal at the 2019 Peck Symposium in May 2019 at Purdue.

2019 Peck Symposium

One hundred and seven students, faculty, industry leaders, and IPPH alumni attended the Sixteenth Annual Garnet E. Peck Symposium, hosted by the Department of Industrial and Physical Pharmacy, on Wednesday, May 8, 2019 in the Wilmeth Active Learning Center at Purdue.

Chaired by IPPH Department Head, Dr. Eric Munson, the symposium's theme was "The Future of Industrial and Physical Pharmacy." The program featured presentations by renowned pharmaceutical industrial representatives and researchers, as well as poster sessions and a "Three Minute Thesis" competition, in which graduate students pitched their thesis research to the audience in three minutes or less.

Presenters included:

- **Thomas Borchartd**, *Director, Drug Product Development, NCE Formulation Sciences, AbbVie*, "Physical Pharmacy in 2050"
- **Nathan Milton**, *Research Advisor in Biopharmaceutical Product Development, Retired from Eli Lilly*, "The Influence of Biotechnology on Industrial Pharmacy and Health Outcomes"
- **Steven Nail**, *Senior Research Scientist, Baxter Biopharma Solutions*, "Some Thoughts on the Need for Graduate Education in Pharmaceutical Biotechnology"
- **Chetan Pujara**, *Pharmaceutical Development Executive, Allergan*, "Evolving Trends in Patient-Centric Dosage From Design and Development"
- **William Randolph**, *Vice President, Global Technology Services, Johnson & Johnson*, "The Future of the Pharmaceutical Supply Chain: Janssen's View on What it means for the Pharmaceutical Scientist of 2035"
- **Dale Wurster**, *Professor, College of Pharmacy, The University of Iowa*, "Considerations in the Design of Graduate Programs"

The event honors the late Garnet E. Peck, professor emeritus of industrial and physical pharmacy, and his contributions to the pharmaceutical sciences, including the development of latex-based tablet coatings that have been used in the industry for more than 35 years.



(L-R from top) The presenters and moderators for the Peck Symposium: Tonglei Li, Steve Nail, Dale Wurster, Thomas Borchartd, Peter Wildfong, Eric Munson, (L-R from bottom) Nate Milton, Chetan Pujara, Elizabeth Topp and David Engers

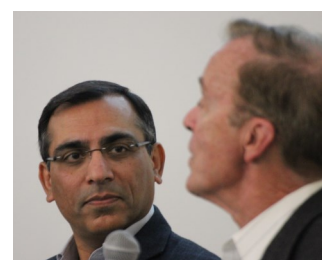


Afternoon round table discussions included the topics:

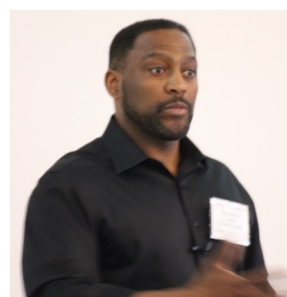
- Mission and Vision Statements—Overall Strategy
- Research Directions
- Education Directions, Grad, BSPh, PharmD



Eric Munson provides an overview of IPPH



Chetan Pujara and Steve Nail during panel discussion



Nate Milton presents at the symposium

A post-symposium reception was hosted in the new College of Pharmacy Collaboration Commons, 2nd Floor, R. Heine College of Pharmacy Building. This space was formerly the pharmacy library.

IPPH News and Events



CONGRATULATIONS IPPH GRADUATES!

Yuan
Chen,
PhD
Topp
Group



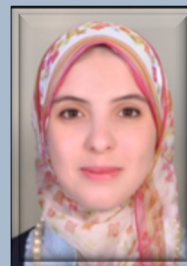
Thesis Title: Photolytic labeling to probe peptide-matrix interactions in lyophilized solids

Hwee
Jing Ong,
PhD
Pinal
Group



Thesis Title: Development of non-amorphous solid dispersions for poorly-soluble drugs using a novel excipient and hot melt extrusion

Maie
Shaaban Taha,
PhD
Yeo
Group



Thesis Title: Development of nanoparticles with a high drug loading capacity and stability

Faculty Opening in Industrial and Physical Pharmacy Assistant Professor / Associate Professor / Professor

The College of Pharmacy at Purdue University is seeking applications to fill a faculty position in the Department of Industrial and Physical Pharmacy in the general area of **Pharmaceutical Biotechnology**.

The position is for a full-time tenure-track Assistant Professor, Associate Professor or Professor. The faculty member is expected to establish an externally funded research program and will teach courses in the undergraduate, graduate and professional (PharmD) programs. It is expected that the individual will collaborate on various research activities within the department and in multidisciplinary, multi-institutional research throughout the University. This is a nine-month (academic year) appointment.

The candidate must have expertise in fundamental and applied research related to the development, design, evaluation and manufacturing of biopharmaceutical products. Representative areas of expertise include, but are not limited to:

- Formulation, analysis and manufacturing of peptide, protein, cell-based and/or nucleic acid-based therapeutics
- Formulation, analysis and manufacturing of vaccines and/or immunotherapeutics
- Drug/device combinations and drug/material interactions for biologics
- Preclinical drug disposition (PKPD), in vitro in vivo correlations
- Interactions of drugs and dosage forms with the gut microbiome

For instructions on how to apply, visit <https://www.ipph.purdue.edu/about-IPPH/open-positions>



Faculty Opening in the Purdue Dept. of Industrial and Physical Pharmacy:
Assistant Professor / Associate Professor / Professor in the general area of Pharmaceutical Biotechnology



Incoming IPPH PhD Students

- Pradnya Bapat
- Hytham Gadalla
- Vaibhav Pathak
- Valeria Tellez Gallego
- Cole Tower
- Peace Umoru

Save the Date

**2019 Varro E. Tyler
Distinguished Lecturer**

Professor William Charman
*Sir John Monash Distinguished Professor
Dean, Faculty of Pharmacy and
Pharmaceutical Sciences
Monash University*

September 4, 2019 at Purdue University

PURDUE
UNIVERSITY.

150
YEARS
OF
GIANT LEAPS

The College of Pharmacy will be the featured college in October 2019 as part of the Purdue's 150 Years of Giant Leaps Celebration

To learn more about special speakers and activities, visit
<https://www.pharmacy.purdue.edu/events>



The Center for Pharmaceutical Development (CPD) held its Spring 2019 meeting at Purdue University. CPD addresses current challenges in the pharmaceutical industry with the aim of developing solutions towards more selective and robust manufacturing processes, more stable formulations, and better characterized and consistent products.

For more information about CPD, visit <http://cpd.gatech.edu/>



LYO hub HIGHLIGHTS

- Congratulations to Dr. Elizabeth Topp and the participants in the October 2018 joint LyoHUB/E55 Workshop, **Lyophilization and the Future of Pharmaceutical Manufacturing**, which was featured in the January/February 2019 ASTM Standardization News. The workshop was held at Purdue and included excellent representation by IPPH faculty and staff. A panel on Pharmaceutical Manufacturing Research was moderated by Liz Topp and included Eric Munson, Lynne Taylor and Tony Zhou. Five IPPH graduate students participated in the poster session. The article, **Pharmaceutical Committee Meets at Purdue**, can be viewed at http://www.standardizationnews.com/standardizationnews/january_february_2019/MobilePagedArticle.action?articleId=1453573#articleId1453573
- You are invited to register for **Lyo Summer School 2019, Lyo 201: Characterization of Lyophilized Solids**. The dates are July 10-11, 2019 at Purdue. Cost is \$275 per participant. To register, visit <http://conf.purdue.edu/LyoSummer>. For more information, e-mail Jen Gray at gray160@purdue.edu.
- LyoHUB is organizing, **"Standards and Best Practices for Pharmaceutical Lyophilization,"** a meeting in September at NIST in Gaithersburg, MD. For more information, e-mail Jen Gray at gray160@purdue.edu.

For the latest news from LyoHUB, you can visit their website (<http://www.lyohub.org>) and follow them on Twitter at <http://twitter.com/lyohub>.



*LyoHUB is celebrating its
5th Anniversary in 2019*





IPPH in the News

Targeted delivery: Purdue cancer identity technology makes it easier to find a tumor's 'address'



Dr. Yoon Yeo, Professor of Industrial and Physical Pharmacy at Purdue, and her team have developed an improved drug delivery method aimed at making chemotherapy easier to help treat people with various tumors.

Read the details in the article at <https://www.purdue.edu/newsroom/releases/2018/Q4/targeted-delivery-purdue-cancer-identity-technology-makes-it-easier-to-find-a-tumors-address.html>.

New 2-in-1 powder aerosol to upgrade fight against deadly superbugs in lungs



A Purdue University drug formulation incorporates two antibiotics to help fight the global crisis of antimicrobial resistance. Read about the work being done in Dr. Tony Zhou's group in this important field at https://www.purdue.edu/newsroom/releases/2018/Q4/new-2-in-1-powder-aerosol-to-upgrade-fight-against-deadly-superbugs-in-lungs.html#.XBJ_ch6HLDw.linkedin.

View online and subscribe to the email edition at www.ipph.purdue.edu/newsletter. Purdue University is an EOE/AA university. If you have trouble accessing this page because of a disability, please contact ipphcomm@purdue.edu.

Copyright © 2019, Purdue University Department of Industrial & Physical Pharmacy. All rights reserved.
Editor: Jennifer Gray, IPPH Communications Coordinator

Department of Industrial & Physical Pharmacy

Purdue University
575 Stadium Mall Dr.
West Lafayette, IN 47907-2091