

# IPPH NEWSLETTER

December 2018

## Dr. Eric Munson



*Dane O. Kildsig Chair and  
Department Head,  
Industrial and Physical  
Pharmacy*



Dr. Lynne Taylor  
named  
Editor-in-Chief of  
*Molecular  
Pharmaceutics*



Dr. Tony Zhou and student, Nivedita  
Shetty receive prestigious NIPTE awards



## GREETINGS FROM THE HEAD



It is a tremendous honor to become the next Department Head of the Industrial and Physical Pharmacy at Purdue University, and I would like to thank the faculty, staff, students, and alumni for all of their support and words of encouragement. In particular, I would like to thank Dr. Tonglei Li, who is the Allen Chao Chair and Professor and has served as interim department head for the past year, for doing an excellent job in his stewardship of the department during this transition, and the staff, Mary Ellen Hurt, Nancy Cramer, and Jennifer Gray, for helping me to understand the workings of the

department since my arrival on September 1<sup>st</sup>.

Our faculty, students, and alumni continue to do wonderful things, as you can see in this newsletter. We highlighted Dr. Lynne Taylor, who will be the next editor of *Molecular Pharmaceutics*, and Dr. Tony Zhou and his student, Nivedita Shetty, for receiving the National Institute of Pharmaceutical Technology and Education (NIPTE) Rising Star Scholarship Award and Outstanding Student Award, respectively, but please take a look at the faculty and graduate student updates to see how much has been done this past year. We are most proud of our alumni and their accomplishments, so please take a look at what Drs. Hostetler, Sepelyak, and Schwegman are up to these days!

It is an exciting time for Purdue as we are celebrating our 150 Years of Giant Leaps. The College of Pharmacy will have its celebration in October of 2019. As we celebrate our past accomplishments, it is a good time to start thinking about the future. We have begun that process by opening an open-rank search (assistant, associate, or full professor) in the area of pharmaceutical biotechnology. We have also entitled the Peck symposium "The Future of Industrial and Physical Pharmacy," which will be on May 8<sup>th</sup>, 2019. We hope to bring together people from industry, academia, and the government to provide their input about where the department should go in the next several decades. If you care about the future of the department, please plan to attend!

Finally, being a strong department is all about establishing and maintaining relationships. The relationships among the faculty are critical to the success of the department, and the relationship with our undergraduate, professional, graduate, and postdoctoral students is to provide them with the highest quality education possible and provide them with the tools needed to succeed in whatever career path they choose. Our relationships with our peers are what define us to the outside world, and reflect how we are perceived (and ranked) by others. Lastly, our relationship with our alumni reflect our commitment by the department to that lifelong bond that started on your first day at Purdue. My hope as department head is to develop that relationship with everyone associated with the Industrial and Physical Pharmacy Department at Purdue. Please send me an email or give me a call, whether it be to introduce yourself, tell me about your great experiences at Purdue, or give me your suggestions about what we should be doing, as we continue to build that path of strong relationships.

Happy Holidays and Boiler up!

Eric Munson  
Dane O. Kildsig Chair and Department Head

## Meet Dr. Eric J. Munson

The Department of Industrial and Physical Pharmacy welcomed Dr. Eric Munson as the new Dane O. Kildsig Chair and Department Head in September, 2018.

Dr. Munson grew up in Yankton, South Dakota, a small town where his days were filled with outdoor activities such as fishing and boating on the Missouri River. After completing his BA in Chemistry & Physics at Augustana College in South Dakota, Dr. Munson traveled to the Technical University of Munich, Germany as a Fulbright Fellow. He completed his Ph.D. in Chemistry at Texas A&M University in College Station. His dissertation was titled, "In Situ Solid-State Nuclear Magnetic Resonance Studies of Reactions in Zeolite Catalysts". After a year of postdoctoral studies at the University of California at Berkeley, Dr. Munson started as an assistant professor in the chemistry department at the University of Minnesota.

A lifelong dedication to pharmaceuticals started with attendance at a chemistry seminar given by the late Dr. David Grant, a leader in the field of solid-state pharmaceuticals at the University of Minnesota. As Dr. Munson listened to the seminar, he found himself thinking, "Solid-state NMR could help solve the problems being presented in this seminar!" An introduction to Dr. Grant that day resulted in years of great collaboration and the publishing of over 20 publications, including "Solid State Characterization of Two Polymorphs of Aspartame Hemihydrate" and "Nuclear Magnetic Resonance and Infrared Spectroscopic Analysis of Nedocromil Sodium Hydrates", and continued collaborations with Drs. Suryanarayanan and Sun at the University of Minnesota.

Dr. Munson's research interests lie in the area of using solid-state NMR spectroscopy, powder X-ray diffraction, and other techniques to characterize solid pharmaceuticals. He currently has three main areas of research. The first is using solid-state NMR spectroscopy to investigate amorphous solid dispersions. "When the systems phase separate, the drug can crystallize, which may impact bioavailability," says Munson. The second area is in protein formulations, where he anticipates working closely with Dr. Elizabeth Topp and others involved in LyoHUB. The third area is excipient viability where he is working on understanding the complex nature of the most commonly-used excipient in the pharmaceutical industry, magnesium stearate.

Dr. Munson collaborates extensively with researchers both in the US and around the world. In many cases, both academic and industrial researchers would like to use solid-state NMR spectroscopy to solve their pharmaceutical problems, but don't have access to the instrumentation or the expertise needed to design the experiments and analyze the data. To help give companies access to solid-state NMR, he started Kansas Analytical Services (KAS), a company that provides solid-state NMR services to the pharmaceutical industry. "Companies like KAS and SSCI, which was founded by Steve Byrn and now owned by AMRI, are two of a very small number of companies that provide this valuable service to the pharmaceutical industry."



Based on his years of research and expertise, Dr. Munson would like to see a solid-state NMR spectrometer in every pharmaceutical company lab. "Solid-state NMR is still slow to be adopted by the pharmaceutical industry. I would like to see drugs emerge in the market faster, cheaper, safer and better. NMR can be used to help make that happen."

Dr. Munson has spent the past 24 years in the Midwest with faculty positions at the University of Minnesota, the University of Kansas, and the University of Kentucky before exploring the Department Head position here at Purdue University. Why Purdue IPPH? Dr. Munson has always wanted to help build programs that benefit everyone. "Purdue has the strongest program in Industrial and Physical Pharmacy in the world". Dr. Munson sees the opportunities to expand and advance the IPPH program here at Purdue as "limitless." Much of Dr. Munson's research overlaps with the great research already ongoing here in IPPH and he is excited to add some of his unique capabilities to the department and university.

Leadership roles are nothing new to Dr. Munson, who has most recently served as the Chair of the Gordon Research Conference on Preclinical Form and Formulation for Drug Discovery, Chair of the NIPTE Faculty Committee, Chair of the Excipients 1 Committee for United State Pharmacopeia, as well as numerous other positions in AAPS and other professional organizations.

His advice to graduate students is to "be flexible." When he started graduate school, he did not anticipate becoming a professor or switching to pharmaceuticals but both helped develop him for his current role. "Don't be afraid to try new things and opportunities. You will always have hardships but understand that setbacks are temporary."

A new home in the country with two acres of land in West Lafayette allows Dr. Munson to once again enjoy the wide



*Located on the first floor of the Robert E. Heine Pharmacy Building, this beautifully renovated lab will be the home to Dr. Munson's research here at Purdue. "A phenomenal job was done when renovating the lab. Much gratitude goes to Tonglei Li and Mary Ellen Hurt for their tireless support and effort in designing the lab. As the college looks forward to a new building, this lab will be a great model of how lab space should be designed," says Munson.*

open spaces and some of his favorite outdoor activities including fishing and golfing. In his free time, he enjoys spending time and traveling with his family, wife Christina and their three children, Ben (25), Max (21) and Julia (18).

We welcome Dr. Munson and look forward to his IPPH leadership as Department Head.

## Munson Lab Group



**Daniel DeNeve**  
Daniel's research is focused on characterizing the sources of variability in the common pharmaceutical lubricant magnesium stearate.



**Julie Calahan**  
Julie's research is investigating the relationships between the properties of magnesium stearate and the effects on pharmaceutical tablets. She has received US Pharmacopeia and PhRMA fellowships.



**Travis Jarrells**  
Travis' research is focused in solid state dosage forms, particularly in amorphous solid dispersions and the impact of water on stability/ crystallization propensity.



**Ashley Lay-Fortenbery**  
Ashley's research is focused on solid-state stability of proteins for lyophilized formulations. She received 3<sup>rd</sup> place on her poster at the LyoHUB/ASTM Workshop on Lyophilization and Pharmaceutical Manufacturing Research.



## Faculty Updates

**Dr. Stephen Byrn** was the recipient of the 2018 AAPS Pharmaceutical Global Health Award. He received the award in absentia as he was in Africa at the time continuing his work in Global Health initiatives.

**Dr. Gregory Knipp** and his laboratory are collaborating on a Programmatic Area Grant from the Purdue University Institute for Drug Discovery (PIDD) aimed at the Development of a Novel BBB-on-a-chip Model to Improve Selection of Therapeutics. The multidisciplinary team, Dr. Tiffany Lyle (PI), are aiming to develop an *in vitro* system that will better predict *in vivo* relevant brain disposition and pharmacodynamic response.

**Dr. Tonglei Li** and his former student, Dr. Alessandra Mattei, have published their edited book, *Pharmaceutical Crystals: Science and Engineering*, in which 20 authors contributed 11 chapters. It is published by Wiley.

**Dr. Sandro Matosevic** was awarded a Showalter Trust Award to study NK cell activation in the context of immunometabolic suppression as a way of developing improved adoptive cell-based therapies. He also received a grant from the Walther Cancer Foundation to develop translational therapies with the use of novel imaging technologies to monitor *in vivo* adoptively-transferred, engineered NK cells as immunotherapies for glioblastoma. For this work, Dr. Matosevic is collaborating with the Indiana University School of Medicine's Dr. Michael Veronesi, an expert in MRI-PET *in vivo* imaging, Dr. Karen Pollok, who runs the glioblastoma *in vivo* core, as well as Dr. Kathryn Nevel, a neurologist who treats glioblastoma patients – in order to train and better inform cell therapy-based interventions for GBM. Dr. Matosevic's lab also published three manuscripts – one of which is a research study authored by graduate student Andrea Chambers on the effect of activation of NK cells by tumor microenvironment adenosine, highly present in solid tumors.

**Dr. Rodolfo Pinal** participated in the AAPS Discussion Group on formulation and manufacturing in China.

**Dr. Lynne Taylor** has been named the new editor in chief of the American Chemical Society journal *Molecular Pharmaceutics*. She will succeed Gordon L. Amidon of the University of Michigan College of Pharmacy early next year. In addition to her research expertise, Taylor will also bring a global perspective to her new role. "Earlier in my research career, I worked in industry in Europe before moving to an academic position in the US. These experiences have helped me develop collaborations and networks with a wide variety of scientists engaged in different sectors of pharmaceutical development," she says. "Longer term, I plan to focus on increasing the global reach of the journal, in particular in Asia, a geographic region where biomedical research is expanding rapidly."

**Dr. Elizabeth Topp** was featured recently on a TV news show explaining the work that she and her students are doing to create an Epipen equivalent for diabetics. You can watch the show at <https://www.wlfi.com/content/news/Professor-and-student-team-creating-Epipen-equivalent-for-diabetics-499343521.html>. Dr Topp was awarded a CPPR grant together with Dr. Qi (Tony) Zhou to conduct the project "Understanding the effect of surface composition on stability of spray dried protein formulations."

**Dr. Yoon Yeo** received two NIH grants 1) R01: Chemotherapy delivery with nanoparticles for targeted induction of immunogenic cell death, 2) R01 supplement: Environmentally-adaptive nanoparticles with focal irradiation for cancer therapy.

**Dr. Qi (Tony) Zhou** received the 2018 NIPTE Rising Star Scholarship Award which is awarded by the National Institute for Pharmaceutical Technology and Education on an annual basis. The award is given to early career investigators with outstanding scientific achievements in the areas of pharmaceutical science and technology. Dr. Zhou was also elected as an Editor of *AAPS PharmSciTech*. *AAPS PharmSciTech* is an official journal of the American Association of Pharmaceutical Scientists (AAPS). *AAPS PharmSciTech* is a peer-reviewed, online-only journal committed to serving those pharmaceutical scientists and engineers interested in the research, development, and evaluation of pharmaceutical dosage forms and delivery systems, including drugs derived from biotechnology and the manufacturing science pertaining to the commercialization of such dosage forms. Because of its electronic nature, *AAPS PharmSciTech* aspires to utilize evolving electronic technology to enable faster and diverse mechanisms of information delivery to its readership. Dr. Zhou (PI) was awarded a CPPR grant together with Dr. Elizabeth M. Topp to conduct the project "Understanding the effect of surface composition on stability of spray dried protein formulations."

## Graduate Student Highlights

**Lia Bersin (Topp group)** was the recipient of the 2018 Kienly Teaching Award for outstanding teaching by a graduate student.

**Siddhi Hate (Taylor group)** was awarded the 2018 Logan Travel Award to attend the Gordon Research Conference in Waterville Valley, NH. She also received the Best Abstract Award at the American Association of Pharmaceutical Scientists (AAPS) PharmSci 360 and a travelship from AAPS and PGSG (Purdue Graduate Student Government) to attend AAPS this year.

**Kelsey Lubin (Knipp group)** was the recipient of the 2018 Lieberman Award for outstanding service and teaching assistance.

**Yihua Pei (Yeo group)** received a Baxter Young Investigator Award (First tier winner). This award was developed to stimulate and reward research that can be directly used for critical care therapies and the development of medical products that save and sustain patients' lives.

**Nivedita Shetty (Zhou group)** received the 2018 National Institute for Pharmaceutical Technology & Education (NIPTE) Outstanding Student Award. The award is given to graduate students with outstanding scientific achievements in the areas of pharmaceutical science and technology. Nivedita also received the Excipient Graduate Student Scholarship Award from the International Pharmaceutical Excipient Council of the Americas Foundation (IPEC). This award acknowledges excellence in research conducted at graduate level in the field of pharmaceutical Excipients. She is also the recipient of the Ronald W. Dollens Graduate Scholarship, McKeenan Fellowship and a travel grant award to attend the AAPS conference.

**Maie Taha (Yeo group)** was the recipient of the 2018 Jenkins-Knevel Award for excellence in outstanding graduate research.

**Fudan Zheng (Li group)** was awarded the 2018 American Chinese Pharmaceutical Association (ACPA) Research Award at the 2018 AAPS meeting and received the 2019 Migliaccio/Pfizer Graduate Fellowship in Pharmaceutical Sciences for her academic performance.



*Lia Bersin, recipient of the 2018 Kienly Teaching Award presents her poster titled, "Sequence and pH Effects of Pyroglutamate Formation in the Solid and Solution States", at the College of Pharmacy Graduate Awards Ceremony.*

*Maie Taha, recipient of the 2018 Jenkins-Knevel Award provides her presentation, "Development of nanoparticles with high drug loading capacity and circulation stability" at the College of Pharmacy Graduate Awards Ceremony.*





## Graduate Student Spotlight



### Rajashekar Kammari

Fourth year graduate student, Raj (Topp group) grew up in Hyderabad, the capital city of Telangana

state in south-central India, enjoying mathematics and playing cricket with his younger brother.

He decided to pursue a career in pharmaceutical sciences after learning that it is a multidisciplinary science critical to drug discovery and development. "I felt it was challenging and exciting at the same time. The opportunity to make a beneficial impact on society's health motivated me to establish a career in pharmaceutical science research."

His current research work is the development of high-resolution characterization techniques to evaluate stability of protein and peptide formulations in solid state. Many biologic formulations are marketed as lyophilized solids to prevent degradation overtime. It is important to characterize these formulations to make sure that there is no instability/degradation during formulation processing and storage. Current analytical techniques provide low-resolution information and techniques such as NMR are complex in nature to characterize large molecules. Moreover, these techniques require several months to years of time to distinguish formulations based on their long-term stability. The application of HDX-MS to characterize proteins in solid state reduces this time to a few weeks and provides peptide level resolution.

"Dr. Topp's group has done extensive work in developing HDX-MS to characterize proteins in solid state for the past ten years and is well recognized in this area. Since I was at Butler for a couple of years, I knew that this is high impact research and I wanted to be a part of this fascinating work. As a result, IPPH at Purdue was a first choice for my PhD studies."

During the summer of 2017, he had an internship at GlaxoSmithKline (GSK) in King of Prussia where he learned the industrial perspective of formulation development and characterization and had the opportunity to interact with several Purdue IPPH alumni.



### Nivedita Shetty

Nivedita is a 4th year graduate student in the Zhou lab and claims that her energy and enthusiasm came from growing up in the bustling city of

Mumbai, India. I spent 21 years of my life growing up in a metropolitan city in India, Mumbai! Since her childhood she has wondered about the miraculous ability of those beautiful colored tablets and capsules prescribed by doctors to cure diseases, "who makes them and how does it cure a disease?" Her curiosity matured into a dream of becoming a pharmacist. At Northeastern University where she received her Masters, she had the unique opportunity to pursue industrial internships in different departments such as the formulation team at Acetylon Pharmaceuticals, PK/PD group at Takeda Pharmaceuticals and an opportunity to work as a graduate research student with Dr. Vladimir Torchilin. All these experiences led her towards research and brought her to Purdue to pursue a PhD in pharmaceutical sciences with specific interest in drug delivery and formulation.

Her research focuses on pulmonary drug delivery systems, particularly on dry powder inhalation therapy (DPI) to combat antimicrobial resistance. Facing the rapid resistance development of bacteria to the first-line antibiotics, aggressive antibiotics with severe adverse effects such as colistin have been increasingly used as the last-line therapy. Given the fact that no new antibiotics against these multidrug resistant pathogens are in the advanced stage of development there is an increasing need to develop new formulation strategies of old antibiotics to fight respiratory 'super bugs'. "My focus is to develop advanced formulations of combination antibiotics by applying cutting-edge nanotechnology and novel particle engineering. By the end of my research we are hopeful that our small efforts in designing an effective DPI formulation will provide a simple yet an effective solution to a complex problem of antimicrobial resistance."

She is very grateful to Dr. Tony Zhou for all his guidance and support. "His hardwork has motivated me and I have learned a great deal of skills under his supervision."



### Maie Taha

Maie is finishing her 4<sup>th</sup> year in the Yeo Lab. She grew up in Egypt in a city called Giza, located on the west bank of the Nile.

When I was young, I enjoyed helping my friends with their studying by explaining complex materials in a simple way as I had a dream of becoming a teacher. In high school, I became particularly fascinated by organic chemistry and biology which led me to study Pharmacy. I excelled in my undergraduate study years and graduated ranked 1<sup>st</sup> on my class. This allowed me to work as a teaching and research assistant in Faculty of Pharmacy, Cairo University during which I earned my master's degree in pharmaceuticals."

Maie's research involves nanoparticle development. Many anti-cancer drugs are poorly water-soluble and show undesirable pharmacokinetics and low bioavailability. Nanoparticles (NP) are used as delivery vehicles to improve bioavailability and biodistribution of such drugs. For clinical translation of an NP product, it is critical that the NP carry a large amount of drug and maintain good stability during circulation. A typical drug loading capacity of current NP formulations is less than 20% of the total mass, which is concerning from the standpoint of safety and administration convenience. Current NP formulations are also limited in retaining a drug during circulation and release the drug prematurely before they reach target tissues. These challenges are responsible at least partly for recent failure of leading NP products in clinical trials. Given these challenges, Maie has focused on developing a stable high-drug loading NP formulation, drug-rich nanocores stabilized by interfacial assemblies of iron-tannic acid and albumin. She hopes that her formulation can improve the delivery of chemotherapeutics to solid tumors, so cancer patients can respond better to the therapy and enjoy their lives with fewer side effects.

"After I get done with my PhD I will go back to Egypt where I will be hired as a tenure-track assistant professor in Cairo University. Therefore, my dream of becoming a teacher will eventually come true."

## Alumni and Friends Focus

### Dr. Scott Hostetler



Dr. Hostetler is a Boilermaker through and through receiving his BS, MS and PhD all at Purdue!

As a member of Dr. Dane Kildsig's group, Dr. Hostetler laughs at the memory of Dr. Kildsig telling him that he didn't care what hours Scott worked as long as "I was there when he got there in the morning and was still there when he left at night!" A draft of Dr. Hostetler's thesis may also still be on a beach in Puerto Rico, accidentally left behind by Dr. Kildsig.

Dr. Hostetler has not wandered too far away from West Lafayette with his position as Principal Research Scientist at Elanco Animal Health, located just outside of Indianapolis. Elanco was launched by Eli Lilly and Company in 1960 after introducing the first antibiotic exclusively for veterinary use. Today, the company has a vision of Food and Companionship Enriching Life.

"I enjoy the challenge of developing innovative dosage forms for companion animals and food animals. The variety of species, routes of administration, and dosage forms provide a constant challenge and keep things interesting. My work in research allows me to help develop products that positively impact the health of animals and in turn positively impact people's lives," says Hostetler. Elanco recently made world-wide news in 2018 with its initial public offering, separating it from Eli Lilly.

Serving as an Adjunct Professor in Purdue's IPPH, Dr. Hostetler enjoys coming back to campus to teach tablet compression for IPPH 562. "I worked in granulation and compression for years before coming to Elanco. I currently formulate hard chew tablets among many other dosage forms. The flavoring involved in animal health products for dogs and cats provides a unique challenge not typically seen in human pharma."

Dr. Hostetler is married to Purdue Pharmacy grad, Christie (Seashols). They had two boys, Jacob and Eli, while in graduate school and adopted daughter Ruthie a few years later.

In his spare time, Dr. Hostetler enjoys working on cars, in particular the 1967 Mustang which he had in graduate school here at Purdue. He is happy to report that it is in much better condition now!

Bob Sepelyak, a 1982 IPPH graduate, reminisces about waking up the first morning after arriving at Purdue and wondering what he was doing here since he could work as a community pharmacist in his hometown of Pittsburgh, PA. "I almost packed-up my car and drove back home on my first day. Instead, I followed my dream and never regretted it." That dream resulted in 36 years at AstraZeneca Pharmaceuticals LP (It was several other companies before becoming AstraZeneca) where he is now a Global Pharmaceutical Project Director for Pharmaceutical Technology & Development. In this position, he is involved in the entire drug development process and has been afforded the opportunity to interface with people from all over the world to contribute to the development of new medicines for patients. My "Purdue education and experience provided me the tools to be successful in my career and life."

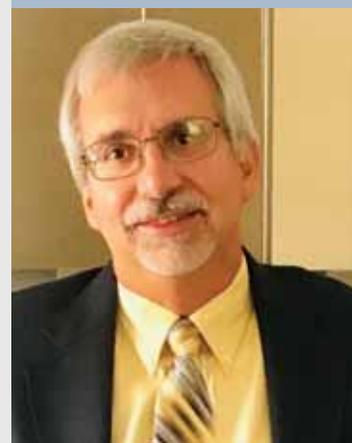
While at Purdue, Dr. Sepelyak enjoyed playing on and managing the IPPH Softball Team, as well as Friday and Saturday night volleyball games at the Levee with his engineering housemates/friends. He also had an ongoing highly competitive research rivalry with his lab partner (Jue-Chen Liu) to see who could present the most data at their weekly Hem Group research meetings!

Dr. Sepelyak offers this advice to graduate students, "A fellow graduate student (Dirk Teagarden) gave me great advice (3

points) in my 1<sup>st</sup> semester at Purdue which I followed and recommend to other students. 1) Select a research project that you can get results fast (1-2 days) 2) Stay away from using animals in your research since results can be variable 3) Select a major advisor who will let you go (graduate) once you are ready."

Since graduating from Purdue, Dr. Sepelyak has been actively involved in professional organizations – at the local (PPF – Philadelphia Pharmaceutical Forum), regional (EPTM – Eastern Pharmaceutical Technology Meeting) and national (AAPS) levels. He is also the vice-chair of the Industrial Advisory Board for the Center for Pharmaceutical Processing (CPPR) where he has been their champion in AstraZeneca since 1995. "My CPPR involvement has kept me close to Purdue and the graduate students and faculty. I am fortunate to have this opportunity and cherish the moments."

### Dr. Robert Sepelyak



# Alumni and Friends Focus

Dr. J. Jeff Schwegman, a 2003 IPPH graduate in Dr. Steve Nail's group, knew that he wanted to own his own business, but leaving a well-paying job at a large CMO was a difficult decision. An invaluable piece of advise from Dr. Nail set him on the path to becoming the Founder and CEO of AB BIOTechnologies. Dr. Nail advised him "to find something that not a lot of people were doing, and become an expert in it. That happened to be freeze-drying, and while he (Dr. Nail) was one of the pioneers in the science of freeze-dying, I was able to follow in his footsteps. For those interested in the life of an entrepreneur, becoming an expert in your field is key, and almost as important is to talk with other entrepreneurs and ask for their advice on the best ways to start/operate a company."

With more than 16 years of experience working in the contract development/manufacturing pharmaceutical industry, Dr. Schwegman launched AB BioTechnologies, a contract provider to the pharmaceutical industry, in 2008. Initially a teaching and consulting firm. AB BioTechnologies started small and budget efficient in the back bedroom of Dr. Schwegman's home. In early 2010 the first small laboratory was opened, and the company quickly grew over the next few years tripling profits each year, adding new lab equipment, and going through two lab expansions to keep up with the demand for their services. A new 23,000-square foot pharmaceutical Manufacturing Facility in Bloomington, IN is currently under construction.

Working in the contract development and manufacturing world, Dr. Schwegman sees all different types of products come through to treat all kinds of diseases. "I really like the idea that the work we are doing will potentially save or signifi-

cantly improve someone's life."

Of his time here at Purdue, Dr. Schwegman remembers how close all of the IPPH graduate students were. "We were all dirt poor and working our tails off to complete our studies and research projects. We didn't have a lot of free time, but when we did we would get together for a pitch in/grilling out, etc. I have a lot of fond memories from those times. The faculty were always good to us as well, and it wasn't uncommon to get together at one of their houses for a gathering."

Dr. Schwegman is also a talented guitar player, after years of practice which started as a childhood hobby. He has recorded in Nashville and played in famous clubs throughout the Midwest, opening for acts such as Luke Bryan, Brookes and Dunn, Florida Georgia Line, Lee Bryce, and others.

Dr. Jeff Schwegman



**Above,** Jeff Schwegman, President of the ISL-FD Midwest Chapter presents Drew Strongrich (Purdue AAE) & Gayathri Shivkumar (Purdue AAE) with the Jennings Award for the best Student Poster at the Intl Society of Freeze Dry Conference.



**Above,** Bob Sepelyak and his wife, Diane with Eric Munson at the Purdue Alumni & Friends Reception at the 2018 AAPS meeting in Washington, DC.



**Above,** Scott Hostetler's sons, Jacob and Eli in front of Purdue Engineering Fountain while Dr. Hostetler was in graduate school at Purdue. Eli (on the left) is now a freshman at Purdue. Boiler Up!

# Graduate Student News

## IPPH Graduate Students attend the 2018 Pharmaceutics Graduate Student Meeting (PGSRM)

Thirteen Purdue IPPH students traveled to the University of Minnesota in June to attend the 50th Annual Pharmaceutics Graduate Student Meeting. This annual meeting provides a "platform for pharmaceutics graduate students to present their research and participate in critical discussions on current, cutting-edge research in the field, all while fostering life-long and meaningful connections with fellow graduate students."

The theme of this year's meeting was "Bridging Therapeutics and Technology." According to organizers, "As pharmaceutical research progresses, the disciplines of chemistry, biology and technology become closely intertwined. As graduate students, we must adapt to the current interdisciplinary nature of pharmaceutical science and learn to bring the space between fields." The keynote speakers addressing this topic were Dr. Clay Siegall (Seattle Genetics) and Dr. Samir Mitragotri (Harvard University). Other speakers included Dr. Jane Kenny (Genentech), Dr. Lynne Taylor (Purdue IPPH) and Dr. Paul Lockman (West Virginia University).

Several IPPH students were honored with awards at the 2018 PGSRM meeting. Congratulations to Clara Correa-Soto and Lia Bersin who won poster awards and S. Andrew Yuk who won a podia award at this meeting!



# Welcome!

## IPPH welcomed (7) new Ph.D. students in the Fall of 2018

- **Matthew Behymer** (Knipp Group) joined Pfizer after receiving a Masters from the University of Kansas. "I came here for the research and the people were very supportive."
- **Dhawal Chobisa** (Yeo Group) graduated from the Institute of Chemical Technology (ICT) in Mumbai, India with a Masters of Pharmacy (Pharmaceutics). "Purdue is known for excellence in research and innovative technologies. I look forward to implementing my research to develop patient centric medicines and contribute to the scientific community."
- **Tram Dao** (Matosevic Group) graduated from Denison University with a BS in Biochemistry. "I chose Purdue because I enjoyed the research being conducted here as well as the department's atmosphere I felt during my visit."
- **Alexandru Deac** (Taylor Group) did his undergraduate work at University of Illinois Urbana-Champaign with a bachelors in chemical engineering, but came to Purdue from the pharmaceutical company AbbVie. "I chose Purdue because of our renown IPPH department and world class professors."
- **Daniel DeNeve** (Munson Group) received a BS in Chemical Engineering from the University of Kentucky. "I chose Purdue to be advised by Dr. Munson and continue my research on formulation impact in pharmaceutical manufacturing."
- **Shan Lu** (Li Group) graduated from Purdue. "I hope to learn about pharmaceutical products and be able to innovate in the future."
- **Jianping Wang** (Yeo Group) graduated with an MS in Pharmaceutics from China Pharmaceutical University. "Purdue has the top ten pharmacy school, and I love the diverse culture and academic atmosphere at Purdue."

## Post Doc News

**Dr. Jiao Wang (Matosevic group)** has been awarded a Young Investigator Award from the Society for Immunotherapy of Cancer. This award will support his attendance at the Annual Meeting of the Society of Immunotherapy of Cancer, held in Washington DC in November 2018.



## IPPH News and Events



### CONGRATULATIONS IPPH GRADUATES!

Monika Lavan,  
PhD  
Knipp Group



**Thesis Title:** Formulation Strategies and Optimization of Poorly Water-Soluble Drugs for Preclinical and Clinical Applications

Yihua Pei,  
PhD  
Yeo Group



**Thesis Title:** Particle Engineering for Intracellular Delivery of Antibiotics.

Venecia Wilson,  
PhD  
Taylor Group



**Thesis Title:** The Prediction of Amorphous Solid Dispersion Performance in vivo from in vitro Experiments.



*Purdue IPPH faculty were well represented on the Panel on Pharmaceutical Manufacturing Research at the LyoHUB/ASTM Workshop on Lyophilization and Pharmaceutical Manufacturing, (left to right) Chris Roberts (NIIMBL), Eric Munson (IPPH), Carl Wassgren (CE, IPPH Adjunct), Lynne Taylor (IPPH), Tony Zhou (IPPH) and Rex Reklaitis (ChE, IPPH Adjunct)*



*Seven Purdue IPPH graduate students were among the (34) industry and academia participants at the 2018 Lyo Summer School held in the LyoHUB demonstration facility in Birck Nanotechnology Center, Purdue*

Do you have news to share, such as professional news (new position, leadership in professional group, special award etc) or personal news? We would love to hear from you! Did you meet up with a fellow IPPH alumni? Snap a photo and e-mail it to us! Please send any of these items to Jennifer Gray, Communications for IPPH, at [gray160@purdue.edu](mailto:gray160@purdue.edu)

We would love  
to hear from  
you!

*Dane O. Kildsig*  
**CPPPR** *Center for  
 Pharmaceutical  
 Processing Research*

The October 2018 CPPPR meeting was held at Purdue. Dr. Eric Munson was the keynote speaker with a title of "Correlating Structure and Mobility Information to Functional Properties of Pharmaceutical Formulations." Dr. Rodo Pinal and Dr. Greg Knipp were both honored at this meeting for their service over the years to CPPPR.

The accomplishments of CPPPR at Purdue cover diverse aspects of pharmaceutical processing research, including:

- Developing a process for manufacturing mini-tablets of very high quality with applications to pediatric pharmacotherapy but readily extended to other segments of the population such as geriatrics and patients suffering dysphagia
- Improved understanding on the stability of lyophilized proteins through novel methods for monitoring oxygen
- Physicochemical characterization, including mechanistic studies, for a potential novel excipient based on naturally occurring nanoparticles, which when modified using GRAS chemistry become effective solubilizers of hydrophobic drugs
- Methodology for characterizing the surface properties of spray dried powders in connection to their aerosol performance
- Advances on the scientific and predictive understanding of the properties and behavior of amorphous dispersions through the development of methods for constructing phase diagrams.



*Rodo Pinal with Robin Bogner (University of Connecticut). Dr. Pinal was honored for his service to CPPPR.*

**LYO hub HIGHLIGHTS**

- LyoHUB welcomed their 17th and 18th new members, Optima Pharma and Amgen to the consortium and appreciate working with all of their industrial partners.
- LyoHUB, along with ASTM International <https://www.astm.org/> hosted the 2018 **Workshop on Lyophilization and Pharmaceutical Manufacturing** at Purdue University in October 2018. Joan Byrne, Vice President Science and Technology - Biologics and Combination Products at AbbVie provided an excellent presentation titled, "The Lyophilization Learning Curve - A Biopharmaceutical Perspective." The workshop was very well received and included a presentation on lyophilization in review, the future of biopharmaceutical manufacturing, overview of LyoHUB and the Lyophilization Technology Roadmap, a review of applications for lyophilized products, a technical foundation of Lyo 101, presentation and panel on the best practices papers currently being worked on by LyoHUB and a student poster session representing many different departments and universities.
- LyoHUB hosted **Lyo Summer School** at Purdue University from July 31-August 2, 2018. Lyo Summer School covered Formulation and Process Development for Lyophilized Pharmaceutical Products, CFD for Lyophilization Equipment and Process Characterization among other topics. The training was reinforced using a fun "Escape the Lyo Lab" game in Birk Nanotechnology Center.

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



*Joan Byrne (AbbVie), Elizabeth Topp (IPPH), Drew Strongrich (AAE), Sherwin Shang (AbbVie) at October Workshop*



*Attendees at October Workshop*



*Poster Session at October Workshop*



**SAVE THE DATE!**

**Garnet E. Peck Symposium  
Topic: The Future of Industrial &  
Physical Pharmacy  
Wednesday, May 8, 2019  
Purdue University**



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