

December 2014

# IPPH NEWSLETTER

INDUSTRIAL & PHYSICAL PHARMACY

**PURDUE**  
COLLEGE OF PHARMACY



## GREETINGS from the department head



Dear Alumni and Friends,

This is something of a milestone: the eleventh edition of this newsletter! (Arguably, it might have been better to call the tenth edition the milestone, but somehow that slipped by.) Since 2009, we've shared our successes and accomplishments with you each July and December. You've seen profiles of our graduate students and faculty, helped us celebrate our awards and accomplishments, and followed along as we completed a major renovation. We've greeted new faculty members, said goodbye to some others, created new knowledge and prepared a slew of graduate students and postdocs for careers in the pharmaceutical sciences. (Well, it seemed like a slew.)

In many ways, this eleventh newsletter is much like the others. You'll meet Bo Sun, a graduate student from Tianjin, China, who's developing a new treatment for ovarian cancer. You'll learn how Dr. Yoon Yeo and her group are modifying nanoparticles to control their interactions with target cells. You'll see the many awards received by our students and faculty, and find a link to a "one year later" view of our renovated laboratories. In one important way, though, this newsletter is different: Dr. Garnet E. Peck, emeritus faculty member and a mainstay of our department, died on September 16. You'll find our written tribute to him below.

May your holiday season be filled with joy, and may it bring you many opportunities to celebrate milestones with those who are dear to you. Happy holidays from all of us here at IPPH - and boiler up!

Liz Topp

Dane O. Kildsig Chair and Department Head

In Memoriam:

### Dr. Garnet E. Peck (1930–2014)

It is with deep sadness that the Department of Industrial & Physical Pharmacy shares the passing of Dr. Garnet E. Peck, Professor Emeritus, on September 16, 2014. Dr. Peck was a long-time faculty member and director of the manufacturing labs. “Dr. Peck made enduring contributions to pharmaceutical technology and education, and helped to develop many of the most influential leaders in today’s pharmaceutical industry”, said Dr. Liz Topp, Department Head. “We offer our deepest condolences to his family in this loss. He will be sorely missed.”

Dr. Peck's research interests included optimization of drug product design and process design, in particular those systems involving tablets: topical drug adsorption, flow of solid systems, dispersed systems design and evaluation, new tablet coating materials as mentioned, and excipient–drug interaction. His research resulted in over 150 scientific publications and he served as major professor for 48 doctoral students. He was elected to the United States Pharmacopeia Committee of Revision for three terms from 1985 to 2000. He served on FDA Advisory Committees for generic drugs, pharmaceutical sciences, pharmacy compounding, and cGMP revision.



Upon his retirement in 2003, the Garnet E. Peck Symposium was established in his honor for his enduring contributions to the pharmaceutical sciences, including the development of latex-based tablet coatings that have been used in the industry for more than thirty years. The goal of the symposium is to stimulate interest in focused areas and to identify opportunities for new research.

Attend the upcoming [12th Annual Garnet E. Peck Symposium](#) in West Lafayette, IN, on Feb. 25–27, 2015.

See how Dr. Peck was honored in March 2014 at the [11th Annual Garnet E. Peck Symposium](#).

Read the [2011 Oral History: An Interview with Dr. Peck](#), courtesy of the Purdue University Libraries, Archives, and Special Collections.

Those wishing to make a donation in Dr. Peck’s memory may contribute to the Dr. Garnet E. Peck Graduate Scholarship.

By mail: Print and complete a [one-time gift form](#) or set up a [recurring gift](#). Send the completed form with a check to: [Purdue Foundation](#), 403 West Wood Street,

West Lafayette, IN 47907.

Online: Specify "Dr. Garnet E. Peck Graduate Scholarship". Under Additional Gift Information, select In Memory/Honor of the person you are paying tribute to: Dr. Garnet E. Peck.

Questions? Please contact Angela Davis, Manager of Stewardship and Donor Relations, with questions at (765) 494-1370 or [ARDavis@prf.org](mailto:ARDavis@prf.org).

The College of Pharmacy will provide a tribute to Dr. Peck's life in the Fall & Winter 2014 edition of The Purdue Pharmacist.



#### FACULTY HIGHLIGHTS

Dr. Liz Topp has been selected by the Purdue University Office of the Provost to participate in the Committee on Institutional Cooperation's Academic Leadership Program (CIC-ALP) during the 2014-15 academic year. The CIC is a consortium of the Big Ten member universities plus the University of Chicago. The program is designed to develop the leadership and managerial skills of faculty who have demonstrated exceptional ability and administrative promise, and is specifically oriented to the challenges of academic administration of major research universities and to the preparation of faculty members to meet those challenges. [Read more](#)

Dr. Lynne Taylor and co-PIs Drs. Ray Galinsky, Garth Simpson (Purdue Dept. of Chemistry), and Brian Decker (IU Medical School) received an award from the U.S. Food & Drug Administration for their project "Formulation, processing and performance interrelationships for amorphous solid dispersions". [Read more](#)

Dr. Rodolfo Pinal's Biokorf, LLC, is creating prefabricated drug dosages that could be used by compounding pharmacists to support patient-centered, precision medicine (PCPM). The company's technology makes pharmaceutical dosage forms in modular form from prefabricated components. The "pills" are patient-tailored in size and shape, with the precise dose and drug release characteristics that the physician prescribes for the individual patient. The Purdue Office of Technology Commercialization and Purdue Foundry have supported Biokorf officials throughout the process to translate the Purdue technology into a startup. [Read more](#)

Dr. Lynne Taylor edited a special issue of the JPharmSci, became the 2014 Chaney Faculty Scholar, and received a Merck award to develop nonlinear optical spectroscopy for

pharmaceutical solids. [Read more](#)

The Defense Threat Reduction Agency (DTRA) has funded Dr. Greg Knipp's project entitled "SaliPhe, a Broad Spectrum Antiviral for Encephalitic Alphavirus" for one year. The primary award is to Omm Scientific; Dr. Knipp is the Principal Investigator on a subcontract to Purdue.

[Read more](#)

Dr. Yoon Yeo (See Research Spotlight below) received NSF funding and was named as the 2014 Showalter University Faculty Scholar. [Read more](#)

[More Faculty Highlights](#)

## GRADUATE STUDENT HIGHLIGHTS



Dr. Tonglei Li presented two IPPH graduate students with awards at the Purdue University College of Pharmacy Jenkins-Knevel Awards Symposium for Outstanding Graduate Research on October 30:



Senior graduate student Lavanya K. Iyer (left – [Topp group](#)) received the Jenkins-Knevel Award for Outstanding Graduate Research for her research on "Photolytic Crosslinking-Mass Spectrometry to Study Molecular Interactions in Lyophilized Matrices".

Fourth-year graduate student Christopher D. Kulczar (right – [Knipp group](#)) received the Kienly Award for Outstanding Graduate Teaching.

Senior graduate student Matt Jackson ([Taylor group](#)) received the 2014 Herbert A. Lieberman Award from the Department of Industrial and Physical Pharmacy. The award recognizes Matt's outstanding service as a Teaching Assistant in IPPH 562 (Introduction to Pharmaceutical Manufacturing Processes) his leadership in our AAPS student chapter and his many contributions to the department. The award was funded by Mr. Bruce A. Lieberman to honor his father, Dr. Herbert A. Lieberman, who co-authored The Theory and Practice of Industrial Pharmacy.

Four IPPH graduate students in the [Taylor group](#) received travelship awards to attend the 2014 AAPS Annual Meeting in San Diego in November:

Laura Mosquera-Giraldo received a travelship from the Colombian Student Association at Purdue (CSAP), Anura Indulkar received a travelship from AstraZeneca, and Matt Jackson and Hitesh Purohit received travelships from the Formulation Design and Development section of AAPS.

Two other IPPH graduate students received notable awards in the past months:

Bo Sun (See Graduate Student Spotlight below) (Yeo group) received a 2014–15 Ronald W. Dollens Graduate Scholarship in the Life Sciences, and Anshul Mishra (Topp group) was elected President Pro Tempore of Purdue’s Graduate Student Government (PGSG).

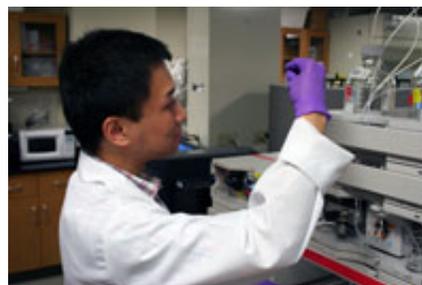
## More Graduate Student Highlights



### Meet Bo Sun

Perhaps coming from the unique and progressive city of Tianjin helped stimulate IPPH graduate student Bo Sun’s interest in pharmaceutical research. Tianjin, northern China’s largest coastal city and home to the world’s current fastest supercomputer, Tianhe-1A, has a thriving pharmaceuticals industry.

Sun earned his BS in Pharmaceutics at the China Pharmaceutical University (CPU) in Nanjing, and worked for about a year at Sino–American Tianjin Smith Kline & French Laboratories, Ltd. He then completed a Master’s degree at CPU in Pharmaceutics, focusing on nanoparticle drug delivery systems, and began looking at PhD programs. U.S. News & World Report ranked Purdue’s College of Pharmacy in the Top 10 pharmacy schools, so he put Purdue at the top of his list of choices. Besides the top ranking and reputation of IPPH, he knew of Dr. Yoon Yeo’s and Dr. Kinam Park’s research. “Their research field fit my background with nanoparticles,” he says.



Bo Sun checks a sample vial prior to starting a sequence on high performance liquid chromatography.

Sun lists the IPPH program’s benefits:

- Research assistantships which free students to focus on research and help pay for school
- Well-organized and well-managed
- Helpful and friendly faculty and staff
- Opportunities to know culturally diverse grad students within and outside of one’s own lab

Now in his fourth year in the Yeo Lab, Sun hopes to finish his PhD by December 2015. After that, he will consider post-doctoral research or a job in industry. Sun would prefer to do post-doctoral work in the U.S., to work independently and to learn about lab management, grant applications and the research process. He hopes to work as a summer intern next year.

In the meantime, Sun focuses on developing an injectable depot as a drug delivery system for safe and effective intraperitoneal (IP) chemotherapy of ovarian cancer. “More specifically, my research is about using an in-situ crosslinkable hydrogel to deliver nanocrystals for IP

chemotherapy and I will perform an in-vivo evaluation of the depot system in a murine model of ovarian cancer,” he says. “I really want to develop some products that will be useful in a clinic to treat cancer.”

In 2013, he received a Purdue Research Foundation grant for his proposal “Nanoparticle depot for intraperitoneal chemotherapy of ovarian cancer”. When he’s not in the lab, Sun enjoys playing tennis and watching tennis games with friends, and would like to travel around the U.S.



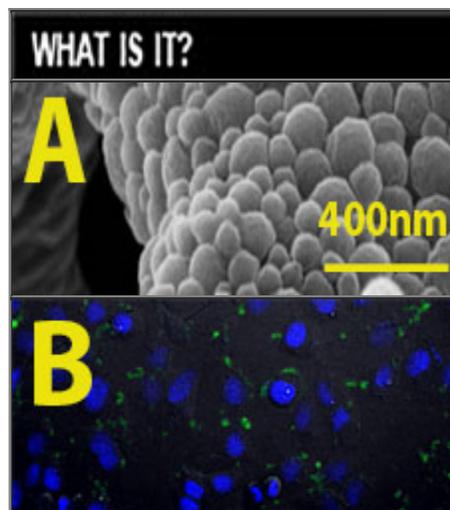
Dr. Yoon Yeo

### Nanoparticle engineering with a tool learned from nature

Drug delivery research often means a battle with a biological environment that interferes with the intended functions of drug carriers. Nanoparticles (NPs) have been considered a promising tool to deliver drug in a target specific manner, but several environmental challenges compromise the potential. For example, inhaled NP gene carriers have the potential to deliver the corrective genes to

target cells in the lung, but they encounter a tenacious sputum layer in the airways that prevent their penetration. Prolonged circulation is a critical requirement for systemic NP delivery, but the surface modification needed to extend the circulation half-life can also compromise NP-cell interactions and reduce the efficacy of the drug. The Yeo Lab develops various strategies to minimize the undesirable interactions between NPs and blood/tissue components without compromising their ability to deliver therapeutic agents to target tissues. These efforts include encapsulating NPs in osmotically active microparticles, which change sputum environment to facilitate trans-sputum NP transport, and modifying NP surfaces with pH- or enzyme-sensitive polymers to allow for conditional activation of NPs in target tissues.

In a recent article published in *ACS Nano*, the Yeo Lab reported a simple and versatile method of modifying the NP surface, which has made the NP engineering a lot easier. This method is based on the principle that dopamine is polymerized in a mild condition into an adhesive film (similar to mussel foot proteins), which can recruit nucleophilic functional groups. Using this method, the Yeo Lab has immobilized various surface modifiers (folate, RGD peptide, chitosan, and synthetic polymer) on polymeric NPs and observed that the modified NPs showed the intended interaction with target cells. A unique advantage of this method is that it is applicable to virtually any types of NPs including polymer, metal, and lipid-based NPs. This flexibility allows one to design core particles according to the applications without being constrained by the needs for surface modification. It also makes it easier to engineer functionally complex NPs, which would otherwise involve multiple inefficient synthesis steps. With this versatile tool, the Yeo Lab hopes to investigate how surface chemistry of a NP dictates its biological fate in the



body and determine design criteria for clinically effective NP drug carriers.



### Attend the 2015 Peck Symposium

The 12th Garnet E. Peck Symposium will be held Feb. 25–27, 2015, at the Four Points by Sheraton Hotel in West Lafayette, IN. The topic will be “Clinical and Commercial Translation of Drug Delivery Systems”, chaired by Professor Yoon Yeo. There will be 21 speakers from industry, academia and government. See the [symposium website](#) for details. For more information, contact IPPH Communications Coordinator DeEtte Starr at 765–494–1484 or [starrd@purdue.edu](mailto:starrd@purdue.edu).

### 2014 PGSRM



IPPH students attended PGSRM in June.

The 2014 Pharmaceutical Graduate Student Research Meeting (PGSRM) took place at the University of Illinois at Chicago June 26–28, 2014. This year’s meeting topics included personalized medicine, nanoparticles in vaccine delivery, and nanoparticles in cancer research. Graduate students from various states and universities attended and presented their research to their peers in an informal and relaxed environment. It was also an excellent opportunity for all of the participating graduate students to network,

share their work and thoughts, and gain a better understanding of the different types of research being conducted across the country in the pharmaceutical sciences field.

Purdue IPPH students Hyesun Hyun, Arjun Kalra, Rubayat Khan, Monika Lavan, Anshul Mishra, Laura Mosquera–Giraldo, Mitulkumar Patel, Yihua Pei, Bo Sun, and Venecia Wilson attended the meeting. IPPH faculty also sent undergraduate students Iris Archer, Marjorie Guillermo, David Harvey, Deborah Lee, and Alexandra Seybold, along with Visiting Scholar Xueying Yan and PULSe PhD student Jun Xu.

### One Year Later: IPPH Labs

In 2013, IPPH finished renovating the ground floor labs in the Robert E. Heine Pharmacy Building. Take a look at how the new labs are being used now to train students and advance pharmaceutical research.

### IPPH Graduates: August 2014

Congratulations to August 2014 IPPH PhD graduate Steven Dale, now working for Vertex

Pharmaceuticals.

Follow Us:  

[Website](#) | [Contact us](#) | [Subscribe](#) | [Search archives](#)



*Editor:*  
DeEte Starr  
IPPH Communications Coordinator

Dept. of Industrial & Physical Pharmacy  
Purdue University  
575 Stadium Mall Dr.  
West Lafayette, IN 47907-2091  
(765) 494-1484  
[ipphcomm@purdue.edu](mailto:ipphcomm@purdue.edu)

Copyright © 2014, Purdue University Dept. of Industrial & Physical Pharmacy.  
All rights reserved.