Greetings from the Department Head

Dear Alumni and Friends;

The end of the year is a time to celebrate. Around the world, in festivals like Diwali, Thanksgiving, Christmas, Hanukkah, New Year’s and Kwanzaa, people gather together to make merry. In IPPH, we have a lot to celebrate this year, too, and we’d like to share it with you in this newsletter. We’re celebrating the addition of our newest faculty member, Dr. Keith Chadwick, and we’ll introduce him to you. We’re celebrating the many awards and accomplishments of our faculty and students. For example, we’re celebrating with Dr. Lynne Taylor and her group, who received two “best manuscript” awards from top journals this year. We’re celebrating with Dr. Jim Litster, who recently received a national award for his work in fluid particle systems; we’ve included a piece on his research. We’re also celebrating the 10th anniversaries of our Peak Research Symposium and of our Regulatory and Quality Compliance Program. And, with the rest of Purdue, we’re getting ready to celebrate the installation of our 12th president, Mitch Daniels, when he completes his term as governor in January.

Thanks for taking the time to celebrate with us through this newsletter. We hope that your holiday season is filled with celebration, and that your New Year is filled with peace.

Boiler Up!

Liz Topp
Dane O. Kildsig Chair and Department Head

Department Highlights

Faculty Highlights

• Dr. Lynne Taylor was named a Fellow of the American Association of Pharmaceutical Scientists (AAPS). Fellows are recognized for having made a sustained and impactful contribution to the pharmaceutical sciences.

• Dr. James Litster received the 2012 Thomas Baron Award in Fluid-Particle Systems at the 2012 annual AIChE meeting. The award is given by the Particle Technology Forum of the AIChE.

• Dr. Stephen Byrn’s ongoing work in Tanzania made international news, including The Guardian and the Ajaat AIDS Weekly. For more information, read the articles on our website http://www.ipph.purdue.edu/index_photos/ByrnNewsScans.pdf and read our feature www.ipph.purdue.edu/features/AfricanMeds.php.
Department Highlights (cont.)

- Dr. Gregory Knipp joined industry professionals in teaching a new "Introductory Mechanistic Oral Absorption Modeling and Simulation" course (aka GastroPlus™) at Purdue in July. The short course was organized and taught by Drs. Haruel Vicente Sanchez-Felix and John Rowe from Eli Lilly and Company, Michael Bolger from Simulations Plus, Inc., and Dr. Knipp, to enhance pre- and post-graduate education and research to include in silico training. Instructors taught the basic principles of absorption modeling and focused largely on the use of the GastroPlus™ program, which SRPh plans to use again in the future.


Graduate Student Highlights

- Chris Kulczar (Knipp group), a second-year graduate student, won first place in June for the best poster presented at the 2012 PDSRM conference in Omaha, NE, for his poster entitled "Juvenile Pigs as Surrogates for Human Pediatrics During Preclinical Pharmacokinetic Testing: A Possible Means to Expedite Pediatric Drug Development?"

- Hillary Holback (Yeo group), a senior graduate student, received a 2012-2013 Ronald W. Dollens Graduate Scholarship in the Life Sciences in August. The scholarship provides merit-based support for graduate students in the Department of Biomedical Engineering and in the College of Pharmacy who are studying in the broad area of hybrid cardiovascular devices, including implantable biomaterials design, drug-delivery systems and biochemical sensors.

- Shweta Raina (Taylor Group), a senior graduate student, received a travelship from the Formulation Design and Development (FDD) Section of AAPS to support her attendance at the 2012 AAPS Annual Meeting. She was recognized at the FDD Section Joint Membership Meeting on October 15.
Welcome New Faculty: Keith Chadwick

Dr. Keith Chadwick joined the IPPH faculty in August. He holds a B.Sc. in Chemistry from the University of Manchester Institute of Science and Technology (U.K.) and a Ph.D. in Chemical Engineering from the University of Manchester. He has spent the past three-and-a-half years working as a Postdoctoral Associate at the Massachusetts Institute of Technology in the MIT-Novartis Center for Continuous Manufacturing, studying the effect of heterogeneous surfaces on the nucleation of organic crystals. His research interests include the crystal engineering of crystalline, polymorphs and salts with desired physicochemical properties, developing mechanistic understanding of crystal nucleation and the control of crystal habit (morphology). The overall vision of his research is for the rational design of materials, such as small-molecule pharmaceuticals, by controlling the internal and external three-dimensional structure of crystals. In his spare time he enjoys playing sports, especially soccer. Having been reared in Manchester, England, he is a diehard Manchester City fan (English Premier League) and never misses watching a game. He is married to Dr. Jie Chen, who has accepted a position as Research Scientist in Dr. Lynne Taylor’s group.

Postdoc Highlights

- Saradha Chandrasekhar (Topp group), a third-year graduate student, was selected in October to receive a 2012 Kienly Award as the outstanding graduate Teaching Assistant in the Department of Industrial and Physical Pharmacy. The award recognizes her contributions as a Teaching Assistant in IPPH 471 (Parenteral Products).
- Lindsey Wegiel (Taylor group), a senior graduate student, was selected in October to receive a 2012 Jenkins-Knevel Award for Outstanding Graduate Research. Lindsay’s work was recognized at the College of Pharmacy’s Graduate Student Awards Symposium on November 8, where she presented her research.

Alumni Highlights

- Dr. Todd Chermak, IPPH RQC Graduate Certificate (2003), received a 2012 Distinguished Alumnus Award from the College of Pharmacy on November 9. Dr. Chermak, R.Ph., Ph.D. is currently the Divisional Vice President, Abbott Nutrition Regulatory Affairs. [Read more on p. 5]

Postdoc Highlights

- Dr. Andrew Otte received a 2012 Purdue Realization and Entrepreneurship Postdoctoral Fellowship (PREPP) in August from the Burton D. Morgan Center for Entrepreneurship in Purdue’s Discovery Park. The fellowship will help to support his work on particle engineering and prefabricated dosage forms. The program will also provide him with training on commercialization and business development related to these novel delivery systems. Drew is a postdoctoral research associate in Dr. Rodolfo Pinal’s group.

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In solid dosage form manufacturing, a granulation step often takes place prior to tableting, since pharmaceutical model agrees well with experimentally-measured values.

For formulations that are not readily compressible in a roller compactor, wet granulation is the only alternative approach. The size enlargement and densification process, a wet granulation method that can be used in continuous processing. The information will be used in a mathematical model for process optimization and control. The use of sensors for process monitoring and control is critical to any continuous process; the group is using a high-speed imaging camera to monitor granule size in real time.

A significant portion of Dr. James Litster’s research revolves around understanding the granulation process. A multi-scale approach is central to the research methodology. For example, for investigating dry roll compaction, the Litster group uses Finite Element Method (FEM) simulations to investigate how pharmaceutical powder blends behave on both microstructure and macroscopic (equipment) levels. An example of FEM simulations for a roller compactor is shown in the figure; note that the powder density predicted by the model agrees well with experimentally-measured values.

Steven Dale finds formulation science a fascinating challenge – whether it’s creating a microbrew or improving the wet granulation process. A fourth-year student in the IPPH Ph.D. program, Dale first became interested in pharmaceutical research when he took Dr. Lynne Taylor’s IPPH 580 class as a senior BSBS student at Purdue. “She explained that IPPH was research-based, which I liked,” he said. He had worked the previous summer as an undergraduate intern at Mylan Pharmaceuticals, completing investigation reports. After he graduated but before graduate school, Dale interned at Eli Lilly & Company. “I worked on characterizing the compaction of two lots of the same API that behaved differently,” he explains. “We wanted to see if the two lots would have different granule sizes and flow properties after roller compaction.”

Dale conducts research in the Particle Design and Formulation Lab of Dr. James Litster and Dr. Carl Wassgren, relating the intra-granular distribution of binders to particle strength, compaction and attrition. Dale likes the combination of pharmaceutical research and chemical engineering. “I’m trying to understand how structure relates to strength in order to optimize the structure,” he says. He uses X-ray microtomography (XRM) to examine where particles, binder and air are located in granule.

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Ground Floor Renovations

Renaissance of our ground floor laboratories is moving forward on schedule. We expect that Phases I and II of the project will be substantially complete by the end of 2012, with occupancy scheduled for March 2013. We have begun planning for Phase III, which will renovate rooms G57 and G59 and update HVAC for that area. Check out our website http://www.ipph.purdue.edu/renovations/ to see the latest updates on construction. Floor plans posted on the site show what’s happening with the space.

RQC 10-Year Anniversary

The Regulatory & Quality Compliance (RQC) graduate program celebrated its 10-year anniversary during the fall of 2012. RQC held a celebration event on July 20 at the University Center of Lake County in Grayslake, IL. Over 60 RQC students, faculty, alumni, educational partners and guest speakers enjoyed reconnecting and sharing what the program had meant to them. (View the Celebration Photo Feature at http://www.ipph.purdue.edu/features/2012-07-20.RQC_10Years.

Spielberg Delivers 2012 Varro E. Tyler Lecture

The College of Pharmacy and the Department of Industrial and Physical Pharmacy together hosted this year’s annual Varro E. Tyler Lecture on November 16. The speaker was Dr. Stephen P. Spielberg, M.D., Ph.D., Deputy Commissioner for Medical Products and Tobacco of the U.S. Food and Drug Administration. Dr. Spielberg spoke on "Precision Medicine and the Future of Therapeutics," discussing advances in biomedical science and the opportunities they bring to selectively target therapeutic agents to provide drug therapy with greater benefit:risk.

2012 IPPH Distinguished Alumnus

Dr. Todd Chermak, A.Ph., Ph.D., met with IPPH students for a roundtable discussion, after receiving a 2012 Distinguished Alumnus Award from the College of Pharmacy. During his visit, Dr. Chermak spoke on "Regulatory Science and Industrial Pharmacy."
The Tenth Annual Garnet E. Peck Symposium took place at Purdue University on October 11, 2012.

Dr. Garnet E. Peck enjoyed reconnecting with three of his former graduate students (from left to right): Drs. Holly Bonsignore, Alton Johnson, Garnet Peck and Karen Nagel.

Are you connected? Join our IPPH LinkedIn group to see what great things our department is doing! Or visit us online at www.ipph.purdue.edu.