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Liz Topp
Dane O. Kildsig Professor and Department Head

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Faculty and Student Highlights

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Graduate Student Highlights

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Faculty and Student Highlights (cont.)

- Andrew Otte (Carvajal group) received a Lilly Endowment Gift Graduate Research Award (April).
- Several of our students completed Ph.D. degrees recently. In alphabetical order, they are (with the post-graduation plans): Nathan Eben (research scientist, Celgene Corp., Summit, NJ), David Ely (postdoc, Heinrich Heine University, Dusseldorf, Germany), David Lindley (research scientist, Abbott Laboratories, Abbott Park, IL), Jennifer Maguire (seeking employment, NJ), Michelle Papp (research scientist, Eurand Inc., Vandala, OH), Kumar Vedantham (research fellow, Center for Biomedical Engineering Systems, UNC Charlotte).

**BSPS Student Highlights**

- Krista Eakins, Danielle Carpenter and Brittany Phillips and their team earned a top prize in the 2010 Student Soybean and Corn Innovation Contest for their soy-based tablet binder (see photo at left, March).
- Margaret (Uyen) Chen, a senior BSPS student, competed with the Purdue Latin and Ballroom Dance Team in the collegiate championship of ABC’s “Dancing with the Stars.” The team placed second (May).

Graduate Student Spotlight: Li Pan

Li Pan is a fourth year graduate student in Dr. Greg Knipp’s group. Li’s doctoral research addresses the effects of fetal exposure to bisphenol A (BPA) on fatty acid homeostasis. She and Dr. Knipp hypothesize that BPA affects the expression of certain transporters, leading to changes in the distribution of fatty acids across the placenta. Her work involves studies in a rat placental cell line and the development of in vitro/in vivo correlations.

Li was one of the key organizers of the 2009 Pharmaceutics Graduate Students Research Meeting (PGSRM), held at Purdue last June. Organizing the conference gave her experience in fund raising, managing and delegating tasks, recruiting speakers, and in the logistics involved in a putting together a multi-day event. She’s grateful that the conference was a success and reports that she even had time to enjoy parts of it. She’s also grateful to be spending this summer on her research.

Born in mainland China, Li Pan grew up in Panama City, Panama, and is fluent in three languages (Spanish, Cantonese, English). She is a 2006 graduate of Purdue’s BSPS program. She credits a 2005 internship with AstraZeneca in the UK as the catalyst for her decision to pursue a career in pharmaceuticals. She is currently working with Dr. Knipp on a 2010 Lilly Endowment Grant to study the impact of fetal exposure to BPA on placental fat and liver development. Ultimately, she hopes to be working in the pharmaceutical industry in the U.S., preferably in biopharmaceutics or biotechnology.

**Endowed Professorship in Pharmaceutical Manufacturing**

We’re beginning a search for an endowed professorship in pharmaceutical manufacturing, a traditional strength of our department. We’re looking for candidates with an internationally recognized research program in pharmaceutical manufacturing, and/or pharmaceutical biotechnology. The successful candidate will have a strong extramurally funded research program and the ability to contribute to both our professional and graduate education programs. This individual will also be expected to participate in the emerging Pharmaceutical Engineering program here at Purdue and to establish research collaborations with the pharmaceutical industry. A link to the complete advertisement and position description is posted on our website (www.ipph.purdue.edu). For additional information, please contact Dr. Rodolfo Pinal (rpinal@purdue.edu) or Ms. Mary Ellen Hurt (mhurt@purdue.edu). We value your suggestions of well-qualified candidates.

Research Spotlight: Preventing the Crystallization of Drugs – Why Do We Do it and How is it Accomplished?

The process of developing new drugs is becoming more challenging in more ways than one. One universal problem faced by drug developers is the fact that the aqueous solubility of promising new molecules has been spiraling downwards over the past two decades. However, in order for orally delivered drugs to be effective, they have to dissolve at some point in the gastrointestinal tract. Using the amorphous form of a drug can improve the dissolution rate of a poorly-water soluble drug and help improve its delivery. However, the downside to this approach is that given enough time, the amorphous drug in a tablet can crystallize and the bioavailability will be reduced. This is similar to what you might see for an old container of honey which has changed from a thick liquid into an opaque crystalline solid; this is an example of the type of slow crystallization that plagues amorphous drugs. The Taylor group studies how adding polymers to amorphous drugs can prevent this crystallization. All the group members are studying how hydrogen bonding interactions between the drug and the polymer can help keep the drug from crystallizing from the drug delivery system. Hydrogen bonding interactions are very important for drugs, both in terms of how they interact with biological receptors as well as how they direct the self assembly of drug molecules into ordered crystals. Hydrogen bonds help to connect the molecules in the crystal lattice, acting as “intermolecular glue”. If these intermolecular interactions can be disrupted by forming hydrogen bonding interactions with bulky polymer molecules, an amorphous solid that does not crystallize very readily can be produced. The Taylor group is currently studying which polymers can form the best hydrogen bonding interactions with various drugs and how these interactions correlate with the crystallization inhibition ability of the polymer. One tool used by the group is infrared spectroscopy, which enables drug-polymer hydrogen bonding interactions to be probed. Recent results (published in CrystEngComm, “Role of polymer chemistry in influencing crystal growth rates from amorphous felodipine” authored by IPPH graduate student Umesh Kestur and Lynne Taylor, http://dx.doi.org/10.1039/c011090d) show that the polymer which forms the strongest hydrogen bonds with the model drug, felodipine, is indeed the best inhibitor of crystal growth. Ultimately, the Taylor group hopes to develop a set of drug-polymer interaction rules to identify the most effective crystallization inhibitors. Long term, this research will help to improve our ability to deliver some poorly-water soluble drugs using an amorphous formulation strategy. For more information about this work and other research in the Taylor group see http://taylor.openwetware.org/

New Research Space

We’re working to improve the research space for IPPH faculty, staff and students. Here are some recent upgrades:

**Ross Enterprise Center** – Due to space constraints, some IPPH research is conducted in rented laboratories off campus. In March, Drs. Steve Byrn and Kinam Park and their groups moved to new space in Suite Q of the Ross Enterprise Center. The Enterprise Center is located in Purdue Research Park and owned by the Purdue Research Foundation (PRF). Suite Q includes 4500 sq. ft. of open-concept laboratory space and 2800 sq. ft. of office and conference room space. Seating for researchers is in cubicles outside the laboratory area. The groups moved to Suite Q from the Kent Building, which is also owned by PRF and has been slated for demolition. Ms. Mary Speer, who provides staff support for our graduate programs in regulatory and quality compliance, is now also located in Suite Q. Dr. Greg Knipp and his group moved from the Kent Building to labs in the Robert E. Heine Pharmacy (RHPH) Building as part of this relocation.

**RHPH Renovations** – The ground level of RHPH houses the pharmaceutical manufacturing labs, as well as research laboratories for several IPPH faculty members and their groups. With support from Dean Svensson, the Lilly Endowment and the Purdue central administration, we are beginning a project to renovate this area. Initial architectural plans include small molecule and biotech manufacturing areas, a mock-GMP growing area and analytical support labs. The project has received initial approval from Purdue’s Capital Projects Committee.
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