

PSC connections

UNIVERSITY OF MARYLAND SCHOOL OF PHARMACY

Fall 2008



Andrew Coop, PhD

Message from the Chair

This year marks the 15th anniversary of the Department of Pharmaceutical Sciences (PSC), and I find it apt that my first chair's message to alumni occurs during our crystal anniversary, as crystals represent our traditional strengths and also our vision for the future. From cutting-edge industrial pharmaceuticals and formulation of new drug delivery systems using nanotechnology, to using the latest X-ray crystallographic methods to determine protein-protein interactions in the design of new drugs, crystals affect us all.

PSC was born from a merger of the three basic science departments at the School of Pharmacy, with the goal of enhancing our talents and molding the department into one that covers the whole drug design and development process. The many changes in the department over the past year have been breathtaking. I was thrilled to succeed Dean Natalie D. Eddington, PhD, as chair of the department. As chair, I envision PSC will continue to grow at an unprecedented pace over the next three to five years. A constant, however, is the commitment of our faculty to excellence in research, service, and education, with a focus on training outstanding graduate students and postdoctoral researchers to be future leaders in the pharmaceutical sciences.

As part of our vision for growth, we are currently recruiting additional faculty for positions across the range of pharmaceutical sciences. Over the summer, we hired a number of excellent faculty members, including Yan Shu, PhD, (pharmacogenomics) from the University of California, San Francisco and Peter Butko, PhD, (protein-peptide interactions) from the University of Southern Mississippi, along with Rohit Kolhatkar, PhD (synthetic chemistry), previously a postdoctoral fellow at the School of Pharmacy.

PSC remains committed to the education and training of graduate students, and recently welcomed a new class of 10 outstanding students. We have paid specific attention to recruiting high-quality students to the department, and several years ago, we initiated a summer internship program for undergraduates. This program has directly led to three graduate students entering our program, and significantly strengthened our application for a National Institutes of Health interdisciplinary graduate student training grant that was submitted earlier this year.

At this important juncture in our School's history, I ask you to consider joining with us to ensure the success of the next generation of graduate students and to help us move forward with our vision by contributing to the School of Pharmacy's comprehensive Capital Campaign. Enclosed, you will find a giving envelope to secure your gift to the School. Your support of PSC initiatives and Schoolwide priorities will ensure that our beloved and true gem of a department will thrive well past our crystal anniversary.

I encourage you to visit PSC's Web site at www.pharmacy.umd.edu/psc/ to learn more about the exciting accomplishments of our faculty, students, and postdoctoral researchers, which are too numerous to list in this issue of *Connections*.

Sincerely,

Andrew Coop, PhD

Professor and Chair, Department of Pharmaceutical Sciences



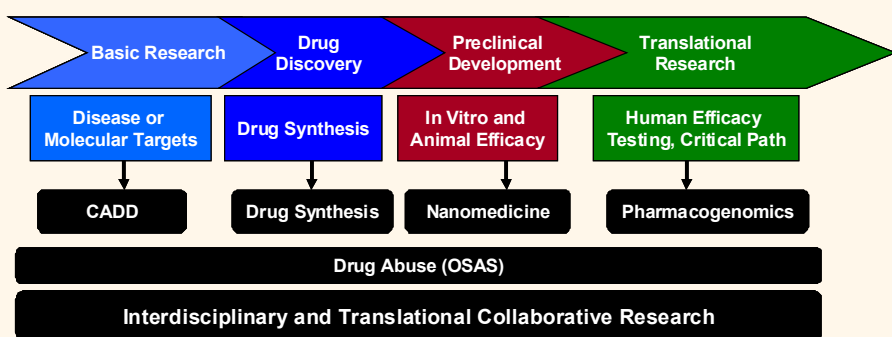
Pharmacy Hall Addition

In April, the Maryland General Assembly approved \$62 million for the construction of Pharmacy Hall Addition, which represents a major advance for the School of Pharmacy and the Department of Pharmaceutical Sciences. The Addition will provide educational resources second to none in the country and space to increase enrollment in both graduate and PharmD programs.

OPENING FALL 2010

With four floors of Pharmacy Hall Addition dedicated to pharmaceutical research, our faculty and students will be on the forefront of discovering new mechanisms of disease and improved therapeutics leading to an ultimate goal of personalized medicine. With access to new cutting-edge equipment and mentoring by world-class faculty, our students will gain unique experiences positioning them as leaders in the pharmaceutical sciences.

In order to reach our goal of being a top five pharmacy school in terms of National Institutes of Health funding, we aim to use the resources provided by Pharmacy Hall Addition to create endowed centers of excellence that cover the whole drug design and development process, as shown in the accompanying chart.



The Computer-Aided Drug Design (CADD) Center translates the latest findings from biochemistry and structural biology into lead compound candidates. A proposed Drug Synthesis Center would optimize these candidates into true drug-like compounds. Formulation and targeted delivery of therapeutics occur under the auspices of the existing Center for Nanomedicine and Cellular Delivery. A new center in the area of translational science, pharmacogenomics, and personalized medicine would translate this work to the patient. This multifaceted approach will lead to the Schoolwide collaborations needed for successful modern biomedical research projects, such as the creation of a cross-departmental center of excellence in the area of drug abuse.

Our current outstanding faculty together with future faculty hires and endowed professorships in the areas of pharmacogenomics, chemistry, pharmacology, and nanotechnology/whole animal imaging will bring this vision to fruition.



FDA Critical Path Contracts

The vision of building on our department's traditional strengths led the Food and Drug Administration (FDA) to award two collaborative research projects to researchers at the University of Maryland School of Pharmacy and School of Medicine, as part of its Critical Path Initiative.

One project focuses on drug product manufacturing factors of tablets and how manufacturing quality factors scale between humans and animals. This research will help resolve manufacturing issues for medicines that are developed for humans and animals, particularly since human drug development relies on animal studies and animal drug development often benefits from prior experience in humans.



James Polli, PhD



Stephen Hoag, PhD

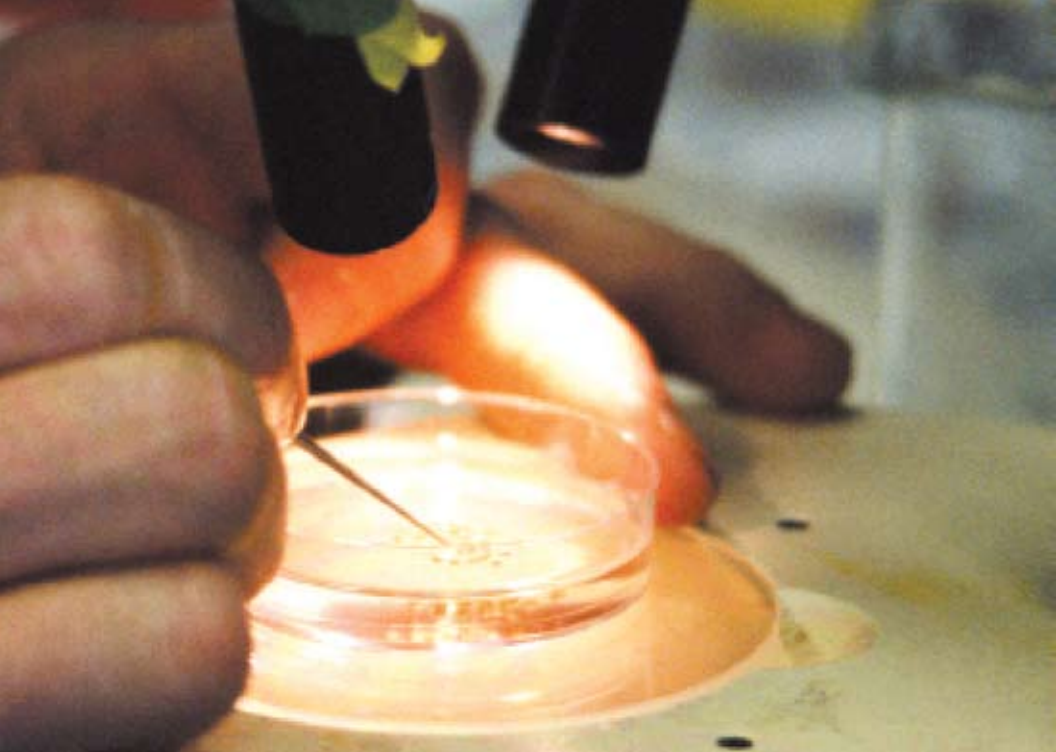
“ The science issues are very interesting, but working with alumni on these projects is especially satisfying. ”

—JAMES POLLI

A second project will evaluate the impact of tablet and capsule formulation components on oral drug absorption. This research has the capability to extend the FDA's efforts to reduce unnecessary human testing and speed approval of new and generic drugs, without compromising patient safety. “The awarding of this contract clearly demonstrates the strength of industrial pharmaceuticals and translational science within PSC, and using our own good manufacturing practice (GMP) facility for formulation will grow our reputation in the area,” says Andrew Coop, PhD, professor and chair of the Department of Pharmaceutical Sciences (PSC).

The investigative team at the School of Pharmacy is comprised of researchers James Polli, PhD, professor of pharmaceutical sciences; Stephen Hoag, PhD, associate professor of pharmaceutical sciences; and Thomas Dowling, PharmD, PhD, associate professor of pharmacy practice and science. Mark Flasar, MD, an assistant professor of medicine at the University of Maryland School of Medicine, and Kimberley Lentz, PhD, of Bristol-Myers Squibb and a graduate of the School of Pharmacy's PSC graduate program, are also collaborating on one project. Sam Haidar, PhD, BSP, is a graduate of the pharmacy and PSC programs and is the FDA contract officer on one of the projects. “The science issues are very interesting,” says Polli, “but working with alumni on these projects is especially satisfying.”

The Critical Path Initiative is FDA's effort to stimulate and facilitate a national focus on modernizing the scientific process through which a potential human drug is transformed from a discovery or “proof of concept” into a medical product.



School of Pharmacy Researcher Awarded First Rathmann Biotechnology Fellowship

With the emergence of antibiotic-resistant bacteria making news headlines around the world, increasing importance is being placed on the development of new medications that can effectively battle these deadly pathogens.

Angela Wilks, PhD, a professor of pharmaceutical sciences at the School of Pharmacy, has for the last several years been working diligently in the lab to develop a new class of antibiotics that won't kill bacteria but will lessen their virulence enough to render them harmless. And now, with support from the Rathmann Family Foundation, Wilks will be able to take her research out of the Petri dish and into a small animal model, one step closer to market.

Wilks was unanimously selected out of 19 applicants for the University of Maryland, Baltimore Rathmann Biotechnology Fellowship. The \$50,000, one-year

“The Rathmann Biotechnology Fellowship provides an opportunity to further develop a technology that has shown real promise.”



Angela Wilks, PhD

fellowship aims to accelerate the bench-to-bedside development of a technology discovered at the University by providing funds for translational biotechnology research conducted with a postdoctoral fellow. The award will fund Wilks' studies to test the toxicity and efficacy of a novel class of antimicrobials that restrict the bacterial pathogens' ability to obtain iron, which is essential for their survival and virulence.

“Traditional antibiotics target functions in the cell that are essential for survival, such as making proteins or DNA,” says Wilks. “Our approach is to target iron, which isn't essential for the bacteria to live but is necessary for them to be harmful. Our premise is that by removing the bacteria's ability to get iron from the host, their virulence will be reduced and a potential antibiotic target will be identified. We are now designing compounds that will block receptors and enzymes that are required to help the bacteria use the host's heme [the pigment found in the red blood cell] to get that iron—essentially a new class of antibiotics.”

With the Rathmann Fellowship, Wilks will be able to support postdoctoral fellow Scott Fisher, PhD, who will perform additional work with the compounds, which were identified by colleagues at the School of Pharmacy's Computer-Aided Drug Design Center. Fisher will be looking at toxicity, how the drug is distributed in the body, and its specific impact in a cystic fibrosis infection model.

“The Rathmann Biotechnology Fellowship provides an opportunity to further develop a technology that has shown real promise, support the work and training of a junior scientist, and provide preliminary data that could attract additional funding from biotechnology companies,” says Wilks.

2007 & 2008 PhD Graduates

Praveen Bahadduri

"Implications of Transporter Proteins in Drug Discovery and Design"

Dissertation Advisor: Peter Swaan, PhD

Currently a research scientist at Genzyme, Cambridge, Mass.

Ahmed Abdel Fattah Othman Abdel Bary

"Contribution of Pharmacokinetic and Pharmacodynamic Factors in Mediating the Behavioral Differences and in Reducing the Cocaine-like Activity of the Benzotropine Analogs"

Dissertation Advisor: Natalie Eddington, PhD

Currently a senior clinical pharmacokineticist in the Division of Clinical Pharmacology & Pharmacometrics at Abbott Laboratories, Abbott Park, Ill.

Kimberly Anne Burkhard

"Insight into Heme Uptake in Shigella Dysenteriae: Future Target for Drug Development?"

Dissertation Advisor: Angela Wilks, PhD

Currently a postdoctoral fellow at the University of Maryland, College Park.

Stuart Cantor

"Design and Characterization of a Compacted Multiparticulate System for Modified Release"

Dissertation Advisors: Larry Augsburger, PhD, and Stephen Hoag, PhD

Currently a senior scientist at ICON Development Solutions in Columbia, Md.

Suntara Eakanunkul

"Characterization of the Periplasmic Heme-Binding Protein, ShuT, From Shigella Dysenteriae"

Dissertation Advisor: Angela Wilks, PhD

Currently an assistant professor, Faculty of Pharmacy, at Chiang Mai University in Chiang Mai, Thailand.

Scott Fisher

"Evaluation of the Effects of the Toxic Ethanol Metabolite, Acetaldehyde, on Gastrointestinal Peptide Transport and Paracellular Permeability"

Dissertation Advisor: Peter Swaan, PhD

Currently a postdoctoral fellow in the laboratory of Angela Wilks, PhD, at the School of Pharmacy.

Hazem Hassan Abdel Hamid

"Evaluation of the Influence of Chronic Opioid Administration on Gene Expression, and Characterization of the Role of Efflux Transporters on the Pharmacokinetics, Pharmacodynamics and Drug-Drug Interactions of Opioids for Effective Management of Pain"

Dissertation Advisor: Natalie Eddington, PhD

Currently on the faculty at Helwan University in Cairo, Egypt.

Ajinder Pal Kaur

"The Role of the Cytoplasmic Heme-binding Protein, PhuS of Pseudomonas Aeruginosa in Heme Utilization and Iron Homeostasis"

Dissertation Advisor: Angela Wilks, PhD

Currently a postdoctoral fellow in the laboratory of James Nataro, MD, PhD, at the University of Maryland School of Medicine's Center for Vaccine Development.

Minori Kinjo

"Evaluations of a Human Kidney (HK2 cells) Model for Drug-induced Nephrotoxicity and BK Virus Infection"

Dissertation Advisor: Thomas Dowling, PharmD, PhD

Currently a research scientist at Cangen Biotechnologies, Inc. in Baltimore, Md.

Cliff Mason

"Functional Genomic Approaches to Delineate Preterm Birth and its Regulation of Placental Transporter Proteins"

Dissertation Advisor: Peter Swaan, PhD

Currently a postdoctoral fellow in the laboratory of Natalie Eddington, PhD, at the School of Pharmacy.

Susan Mercer

"Synthesis and Characterization of Meperidine Analogs at the P-Glycoprotein Efflux Transporter"

Dissertation Advisor: Andrew Coop, PhD

Currently an assistant professor of medicinal chemistry at Lipscomb University College of Pharmacy in Nashville, Tenn.

Matthew David Metcalf

"Synthesis and Evaluation of Novel Epoxymorphinans"

Dissertation Advisor: Andrew Coop, PhD

Currently a postdoctoral fellow at the University of Minnesota.

Vijay V. Upreti

"Characterization of Pharmacokinetic and Pharmacodynamic Drug Interactions of 3,4-methylenedioxymethamphetamine (MDMA, Ecstasy)"

Dissertation Advisor: Natalie Eddington, PhD

Currently a research investigator in discovery medicine and clinical pharmacology at Bristol-Myers Squibb in Princeton, N.J.

Yanjue Wu

"Modulation of Beta-amyloid Toxicity by Ginkgo Biloba Leaf Extract EGb 76 I in Alzheimer's Disease Models"

Dissertation Advisor: Yuan Luo, PhD

Currently a postdoctoral fellow at Johns Hopkins University.

Guanjun Xia

"Novel Role of Lymphocyte-specific Kinase (Lck) and Filamin A (FLNA) in Activation-induced T Cell Synapse Formation and the Characterization of Novel Small Molecule Inhibitors Targeting Lck SH2 Domain"

Dissertation Advisor: Paul Shapiro, PhD

Currently a project leader at A & G Pharmaceutical, Inc. in Columbia, Md.

2008

New Students



Brittany Avaritt
University of Kentucky,
BS '08, Chemistry



Jessica Schwartz
University of Maryland,
Baltimore County, BS '08,
Chemical Engineering



Aaron Smith
University of Maryland,
Baltimore County,
BS '07, Biochemistry
and Molecular Biology



Joseph Stanton
Towson University,
BS '08, Molecular
Biology, Biochemistry
and Bioinformatics

Student Fellowships

Charlene Baksh

21st Century Club/Albert B. Fisher Jr. Memorial/American Foundation of Pharmaceutical Education (AFPE) Predoctoral Fellowship in the Pharmaceutical Sciences

Mark Borgman

Wyeth Pharmaceuticals/AFPE Predoctoral Fellowship in the Pharmaceutical Sciences

Lisa Coles

Ruth L. Kirschstein National Research Service Award Predoctoral Fellowship; Predoctoral Fellowship, National Institute on Drug Abuse

Christopher Cunningham

Ruth L. Kirschstein NRSA Predoctoral Fellowship; National Institute on Drug Abuse



Katherine Joyner
College of Notre Dame,
BA '08, Biology,
pre-professional
concentration



Caitlin Lynch
University of the
Sciences in Philadelphia,
BS '08, Pharmaceutical
Sciences



Jamie Michalek
University of Maryland,
Baltimore County,
BS '08, Biochemistry
and Molecular Biology



Ting Wang
Beijing University of
Chinese Medicine, BS '03,
Chinese Pharmacy;
Peking Union Medical
College, MS '06,
Pharmacognosy



Jun Zhang
Tongji Medical College,
Diploma '93; Chinese
Academy of Sciences,
MS '97, Virology;
Purdue University, PhD
candidate, Medicinal
Chemistry and Molecular
Pharmacology

Not Pictured:

Brandy Alford
Duquesne University,
BS '99, Biochemistry,
Hampton University,
MS '06, Chemistry

Diane Doughty
Josiah Kirby Lilly Sr. Memorial/AFPE
Predoctoral Fellowship in the
Pharmaceutical Sciences

Hobart Rogers, PharmD
American Heart Association
Predoctoral Fellowship

Naissan Hussainzada
United States Pharmacopeia/AFPE
Predoctoral Fellowship in the
Pharmaceutical Sciences



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