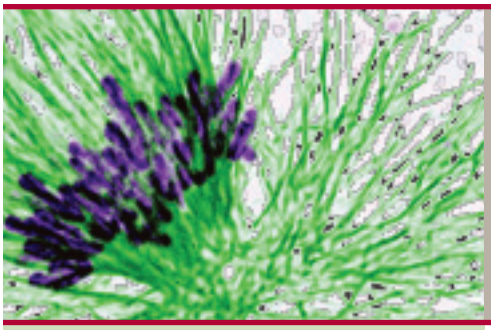

MOLECULAR AND CELLULAR BIOLOGY

GRADUATE PROGRAM NEWSLETTER

Fall 2012 ■ Volume 2, Issue 1

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Suggestions and comments concerning the MCB newsletter may be directed to: mcb@mcb.umass.edu

MCB GRADS

We want to stay in touch! Remember to email your contact information to us at: mcb@mcb.umass.edu

TO MAKE A GIFT TO THE MCB PROGRAM in support of our graduate training in the biological sciences, contact us at mcb@mcb.umass.edu. If you would like to give online, visit the UMass Amherst giving page at www.umass.edu/development/give/?a=279 and complete the confidential form.

College of Natural Sciences
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From the Director

Dear MCB Community,

As director of the Molecular and Cellular Biology Graduate Program, I invite you to read about the many recent accomplishments of our faculty and students. We have reformatted the newsletter and are posting it on the MCB website in order to reach more of you who are active in the program, as well as MCB alumni who may be interested in maintaining a connection with us.

It is our hope to remain in contact with previous MCB students and welcome their input as we attempt to highlight all that is compelling about our research roles, here at UMass and beyond.

In particular, we ask that as you venture off to your careers, whether near or far, remember to provide us with a current email address so we may keep in touch. Please direct newsworthy items for inclusion in our next issue, as well as any contact info updates, to mcb@mcb.umass.edu.

Barbara A. Osborne

Barbara Osborne

Speaking of MCB Alumni…

Dr. Kodi S. Ravichandran, PhD student of Richard A. Goldsby, presented the keynote talk entitled "Signals of Apoptotic Cell Clearance: The Beginnings of a Good Meal" at the MCB Retreat and Recruitment Weekend on February 24-25, 2012. Ravi received his PhD from MCB in 1992.

After postdoctoral training at Harvard Medical School, Ravi accepted a position at the University of Virginia as professor of Microbiology, Immunology, and Cancer Biology. He is now chair of UVA's Department of Microbiology and a Harrison Distinguished Professor. His research interests include intracellular signaling in lymphocytes and phagocytes.

Ravi's success was an inspiration to all MCB students and it was a pleasure to have him speak at the annual MCB Retreat.

MCB Recruitment Event Speakers

In addition to Dr. Ravichandran's keynote address, MCB faculty presented the following talks:

Continued on next page

Recruitment Event Speakers, continued

Dr. Matt Holden, Chemistry: "Building Biology: Drop by Drop"

Dr. Dong Wang, Biochemistry: "Sticks and Carrots: Host Strategies in a Symbiosis Model"

Dr. Pat Wadsworth, Biology: "Putting Brakes on a Mitotic Motor"

Byron Prize Recipient

The Annual Byron Prize was awarded to **Dr. David F. Bruhn '11PhD** at the MCB Retreat on February 25, 2012. David presented a talk entitled, "Spectinamides: A Novel Series of Semi-Synthetic Inhibitors that Overcame Native Efflux and Retain Potent Activity Against MDR/XDR Mycobacterium Tuberculosis."

David, who was advised by Dr. Michele Klingbeil in Microbiology, is currently a postdoctoral researcher at St. Jude Children's Research Hospital in Memphis, TN. David works as part of a multidisciplinary team focused on the development of novel antibiotics for the treatment of drug-resistant infections. As a postdoc in the Department of Chemical Biology and Therapeutics, David performs initial characterization of lead compounds, mechanism of action studies for novel series, and employs a number of *in vitro* models to assess activity against biologically important drug-refractory bacterial populations.

Outside of the laboratory, David enjoys volunteering with patients and their families at Target and Grizzlies House, and he is his department's representative to the Postdoctoral Association Council.

David has benefited greatly from the strong support provided to postdoctoral researchers at St. Jude and has presented his research at international conferences held in Uganda and Paris.

Student Achievements and Awards

Kate Fagan-Solis, recent PhD graduate, scores breast cancer tissue microarrays with Dr. Christopher Otis, director of Surgical Pathology at Baystate Medical Center. *(Photo credit:* Kristin Williams, Arcaro Lab)

Genevieve Abbruzzese got a perfect score on her F-31 fellowship application, culminating in the receipt of the Ruth L. Kirschstein National Research Service Award for individual pre-doctoral fellows. Additionally, Genevieve was awarded a scholarship from the Karlsruhe House of Young Scientists to work as a visiting researcher with collaborator Dr. Jubin Kashef at the Karlsruhe Institute of Technology in Germany during the months of July and August.

Abla Tannous and **Ketan Mathavan** were both selected to receive two-year NIH-funded traineeships in the Chemistry-Biology Interface (CBI) Program.

Benjamin Johnson was awarded a one-year NSF-funded Institute for Cellular Engineering (ICE) Traineeship.

Fall 2012 Entering Students

PhD Students

Jill Graham, BS in Cell Biology, University of California Santa Cruz

Patrick Hill, BS in Biology, Stonehill College

Tomoko Mino, BS in Life Science, University of Tokyo

Safia Omer, BS in Zoology, Institute of Endemic Diseases; MS in Molecular Medicine, University of Khartoum

Emrah Ozay, BS in Molecular Biology & Chemical Engineering, Istanbul Technical University

Amrita Palaria, BS in Biochemical Engineering, Kumaon Engineering College; MS in Microbial Engeering, University of Minnesota; PhD transfer from University of Illinois

Sara Williams, BA in Biochemistry. Mt. Holyoke College

Yili Zhu, BS in Biology, Nanjing University

MS Students

Alex Johnson, Kaltashov Lab, Chemistry

Edwin Murenzi, Clark Lab, Veterinary & Animal Science

This September, **MCB welcomed new students** with an Orientation in the Integrated Sciences Building as well as a Lab Rotation Fair, where MCB faculty presented an overview of their research labs to help new students choose an area of interest for their first lab rotation.

Student Service

Elected Officers and Committee Members for 2012-2013

MCB Student President: Karan Hingorani

Social Chairs: Leslie Conway, Monifa Fahie, Barbara Mann, Chelsea Marcho

Steering Committee: Ben Johnson

Admissions/Recruiting Committee: Christina Chisholm, Jill Graham, Patrick Hill, Ketan Mathavan

Program Committee/Seminar Scheduling: Genevieve Abbruzzese, Leslie Conway

Colloquium Organizers: Karan Hingorani, Chelsea Marcho, Anna Ye

GEO Representative: Lydia Lamriben

Life Science Graduate Research Council: Payal Damani-Yokota

Faculty Membership Update

Since publication of our last newsletter, the MCB Steering Committee approved MCB membership for the following UMass faculty:

Professor Maria Santore, Polymer Science & Engineering

Assistant Professor Geng-Lin Li, Biology

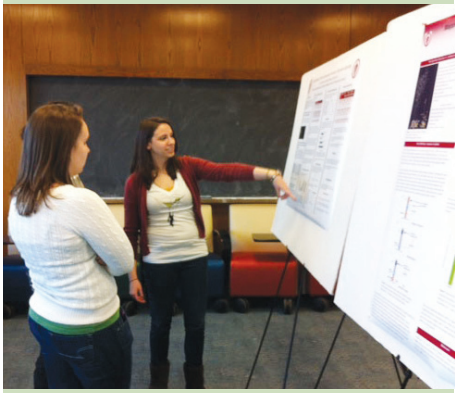
Assistant Professor Kristen DeAngelis, Microbiology

Assistant Professor Yasu Morita, Microbiology

Assistant Professor Michele Markstein, Biology

First-Year Poster Session

February 6, 2012



Above: Chelsea Marcho, currently in the Mager Lab, explains her research to Barbara Mann.

Below: Monifa Fahie (foreground) shares her perspective, while Payal Damani-Yokota looks on.

Faculty Awards

Alice Cheung and David Gross recieve 2012 CNS Awards. Professor Cheung (Biochemistry & Molecular Biology) was chosen by the College of Natural Sciences as an Outstanding Researcher. She maintains an active and productive research program in plant pollination and has been a pioneer in developing the pollen growth process as an important model for understanding a broad spectrum of mechanisms that contribute to and regulate the fundamental systems of plant growth and development.

Associate Professor of Biochemistry Gross was honored with the CNS Outstanding Teaching Award. Research in the Gross lab focuses on receptor-mediated second-messenger signaling in individual cells. Also worthy of mention is that Dr. Gross served as the interim MCB Director from 2007 to 2010.

Biochemistry & Molecular Biology's Danny Schnell and Elizabeth Vierling appointed as Fellows of the American Society for Plant Biology. The ASPB is the largest professional society of plant biologists in the world (with approximately 6,000 members, 60% domestic and 40% international), and it is devoted to the advancement of the plant sciences.

Shelly Peyton, associate professor of Chemical Engineering, in collaboration with Nick Reich in Public Health, received an NSF PESO grant (for "Materials and Multivariable Models to Predict Tissue Tropism in Metastas") to study how different types of breast cancer interact with different human tissues. Peyton also was awarded the Barry and Afsaneh Siadet Early Career Award, which will fund her work to study chemotherapy resistance in carcinoma.

Jenny Ross, associate professor of Physics, has won the 2013 Margaret Oakley Dayhoff Award from the Biophysical Society of Rockville, MD. It is given to a woman who has achieved prominence for "substantial contributions to science" while showing very high promise for ideas and leadership in the early stages of her biophysical research career.

Luke Remage-Healey, an assistant professor of Psychology, leads behavioral physiology research in zebra finches, focusing on how steroid hormones regulate brain function and behavior. He will receive the 2012 Frank A. Beach Award from the Society for Behavioral Neuroendocrinology for work showing significant contributions in the field.

Research Highlights

Gregory Tew (Polymer Science & Engineering) and colleagues (including immunologist **Lisa Minter,** Veterinary & Animal Sciences) have found a way to get inside naïve T cells and deliver bioactive cargo such as proteins and synthetic molecules across what had been a long-locked cell membrane. They do this by using a new synthetic protein transduction domain (PTD) that mimics natural ones. Tew and his team call their new macromolecules "PTD mimics" (PTDMs). They are able to slip through the T cell's membrane and deliver a payload of therapeutic small interfering RNA (siRNA). The invention is "something like a master key, because we can get into cells without their permission and into difficult-to-access cell types like human T cells," says Tew (*science360,* 10.12.12 News).

Dan Chase, Biochemistry & Molecular Biology, received an NIH R03 award to develop a heritable method of cell-specific knockdown in *C. elegans*. Dr. Chase et al. published "D1 Dopamine Receptor Signaling Is Modulated by the R7 RGS Protein EAT-16 and the R7 Binding Protein RSBP-1 in *Caenoerhabditis elegans* Motor Neurons" (*PLoS ONE* 7(5): e37831).

Seahorse Biosciences has licensed a patent, titled "Methods, Compositions and Kits for Assaying Mitochondrial Function," developed in the laboratory of **Dr. Nagendra Yadava,** the John Adams Investigator at the Pioneer Valley Life Sciences Institute (PVLSI) and **Alejandro Heuck,** an assistant professor of Biochemistry & Molecular Biology at UMass Amherst.

In 2011, UMass Amherst Biochemist **Alejandro Heuck** and graduate student **Fabian Romano '12PhD** characterized a needle-like tool used by bacteria, such as *Salmonella,* to drill holes in mammalian cell walls. From this, the team built a model membrane system to be used for further experiments. The National Institutes of Health recently awarded Heuck and his team a five-year, $950,000 grant to map the molecular structure of the tool, which will further enable study of how the molecular machine known as the Type III secretion system (T3S) pokes holes, or translocons, in cell walls of warm-blooded animals and humans to inject the toxic proteins. Dr. Heuck, graduate student **Yu-zhou Tang,** and others plan to use a special microscope to watch the organization of the channels at the single-molecule level.

Alumnus **Nathaniel Clark '12PhD** and Biochemist **Scott Garman** are part of the research team that has identified two small "chaperone" molecules that may be useful in treating the inherited metabolic disorder known as Schindler/Kazaki disease. The findings offer hope for developing the first-ever drug treatment for the very rare disease ("Pharmacological chaperones for human α-*N*-acetylgalactosaminidase," Clark NE, Metcalf MC, Best D, Fleet GW, Garman SC. *Proceedings of the National Academy of Sciences [PNAS]* 2012; published ahead of print October 8, 2012).

"PI (3,5)P2 sows the seeds of plant growth" by Biologist **Magdalena Bezanilla** et al. was published in and highlighted by *The Journal of Cell Biology,* July 23, 2012. Co-first author **Ming Lin** was an MCB student in Danny Schnell's lab.

Igor A. Kaltashov et al. published "Mass spectrometry study of a transferrin-based protein drug reveals the key role of protein aggregation for successful oral delivery" in the August 21, 2012, issue of the *PNAS* (109: 13544-13548).

A publication by **Elih M. Velázquez-Delgado** and **Jeanne A. Hardy,** Chemistry, "Phosphorylation Regulates Assemby of the Caspase-6 Substrate-Binding Groove," was featured in the Cell Press journal, *Structure* (vol. 20, issue 4, 742-751).

Vincent Rotello (Chemistry) et al. published "Array-based sensing of metastatic cells and tissues using nanoparticle-fluorescent protein conjugates" (*ACS Nano 6,* 8233–8240), which continues to receive considerable press coverage, including the news summary, "'Chemical Nose' Can Detect Cancer" (medicaldaily.com., September 9, 2012).

Polymer Science & Engineering Professor **Muthukumar Murugappan's** work on virus assembly was highlighted in *Physics Today* (June 2012, 24), in the physics update section of "Search and Discovery" ("Langevin dynamics simulation of polymer-assisted virus-like assembly," J. P. Mahalik, M. Muthukumar, *J. Chem. Phys.* 136, 135101, 2012).

Li-Jun Ma (Biochemistry & Molecular Biology) et al. recently published "Lifestyle transitions in plant pathogenic *Colletotrichum* fungi deciphered by genome and transcriptome analyses" (*Nature Genetics 44*(9): 1060-1065).

Research from the laboratory of **Michele M. Klingbeil** was recently featured on the cover of the journal, *Eukaryotic Cell.* The Klingbeil lab studies unique biochemical properties of the protozoan parasite *Trypanosoma brucei* that could be targeted for new drug treatments. The highlighted research was the work of NEAGEP PhD student Jeniffer Concepción, who uncovered a novel mechanism for how an essential DNA polymerase dynamically redistributes, or changes location, during the replication of the organism's unique catenated mitochondrial DNA network, called "kDNA." The Klingbeil research team was the first to visualize a mitochondrial replication protein undergoing dynamic localization and directly link this change to DNA synthesis.