Introducing our AUTHORS

Image courtesy of Stephen Goldfless.

Brian Belmont

Current position: Massachusetts Institute of Technology, Department of Biological Engineering, Ph.D. candidate with Prof. Jacquin Niles
Education: Stanford University, B.S. in biological sciences, 2005
Industrial Work: Sunesis Pharmaceuticals, Cell Biology and Protein Chemistry, 2005–2007
Nonscientific interests: Squash, woodworking, testing out new recipes on my bread machine

My current research aims to develop molecular tools that enable scientists to control RNA in living organisms. Through our work, we build upon the paradigm of natural RNA regulation and begin placing methods of RNA manipulation in the hands of the experimenter. This will be useful not only in the study of organisms but also in the design of synthetic intracellular circuits. In the future, I plan on unraveling the rules governing our protein-aptamer system to make it suitable for controlling a wide array of RNA-related processes. This work piques my interest in combining biological sciences with engineering to invent novel and useful technologies. (Read Belmont's article, DOI: 10.1021/cb100070j)

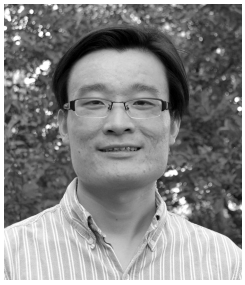

Image courtesy of Juan Li.

Shencheng Ge

Current position: University of Minnesota, Ph.D. candidate in chemistry with Prof. Christy L. Haynes
Education: Fudan University, B.S. in chemistry, 2005
Nonscientific interests: Traveling, hiking, reading, and cooking

One of my strong research interests is to develop and apply bioanalytical tools to address important biological questions. In this study, I have exploited carbon-fiber microelectrochemistry techniques to measure single platelet exocytosis and obtained previously inaccessible mechanistic understanding of the role of cholesterol in exocytosis. We introduced blood platelets as a new exocytotic cell model for its several highly favorable cellular features not found in many other exocytotic cells investigated so far. Moreover, the high quantity and purity of readily accessible platelets allow a novel lipid substitution strategy that greatly facilitated the understanding of the role of cholesterol in exocytosis. Together, this study clearly defined some aspects of the critical role of cholesterol in exocytosis. (Read Ge's article, DOI: 10.1021/cb100130b)

Image courtesy of Zachary Gurard-Levin.

Zachary Gurard-Levin

Current position: University of Chicago, Department of Chemistry, Ph.D. candidate with Prof. Milan Mrksich
Education: Johns Hopkins University, B.A. in chemistry, 2005
Nonscientific interests: Boston Red Sox, playing sports, traveling, writing rap lyrics

Assays of biochemical activities are fundamental to biological research and drug discovery and in the clinical setting. The development and application of bioanalytical methods continue to be dominant themes in analytical chemistry driven by a motivation for small sample volumes, parallel assays, and label-free detection formats. My work has focused on combining peptide arrays and the label-free SAMDI mass spectrometry assay to characterize the activity and specificity of lysine deacetylase (KDAC) enzymes. Here we use arrays to identify isoform-selective substrates among a subset of KDACs, which we then use to characterize isoform activity through the HeLa cell cycle. These peptides lay the foundation for a set of reagents that will be integral toward understanding the differential roles of KDACs in cellular activity. (Read Gurard-Levin's article, DOI: 10.1021/cb100088g)

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Image courtesy of Alex Cargill.

Kristopher Kilian

Current Position: The University of Chicago, Department of Chemistry and the Howard Hughes Medical Institute, Postdoctoral Fellow in the laboratory of Milan Mrksich
Education: University of Washington, B.S. in chemistry, 1999; University of Washington, M.S. in chemistry, 2004; The University of New South Wales, Ph.D. in chemistry with Justin Gooding, 2007
Nonscientific interests: Percussion, snowboarding, martial arts, and rugby

I am interested in using materials science and engineering tools to design model systems for probing biological processes. During my graduate research I developed biorecognition interfaces on nanostructured optical materials for applications in biosensors and biomedical devices. In my current position, I explore the use of self-assembled monolayers of alkanethiolates on gold for biochip assays. The two main thrusts of my research are (1) model extracellular matrices for cell biology and (2) peptide arrays for label-free profiling of biochemical activities. In the current study, we show how this platform can be used to identify optimal peptide substrates for members of the lysine deacetylase (KDAC) family of enzymes and further demonstrate the application of these reagents by profiling KDAC activity during cell cycle. (Read Kilian's article, DOI: 10.1021/cb100088g)

Image courtesy of Cecilia Chen.

David Kwan

Current position: Postdoctoral researcher, University of British Columbia, Centre for High-Throughput Biology, supervisor Stephen Withers
Education: University of British Columbia, B.Sc. in biochemistry, 2005; University of Cambridge, Ph.D. in biochemistry, 2009, supervisor Peter Leadlay
Nonscientific interests: Traveling when possible, snowboarding.

Broadly, I am interested in understanding and engineering the biosynthesis of biologically relevant compounds. During my graduate research, I studied stereochemical aspects of polyketide biosynthesis. Complex polyketides are a structurally and functionally diverse class of natural products. Their biosynthetic enzymes, modular polyketide synthases, are akin to molecular "assembly lines" in which the organization of numerous successively acting catalytic domains gives rise to complex structures. The stereospecific activity of these catalytic domains can also generate many chiral centers within said structures. My work on this subject focused on elucidating the determinants of stereospecificity in efforts toward engineering the stereochemical outcome of polyketide biosynthesis. The article in this issue details some of my findings on the enoylreductase domains of modular polyketide synthases. Currently, in my postdoctoral research I am focused on engineering the biosynthesis of glycans. Applying techniques such as directed evolution, I am developing methods for engineering glycosyltransferases and glycosynthases. (Read Kwan's article, DOI: 10.1021/cb100175a)

Image courtesy of Katherine Scanlon.

Thomas C. Scanlon

Current position: Dartmouth College, Thayer School of Engineering, Postdoctoral Researcher with Prof. Karl Griswold, 2008–present
Education: McGill University, B.S. in biology, 2001; McGill University, Ph.D. in human genetics with Prof. Mark Trifiro, 2008
Nonscientific interests: Golf, homebrewing, playing with my son

Antibiotic resistance among microbial pathogens is a grave public health concern. Since arriving at Dartmouth, I have developed a platform for discovery of novel antibiotic biocatalysts. Our lab has proposed that biocatalysts are a rich source of next-generation antibacterial/antifungal agents with the potential for application as human therapeutics. The exquisite selectivity of enzymes makes it possible to target a plethora of microbe-specific biomolecules, highly reducing the chance of "off-target" toxicity and/or reducing killing of commensal microbes. With our "enzybiotics", we aim to target cell wall structures that are not directly encoded by DNA, thus potentially delaying the onset of resistance phenotypes. Utilizing directed evolution approaches coupled with ultrahigh throughput screening techniques, we aim to "out-evolve" microbial antibiotic resistance phenotypes in the search for new therapies. (Read Scanlon's article, DOI: 10.1021/cb1001119)

Introducing our AUTHORS

Image courtesy of Xinni Yuan.

Qunzhao Wang

Current position: University of North Carolina at Chapel Hill, School of Pharmacy, Research Assistant Professor
Education: Beijing University, B.S. in chemistry, 1991; Zhongshan University, M.S. in polymer chemistry, 2006; Duquesne Univerisity, Ph.D. in organic synthesis, 2001; Cornell Univeristy, Postdoctoral Researcher with Bruce Ganem, 2001–2003; Albert Einstein College of Medicine, Postdoctoral Researcher with David S. Lawrence, 2003–2007
Nonscientific interests: Soccer and chess

My current research has been focused on fluorescent reporters for tyrosine kinases and their application as cancer diagnostics. (Read Wang's article, DOI: 10.1021/cb100099h)

Image courtesy of Betsy Clarke.

Eric Zimmerman

Current position: University of North Carolina at Chapel Hill, Dept. of Pharmacology, Ph.D. candidate with Dr. Lee M. Graves, anticipated graduation, spring 2011
Education: Tufts University, B.S. in biology, 2005, undergraduate mentor Dr. Ronald P. Hammer, Jr.
Nonscientific interests: major and minor league baseball, fishing and running

Because drug resistance remains a major impediment to the treatment of leukemia, my research is focused on the elucidation of kinase-dependent mechanisms of cellular adaptation to drug exposure. Many times, kinases are interchangeable, a phenomenon termed "oncogene switching". For instance, chronic myelogenous leukemia (CML) cells become resistant to the BCR-Abl kinase inhibitor imatinib by up-regulating the expression of a Src-family kinase, Lyn kinase. Knowledge of the relative expression of these kinases affects the chemotherapeutic regimen for CML patients. Therefore, kinase-specific fluorescent sensors may provide a simple, high-throughput method of predicting patient response to drugs. It is my hope to use these biochemical skills acquired during my Ph.D. training in a postdoctoral position focused on cancer research. (Read Zimmerman's article, DOI: 10.1021/cb100099h)