Introducing our AUTHORS

Image courtesy of Jillian Blatti.

Joris Beld

Current position: University of California, San Diego, Department of Chemistry and Biochemistry, Postdoctoral Associate with Prof. Michael Burkart
Education: University of Twente, M.S. in Chemical Engineering with Prof. David Reinhoudt, 2003; ETH Zürich, Ph.D. in Chemistry and Applied Biosciences with Prof. Donald Hilvert, 2009
Nonscientific interests: Climbing, hiking, biking, movies, traveling

The proper formation of disulfide bonds is often essential for protein function. Reagents that enhance this process have high potential as therapeutics or additives for protein production. My graduate work focused on the effect of small-molecule diselenides on oxidative protein folding. We found that diselenides, in sharp contrast to disulfides, catalyze oxidative protein folding in the test tube. In this paper, we show that the activity of diselenides extends to living systems. We could fully replace *E. coli*'s primary oxidase, DsbA, by adding small amounts of diselenides to the growth medium. The ability of a simple synthetic compound to functionally replace a natural enzyme demonstrates the potential power of small molecules as tools for manipulating biological systems. (Read Beld's article, DOI: 10.1021/cb9002688)

Image courtesy of Catherine Mark.

Angel Cipres

Current position: Centro Nacional de Biotecnología/CSIC (Madrid, Spain), Department of Immunology and Oncology, senior researcher with Isabel Mérida
Education: Universidad Complutense de Madrid, B.S. in Chemistry, 1995; Universidad Autónoma de Madrid, Ph.D. in Biochemistry with Isabel Mérida, 2000; Centro Nacional de Biotecnología/CSIC, Department of Immunology and Oncology, Postdoctoral fellow with Isabel Mérida, 2000–2002; The Burnham Institute for Medical Research (La Jolla, CA), Postdoctoral associate with Kristiina Vuori, 2003–2008
Nonscientific interests: Swimming, hiking, economics, cooking

Using a fluorescence cell-based assay, we found sceptrin to be a new agent able to block cell migration. I am very interested in exploiting state-of-the-art automated microscopy to set up functional cell-based assays that could lead to the discovery of new molecules with useful biological activities. Although no one doubts the beauty of cell-based assays, the current pressure of the scientific system to determine the molecular target of any compound before moving studies toward clinical research does not encourage studies of this type. My vision is that if aspirin or penicillin (just two examples) safely helped millions of people before the molecular targets of their action were known, perhaps the "know-the-target" requirement should be relaxed. (Read Cipres' article, DOI: 10.1021/cb900240k)

Image courtesy of Kylynn Daniels.

R. Nathan Daniels

Current position: Vanderbilt University, Department of Chemistry, Ph.D. candidate with Prof. Craig W. Lindsley
Education: The Ohio State University, B.S. in Chemistry with Robert S. Coleman, 2003
Nonscientific interests: Spending time with family, home improvement, gardening, fishing, photography and watching movies

There are multiple aspects to my graduate research: total synthesis (ciliatamides A–C, carpanone, epilucentamycin), synthetic methodology (microwave-assisted protocols for the expedited synthesis of pyrazolo[1,5-*a*]pyrimidines, β,β-phenolic couplings of styrenyl phenols), and medicinal chemistry (selective VEGF and BMP inhibitors, selective muscurinic allosteric modulators). I also engage in probe development of PPI disruptors through the Molecular Libraries Probe Production Centers Network (MLPCN) initiated and supported by the NIH Molecular Libraries Roadmap. My training has given me an interest in laboratory technology through hands-on use of state-of-the-art microwave synthesis technology, a mass-directed HPLC purification platform, automated normal and reverse phase chromatography, analytical and preparative chiral HPLC, and polymer-supported reagents. My exposure to problem solving in total synthesis, synthetic methodology, and medicinal chemistry has greatly increased my desire to continue using chemistry to tackle problems in medicinal chemistry and chemical biology. (Read Daniel's article, DOI: 10.1021/cb9002865)

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Image courtesy of Rohan Fernandes.

Rohan Fernandes

Current position: Johns Hopkins University, Chemical and Biomolecular Engineering Department, Postdoctoral Fellow with David H. Gracias

Education: Mumbai University Institute of Chemical Technology, Mumbai, India, B.S. in Chemical Engineering, 2001; University of Maryland Baltimore County, M.S. in Chemical and Biochemical Engineering with Gregory F. Payne, 2003; University of Maryland College Park, Ph.D. in Bioengineering with William E. Bentley, 2008

Nonscientific interests: Following the fortunes of Indian cricket, Formula 1, reading fictional and historical books, listening to music, and occasionally dancing

My Master's research involved using biopolymers to create interfaces between devices and biological matter. The interfacing biopolymers facilitate spatially selective attachment of biological matter such as proteins and DNA within the device and offers methods for the creation of biosensors. My Ph.D. research was centered on the creation of biological nanofactories, which are nanosized factories that are capable of targeting cells, synthesizing useful molecules at their surface and altering their response. Our "nanofactories" were demonstrated to alter the native quorum sensing response of targeted bacteria, a mechanism of signal processing responsible for diverse and often undesirable bacterial phenotypes. The technique facilitates the creation of the next generation of antimicrobials based on inhibition of quorum sensing. (Read Fernandes' article, DOI: 10.1021/cb9002738)

Image courtesy of Yun Qiang.

Jijun Hao

Current position: Vanderbilt University, Division of Cardiovascular Medicine, Department of Medicine, Research Fellow with Dr. Charles C. Hong

Education: East China University of Science and Technology, B.S. in Biochemical Engineering, 1996; University of Leeds, Ph.D. in Biochemistry with Dr. Alan Berry, 2003

Nonscientific interests: Traveling, playing with kids

My current research is focused on using zebrafish as a tool to identify small molecular compounds which can modulate the key signaling pathways such as BMP, Wnt/β-catenin, Notch and Hedgehog, NF-κβ, VEGF, etc. As these pathways are implicated in stem cell differentiation and variety of diseases like cancers, the identified small molecules, which selectively target these key pathways, have potential to direct stem cell differentiation and serve as drug leads for future therapeutics. (Read Hao's article, DOI: 10.1021/cb9002865)

Image courtesy of Jiwon Seo.

Jiyoun Lee

Current position: Stanford University School of Medicine, Department of Pathology, Postdoctoral fellow with Prof. Matthew Bogyo

Education: Seoul National University, B.S. in Pharmacy, 1998; Seoul National University, M.S. in Medicinal Chemistry with Prof. Jeewoo Lee, 2000; Northwestern University, Ph.D. in Chemistry with Prof. Thomas J. Meade, 2006

Nonscientific interests: Photography, aquatic gardening, science fiction and horror films

My current research in the Bogyo lab focuses on the development of activity-based probes (ABPs) for noninvasive imaging of cysteine proteases in mouse models of cancer. The greatest advantage of using ABPs *in vivo* is that they covalently modify active proteases,and thus allow for *ex vivo* biochemical profiling and correlate these data with *in vivo* images. Furthermore, we can track the distribution of the probe and monitor therapeutic outcomes after drug treatments *in vivo*. In this paper, we demonstrate that legumain (asparaginyl endopeptidase)-specific ABPs selectively label and visualize active legumain in tumor-bearing mice. In addition to this work, I am currently developing synthetic libraries of legumain inhibitors and evaluating *in vivo* efficacy of these inhibitors in various disease models. (Read Lee's article, DOI: 10.1021/cb900232a)

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Image courtesy of Ben Adams.

Jana A. Lewis

Current position: Living Proof, Inc., Senior Research Scientist

Education: Lawrence University, B.A. in Chemistry, 2002; University of California, San Diego, Ph.D. in Biochemistry with Prof. Seth M. Cohen, 2007; Vanderbilt University, Department of Pharmacology, Integrative Training in Therapeutic Discovery Postdoctoral Fellow with Prof. Craig W. Lindsley, 2007–2009

Nonscientific interests: Reading fiction, socializing with friends, movies

My academic career focused on the development of libraries of small molecule therapeutics targeting a variety of problems ranging from cancer to lead poisoning to anthrax infection to parasitic diseases such as leishmaniasis. My current position applies a biotech approach to develop novel small molecule libraries for breakthrough beauty products. This paper highlights powerful insights that can be gained from using a platform such as zebrafish to assess compound potency and bioactivity in parallel with *in vitro* assays. Here inhibitors selective for BMP demonstrated that angiogenesis is independent of BMP signaling in zebrafish. (Read Lewis' article, DOI: 10.1021/cb9002865)

Image courtesy of Varnika Roy.

Varnika Roy

Current position: University of Maryland College Park, Department of Molecular and Cell Biology, Ph.D. candidate advised by Dr. William E. Bentley

Education: University of Westminster, London, U.K., B.S. in Biotechnology, 2006

Nonscientific interests: Hosting friends and family, cooking, traveling, watching movies, and dancing

My graduate work has focused on the development of methods to inhibit cross-species bacterial communication, also known as quorum sensing, which leads to various phenotypes in bacteria including increased virulence. As a greater number of bacteria become resistant to antibiotics, disruption of their communication networks is being pursued as an alternative antimicrobial therapy. In this paper we degrade the signaling molecule that mediates quorum sensing by using the *in vivo* native signal processing machinery of the bacterium itself *ex vivo*. Unlike antibiotics our method is not bacteriostatic or bacteriocidal and poses less evolutionary pressure on the bacterium to develop resistance. Our nature inspired enzymatic approach of degrading the QS signal opens new avenues for controlling bacterial pathogenicity. (Read Roy's article, DOI: 10.1021/cb9002738)

Image courtesy of Fabio Serventi.

Fabio Serventi

Current position: ETH Zurich, Institute of Microbiology, Ph.D. candidate in microbiology with Hauke Hennecke

Education: University of Parma, B.S. in Biology, 2005; University of Parma, M.S. in Molecular Biology, 2008; thesis work in the Biochemistry and Molecular Biology Department with Riccardo Percudani

Nonscientific interests: Traveling and getting in contact with different ways of life, contemporary arts, informatics, and new technologies

My research interests are primarly focused on the nitrogen metabolism in bacteria and plants. My current work at ETH Zurich is focused on the characterization of unidentified genes of the nitrogen fixing bacteria *Bradyrhizobium japonicum*, a soybean symbiontic microorganism. My passion for this field arose during my M.S. studies carried out in Parma, here reported. We have been able to identify in both *E. coli* and *A. thaliana* the key enzymes and compounds of an important catabolic step, conserved in some bacteria and in all plants, which allows recovery of ammonia from ureides, purine degradation derivatives. Ureides act as nitrogen carriers from the root nodules to the higher part of tropical legumes, and their degradation is therefore fundamental for the nitrogen availability. (Read Serventi's article, DOI: 10.1021/cb900248n)

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Image courtesy of Tomissa Nielson.

Kenneth Woycechowsky

Current position: University of Utah, Department of Chemistry, Assistant Professor

Education: Penn State University, B.S. in Chemistry, 1994; University of Wisconsin—Madison, Ph.D. in Biochemistry with Prof. Ronald T. Raines, 2002; ETH Zürich, Laboratory of Organic Chemistry, Postdoctoral Researcher with Prof. Donald Hilvert, 2002—2008

Nonscientific interests: Softball, traveling, watching college football, playing with my cat

My research interests focus on elucidating structure—function relationships in proteins and on using our understanding of how proteins work to develop novel variants or small-molecule mimics with useful properties. In this paper, knowledge of the requirements for catalysis of oxidative protein folding by the enzyme DsbA inspired the development of diselenide reagents that can functionally replace this enzyme *in vivo*. The high activities of these compounds, both in living cells and in the test tube, present exciting opportunities as potential tools for manipulating cellular redox phenomena and for improving biotechnological protein production. My laboratory in Utah continues to engineer molecules, both large and small, as a means to explore biochemical processes including protein folding, self-assembly, and enzyme catalysis. (Read Woycechowsky's article, DOI: 10.1021/cb9002688)