Introducing our AUTHORS

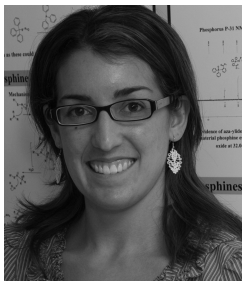

Image courtesy of Tommy Murphy

Erica Bechtold

Current position: Wake Forest University, Ph.D. candidate in Chemistry with Prof. S. Bruce King, anticipated graduation December, 2010
Education: Virginia Polytechnic Institute and State University, B.S. in Chemistry, 2006
Nonscientific interests: Backpacking, running, snowboarding, and caving. If I'm not outdoors, I enjoy cooking and hanging out with my friends.

My research interests have focused on the synthesis and evaluation of chemical probes to track cysteine-based oxidative modifications within the proteome. Specifically, I am interested in covalently tagging sulfenic acids and *S*-nitrosothiols. Both are post-translational modifications resulting from low levels of reactive oxygen and nitrogen species and alter protein structure and function. I have synthesized a series of dimedone-based probes for mapping sulfenic acid formation. Many of these new compounds have helped in identifying sulfenic acid susceptible sites within key regulatory proteins. With this recent work published in *ACS Chemical Biology*, we examined the ability of TX-PTS (a water-soluble triarylphosphine) to label peptide and protein *S*-nitrosothiols. This has been an exciting and collaborative project that combines redox biology, protein mass spectrometry, and synthetic methodology. (Read Bechtold's article, DOI: 10.1021/cb900302u)

Image courtesy of Liuhong Chen

Liuhong Chen

Current position: Department of Chemistry, University of Cambridge, U.K., Ph.D. candidate with Prof. Chris Abell
Education: University of Cambridge, M.Sci. in Natural Sciences, 2006
Nonscientific interests: Photography, action films, and rowing, but my main obsession in life is food

A central objective of our research group is to explore the potential of fragment-based approaches to discovering ligands for biological macromolecules. My work focuses on finding ways of applying the methodology to structured RNAs, specifically riboswitches. Riboswitches are fascinating targets and epitomise the versatility of RNA. Utilizing just 4 basic building blocks, they discriminate between closely related chemical species to control gene expression in many bacteria and higher organisms. Our aim is to leverage the power of fragment-based approaches to rapidly identify ligands for these RNAs and to ultimately develop potent and selective small molecule effectors. These molecules could enable riboswitches to become useful biotechnology tools or novel drug targets. An exciting aspect of the research has been how well techniques developed for proteins can be adapted to oligonucleotides, supporting the idea that there is something fundamental about fragment-based methods. (Read Chen's article, DOI: 10.1021/cb9003139)

Image courtesy of Elena Cressina

Elena Cressina

Current position: Department of Chemistry, University of Cambridge, U.K., Post-Doctoral Research Assistant with Prof. Chris Abell and Prof. Alison Smith
Education: University of Trieste, Italy, Degree (Laurea) in Chemistry, 2004; University of Warwick, U.K., Ph.D. in Chemistry with Prof. Timothy Bugg, 2007
Nonscientific interests: Traveling and visiting new places, cooking, listening to music, photography

My scientific interests are focused on understanding the chemistry involved in biological processes and to employ chemical tools to address biological questions. An interesting and expanding field in chemical biology is the study of noncoding RNAs, an example of which is riboswitch RNA. My current research is aimed at developing methods and tools to study riboswitch action *in vitro* and *in vivo*. In this paper, we describe how we screened a library of small molecules on a riboswitch target using a combination of three biophysical techniques. (Read Cressina's article, DOI: 10.1021/cb9003139)

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Image courtesy of Nikki Dellas.

Nikki Dellas

Current position: Department of Chemistry, University of California, San Diego, Ph.D. student with Prof. Joseph Noel
Education: Carnegie Mellon University, B.S. in Chemistry, 2005
Nonscientific interests: Drawing, traveling, outdoor activities, rocks

My research focuses on the biochemical and structural analysis of several enzymes from the mevalonate (MVA) pathway. This pathway is important not only for cholesterol biosynthesis but also for the production of downstream secondary metabolites such as terpenes. Terpenes are a diverse class of small molecules that function in plant defense and communication, but they also can possess medicinal properties and can therefore be exploited as drug targets. Both structural and biochemical information that we have gathered from various enzymes in the pathway has guided our efforts toward the development of a new biosynthetic pathway that culminates in the overproduction of these valuable secondary metabolites. (Read Dellas' article, DOI: 10.1021/cb900295g)

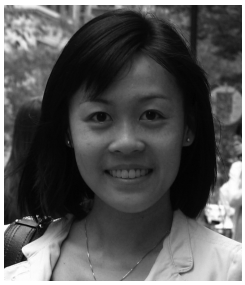

Image courtesy of Thomas Beveridge

Chananat Klomsiri

Current position: Department of Biochemistry, Wake Forest University School of Medicine, Postdoctoral Fellow with Prof. Leslie B. Poole
Education: Mahidol University, B.S. in Biotechnology, 2000; Mahidol University, Ph.D. in Biotechnology, 2005
Nonscientific interests: Traveling, cooking, movies, home improvement, playing with my dog

Reactive oxygen and nitrogen species have been shown to modulate protein function *via* oxidation of low pK_a cysteines. We have focused on the evaluation of cysteine oxidation in proteins (to generate sulfenic acids or *S*-nitrosothiols) as a potentially widespread cellular mechanism participating in enzyme catalysis and inhibition, cell signaling, and transcriptional control. In collaboration with Prof. S. Bruce King at Wake Forest University, we have developed reagents and methods to incorporate a specific "tag" into proteins containing a cysteine sulfenic acid or *S*-nitrosothiol modification. I have characterized reagent properties such as their rate of reaction with protein sulfenic acids and cell permeability. Other studies with these compounds have focused on identifying which proteins are oxidized in response to stimulation with growth factors or cytokines. (Read Klomsiri's article, DOI: 10.1021/cb900302u)

Image courtesy of Neal Cramphorn

Simone Kunzelmann

Current position: Division of Physical Biochemistry, National Institute for Medical Research (London, U.K.), Postdoctoral Fellow with Martin R. Webb
Education: Ruhr-University Bochum (Germany), Diploma in Biochemistry, 2002; Max Planck Institute of Molecular Physiology (Dortmund, Germany) and Ruhr-University Bochum, Ph.D. in Chemistry/Biochemistry with Prof. Christian Herrmann, 2007
Nonscientific interests: Reading fiction, movies, hiking, traveling

ADP is a key metabolite in cells, but surprisingly, there are only few methods available for optical detection of this important molecule. My current research is focused on the development of fluorescent biosensors for ADP determination. In the paper we describe a novel reagentless biosensor that is based on a protein framework, a bacterial actin-like protein, covalently labeled with tetramethylrhodamine fluorophores. This approach combines the advantages of highly specific ADP recognition by the protein's active site and the potential for high fluorescence changes of small synthetic dyes. The fluorescent biosensor allows for real-time measurements of ADP generation, in particular in ATPase and kinase reactions. Considering the importance of kinases as a target for drug screening and the generic nature of the ADP detection method, the ADP biosensor could have important applications in high throughput screening. The biosensor also has the potential for further development toward ADP detection in cells. (Read Kunzelmann's article, DOI: 10.1021/cb9003173)

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Image courtesy of Brad Pentelute

Brad Pentelute

Current Position: Department of Microbiology and Molecular Genetics, Harvard Medical School, Postdoctoral Fellow with R. John Collier

Education: University of Southern California, B.S. in Chemistry and B.A. in Psychology, 2003, research with Roy A. Periana on the conversion of methane to methanol; University of Chicago, M.S. in Organic Chemistr, 2004; Ph.D. in Bioorganic Chemistry with Steve Kent, 2008

Industrial work: Ethos Pharmaceuticals, Senior Scientist, 2008

Nonscientific interests: Cooking, fly fishing, tennis, and traveling

My current research aims to use modern protein semisynthesis methods and biophysics to study protein structure−function relationships in bacterial virulence factors. Currently I am focusing on anthrax toxin. We have established synthetic access to the N-terminal region of lethal factor that is important for blockage of ion conductance and translocation through protective antigen pore. To date, we have prepared over 30 analogues using the semisynthesis platform reported here and characterized these variants in planar phopholipid bilayers. These methods, protein semisynthesis and planar phospholipid bilayers, drive my curiosity and excitement. With chemical access we can tailor lethal factor in ways limited by the imagination and probe these effects in a rapid and sensitive manner. Once we understand the primary factors needed for lethal factor translocation through protective antigen pore, we will apply these principles to engineer other proteins that translocate across membranes. (Read Pentelute's article, DOI: 10.1021/cb100003r)

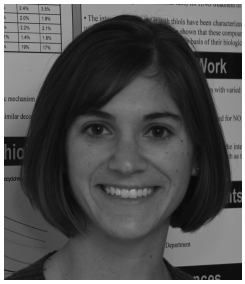

Image courtesy of Tommy Murphy

Julie Reisz

Current Position: Wake Forest University, third year Ph.D. student in Chemistry doing research under the direction of S. Bruce King

Education: Allegheny College, B.S. in Chemistry, 2007

Nonscientific interests: Running, reading, and politics

My research project involves the use of reductive phosphine-mediated ligations for the aqueous detection and quantification of nitroxyl (HNO). HNO donors increase myocardial contractility and elicit vasodilation, providing a promising role in the treatment of heart failure. Understanding HNO mechanisms *in vivo* is hampered by a lack of detection methods for the identification of endogenous sources. We have demonstrated that phosphines serve as rapid and efficient nucleophiles, attacking the electrophilic nitroso moiety of HNO. We are currently exploring the reaction kinetics and the compatibility of the method in biological systems. In this paper, we report the reaction of a triarylphosphine with *S*-nitrosothiols to provide a covalent protein label. Together, these studies demonstrate that the interaction of phosphines with highly reactive nitroso-containing compounds leads to unique and stable biomarkers. (Read Reisz's article, DOI: 10.1021/cb900302u)