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Chemistry for Life™



## Chemistry Career Café III Chemistry of Protection & Global Security Speaker Biographies

### Robert Billmers

*Intellectual Property Specialist*

Akzo Nobel Chemicals

Bridgewater, NJ

#### Education

BS Biology, Drexel University

PhD Organic Chemistry, Drexel University

#### Job Description

As an IP specialist, Dr. Billmers' job is to essentially predict the future consumer needs in various markets, and ensuingly help design research programs at Akzo Nobel to address these constantly changing needs in such areas as Personal Care, Fabric Care, Household Cleaning and Agricultural Markets. He is able to do this by strategically searching the primary chemical literature, and technology road-mapping to define and create research programs with high value markets. Once new technologies are identified and developed into commercial products, Dr. Billmers' role continues by bridging the communication gap between scientists and non-technical attorneys, in order to obtain the optimal and most broadly encompassing IP possible. Unlike many benchtop chemists, Dr. Billmers is required to use his imagination with regards not only to chemistry, but how that chemistry applies to everyday life. In order to keep competitive and make money with the consumer marketplace, Akzo Nobel must continually innovate and develop enhanced, effective, and safer materials such as new sunscreens, laundry

detergents, and pesticides. Dr. Billmers says that to remain competitive, a company does not have to be different, but must rather provide the public with the products they need and want, and will make a difference in the environment in which we all live. The aspect of his career that Dr. Billmers finds most interesting is the global nature of the business. Everywhere around the globe has different and unique perspectives and requirements for their consumers, and on any given day, he finds himself in conferences with people from a dozen different countries representing every region around the globe.

#### Background

Dr. Billmers started off in college wanting to be a medical doctor, but quickly discovered that "working with sick people is no fun." Once he was given the opportunity to do research, he contracted "I created a new molecule" syndrome, and was hooked, subsequently moving on to graduate school and a postdoctoral position in the early 1980s, wherein he studied the liquefaction of coal, especially relevant during that energy crisis. Dr. Billmers subsequently spent twenty years at Akzo Nobel as a carbohydrate chemist, but when the company turned their focus to food, there was little need of an organic chemist. Fortunately, his second interest in patents allowed him to keep his job with only minor disruption, and for the last eight years he has enjoyed helping his colleagues find, secure and defend their unique product placement in the market, in order to keep Akzo Nobel's margins

up to make money. "It's a great job, but not like anything I could have imagined when I was in school."

## Peter Coneski

*Post-Doctoral Fellow, American Society for Engineering Education*  
US Naval Research Laboratory  
Washington, DC

### Education

BS Biomolecular Science  
(Minor in Business Administration),  
Clarkson University  
PhD Polymer Chemistry, UNC Chapel Hill

### Job Description

Dr. Coneski works in the Applied Concepts in Materials Section at the NRL. The Materials Chemistry Branch addresses Naval needs through the pairing of carefully chosen research projects proposed to advance the frontiers of synthetic chemistry and materials science, and more advanced research to provide definitive solutions to Naval needs in areas of critical material deficiencies. His current projects include the synthesis and characterization of advanced organic materials as novel self-decontaminating materials, chemical/biological warfare defense, antifouling and corrosion resistant marine coatings, and smart materials. Dr. Coneski employs common synthetic organic, polymer, and silane chemistry techniques daily, as well as analytical characterization of his novel materials.

## George Emmett

*Senior Research Scientist, Chemical Security Analysis Center*  
Department of Homeland Security  
Aberdeen Proving Ground, MD

### Education

BS Chemistry, Mount St. Mary's College  
PhD Organic Chemistry, University of Delaware

### Job Description

As a support contractor, Dr. Emmett performs risk assessment of toxic chemicals as terrorist's weapons. He is constantly working at the interface between science and policy. Although he and his colleagues strictly do laboratory research at the CSAC, the data they obtain directly feeds those who can influence policy. As a result, most of his work requires input from industrial trade groups such as the American Chemistry Council (ACC) and the Society of Chemical Manufacturers & Affiliates (SOCMA), as well as the intelligence community and academia.

### Background

To say that Dr. Emmett has enjoyed a diversity of targets and techniques throughout his career as a chemist, both in industry and government, is an understatement. After completing his graduate degree, he worked at Hercules Inc. on the development of solid rocket propellants, wherein he developed skills in the synthesis of polymers and reactive intermediates. He subsequently moved to Balsinger Inc. to research novel advances in commercial explosives, including ammonium nitrate based dynamites and blasting agents, non-electric initiators, and high speed digital timers. Dr. Emmett spent the majority of his career on less explosive targets, synthesizing small molecule as fluorescent DNA sequence terminators and other medicinal purposes. Before joining the DHS, Dr. Emmett had the opportunity to synthesize stable isotope labeled chemical warfare agent intermediates at the Battelle Memorial Institute. These compounds are

currently used as reference standards by the Center for Disease Control (CDC) in analytical methods development for their Rapid Response Program.

## **Rachel Lieberman**

### *Application Scientist*

Shimadzu Scientific Instruments  
Columbia, MD

### Education

BS Chemistry (Minor in Mathematics),  
University of Cincinnati  
PhD Analytical Chemistry, UNC Chapel Hill

### Job Description

In her current position as an applications scientist, Dr. Lieberman works on the development of applications for Shimadzu liquid chromatography mass spectrometry (LCMS) instruments. She further assists in the sales of these products by running potential customer samples, developing effective LCMS methods for new problems in analytical chemistry, and participates in customer demonstrations at conferences.

### Background

Before coming to Shimadzu Scientific Instruments, Dr. Lieberman was a post-doctoral researcher at the National Institute of Standards and Technology (NIST). As part of the Analytical Chemistry Division, she learned the laboratory techniques integral to the proper, accurate, and precise measurement of various chemical standards and materials. In partnership with the Food & Drug Administration (FDA) and National Institutes of Health (NIH) Office of Dietary Supplements, her specific role was to help develop standard reference materials (SRMs) for dietary supplements and botanicals. These typically natural products are not considered foods or drugs, so they cannot be regulated by the FDA. In response, NIST has been fundamental to the development of SRMs that manufacturers can

use to validate their production methods, and so that consumers can consequently have better knowledge of their dietary intake. Some examples of SRMs that Dr. Lieberman and NIST have developed are vaccinium berries, green tea, ginseng, and fat-soluble and water-soluble vitamins.

## **Stuart Nagourney**

*Research Scientist, Office of Quality Assurance*  
NJ Department of Environmental Protection  
Pennsville Twp, NJ

### Education

BS Chemistry, Brooklyn College  
MS Inorganic & Physical Chemistry, Indiana University

### Job Description

Mr. Nagourney has various responsibilities in the area of quality assurance and technology implementation at the DEP. Primarily, he conducts certification audits of NJ environmental testing laboratories, focusing on their ion chromatography and atomic spectroscopic methods, that allow these labs to maintain their current status. Mr. Nagourney also reviews internal DEP programs for adherence to quality principles, implementation of innovative environmental technologies, and the development of staff training courses. His research includes collaborations with the US Environmental Protection Agency (EPA) and National Institute of Standards & Technology (NIST) to develop new reference materials to ensure test method validity. He has recently provided peer review for the State of California on the analysis of groundwater samples for hexavalent chromium.

### Background

Prior to his employment at NJDEP, Mr. Nagourney was a research scientist for the US Department of Energy (DOE), manager of the Analytical Laboratories for the Argus Division of Witco Corporation. At the NJDEP he has also

held the position of Bureau Chief for Inorganic and Radiological Services. Mr. Nagourney has taught chemistry and environmental science at several community colleges and Princeton University, and is currently an adjunct Professor of Chemistry at The College of New Jersey. His professional activities include serving on several national committees, reviewing analytical test methods, and providing peer review for numerous chemistry journals.

## **Stella North**

*Research Biologist*

US Naval Research Laboratory  
Washington, DC

### Education

AB Biology (Minor in Art History), Smith College  
MEd Science Education, UMass  
PhD Biochemistry & Molecular Biology,  
Georgetown University

### Job Description

As a research scientist at NRL, Dr. North is currently engaged in a broad spectrum of chemistry & biochemistry research efforts addressing a broad spectrum of critical military interests, including biosensors and bioterrorism, decontamination, and wound healing. She continues to employ her background in surface chemistry work in peptide arrays for the detection of bioterrorism agents, as well as immunoarrays for the detection of biomarkers of traumatic brain injury. In addition, in the burgeoning field of plasma biology, Dr. North has begun studying the use of gas-discharge plasma to produce reactive species that elicit specific physiological and biochemical responses. The impact of this research will be critical to decontamination/sterilization and wound healing, two applications that are critical to the military.

### Background

After graduating from Smith College, Dr. North conducted molecular & cell biological research in the fields of ion channels at Duke University Medical Center, and then cancer biology at the Brigham and Women's Hospital at Harvard School of Medicine. Her original plan was to attend medical school, however she soon discovered a better fit in basic research. Dr. North accordingly entered the doctoral program in the Department of Biochemistry and Molecular Biology at Georgetown University, where she trained as a protein biochemist investigating regulatory mechanisms linking bacterial DNA replication and recombination pathways. She remained in the DC metro area as an American Society of Engineering Education (ASEE) post-doctoral research fellow at the NRL, where she developed peptide microarrays for fluorescence-based multianalyte detection of biological threat agents. Indirectly coupled to this work, she also investigated the implications of surface chemistry for covalent immobilization of recognition elements on transducing platforms for biosensing and bioterrorism applications. This was followed by a one year fellowship at a DC-based think-tank, providing strategic science and technology assessment and foresight analyses for chemical and biological defense research investment, after which she returned once again to the NRL.

## **Sean Palmer**

*Chief Biochemist, Medical Toxicology Branch*  
US Army Medical Research Institute of Chemical  
Defense  
Gunpowder, MD

### Education

BS Biochemistry, University of New Mexico  
PhD Biochemistry & Biophysics, UNC Chapel Hill

### Job Description

Upon completing his graduate and post-doctoral education, Dr. Palmer enlisted in the

US Army as a commissioned officer, and was assigned to USAMRICD following basic officer training. Following his promotion to US Army Captain, Dr. Palmer is now the principal investigator for two projects funded by the Defense Threat Reduction Agency. He supervises and manages a group of approximately 25 civilian research personnel, including eight PhD level scientists, on the development of effective therapeutics to protect against the maleffects of organophosphorus nerve agent poisoning in biological warfare. As the principal investigator, Dr. Palmer writes and submits research proposals to provide grant funding for the projects, and directly leads the research efforts in the laboratory.

#### Background

Prior to joining the US Army, Dr. Palmer attended graduate school at the University of North Carolina at Chapel Hill as a part of the Department of Biochemistry & Biophysics in the Molecular and Cellular Biophysics Program. His graduate work was in the field of protein structure and function, wherein he used multi-dimensional protein NMR as a primary characterization tool.

## **Gretel Raibeck**

*Chemical Engineer*

US Armament Research, Development & Engineering Center  
Picatinny Arsenal, NJ

#### Education

BS Chemical Engineering, Lafayette College  
BA German, Lafayette College  
MS Chemistry, Rutgers University

#### Job Description

Ms. Raibeck's job entails research and development in support of pyrotechnic items used by the Army. Her focus areas include smokes for obscuration and signaling as well as artillery illumination rounds, or flares. She

provides expertise for fielded items, aiming to answer questions such as: "How can we make this item safer for humans, better for the environment, and/or have better reliability? If we must change this chemical or component, how does that affect the sensitivity of the pyrotechnic? How can we reduce weight of an item while increasing the desired output?" From concept development through system demonstration and fielding, Ms. Raibeck has spent much of her career developing environmentally benign alternatives to black and colored smokes, including the M18 Colored Smoke Grenade. Specifically for this smoke program, she and her colleagues have been dedicated to replacing standard hazardous components with non-hazardous counterparts. Ms. Raibeck depends upon her basic understanding of analytical chemistry and chemical reactivity daily, not only to identify and quantify the pyrotechnic chemicals she is working with, but to further make decisions on how to improve upon them. In the past, Ms. Raibeck comments that making pyrotechnics was more like baking from grandma's old recipes; now she and her colleagues make logical alterations, aiming to answer, "what *actually* happens when I mix these all together?"

#### Background

After her graduation from Lafayette College in 2003, Ms. Raibeck spent the summer in Munich via a Science & Technology study program through DAAD (German Academic Exchange Service). She unfortunately turned down several job opportunities that either required her to start while she was in Munich, or to move well outside the northeast, which was not a wise decision given the job market at that time. So instead, when she returned to the United States, she was offered a temporary position at Gulbrandsen Technologies, an industrial chemical supplier that re-purposed and sold waste chemicals between various industries. She was directly interested in working at Picatinny Arsenal, and even though she had applied to the general website, it took nothing

less than persistent personal correspondence to contact the person who would eventually become her future boss at the Pyrotechnic Branch under the Energetics and Warheads Division. Although the structure of the Division has changed since then, her Center easily employs the most chemists and chemical engineers at Picatinny Arsenal, since they support all chemical pyrotechnics, propellants, and explosives. After being in this position for 8 years, Ms. Raibeck says that she had never planned to work in this field, but honestly enjoys her job. And as an added benefit, her Master's studies were paid for by USARDEC, and there are future opportunities to maintain her position while working on a PhD.

## **Julie Sullivan**

*Science & Technology Policy Fellow, AAAS*  
US Department of Health & Human Services  
Washington, DC

### Education

BS Chemistry (Biochemistry Option),  
SUNY Geneseo  
PhD Biological Chemistry, UNC Chapel Hill

### Job Description

The Science and Technology Policy Fellowship is a 1-2 year position that mutually places PhD level scientists into Government offices and Congress to teach them about science policy, while concurrently bringing scientists and their expertise to the forefront of Governmental policy on scientific matters. As a 2011-2012 fellow with expertise in biological chemistry, Dr. Sullivan is currently working on a few projects involving the coordination of public health and medical laboratory capability in the event of a radiological incident, and examining the efficacy of current biodosimetry tools—analytical methods for determination of radiation dose exposure. Dr. Sullivan's chemical background allows her to knowledgeably discover limitations on biodosimetric tools such as detection times, rates, and accuracy, which may

pave the way to the development of more modern, efficient tools for radiation detection. She is currently focused on radiation biology, and the health effects of radiation and chemical agents.

### Background

Dr. Sullivan started out in college as a biology major, on a standard path to becoming a physician. However, she soon changed her mind when she saw chemistry as more of a puzzle to solve. She remained interested in the biological applications of chemistry, studying how antibiotics bind to mRNA for her PhD thesis, but believed she needed more comprehensive exposure to biological laboratory techniques. Dr. Sullivan accordingly pursued a three-year post-doctoral position in the Department of Radiation Oncology at Duke University, employing mouse models to study mechanism of Acute Radiation Syndrome. She attributes this unique expertise and comprehensive experience with radiation biology to solidifying her current position at the US Department of Health & Human Services. Although she no longer uses chemical equipment or methodology, Dr. Sullivan's chemistry background is crucial to her ability to make informative policy recommendations. On a daily basis, she still reads and makes decisions based on recent reports from scholarly journal articles; but more importantly, she employs the analytical, logical thinking, and troubleshooting skills that she learned by being a chemist.