

2014 WCC Rising Stars

Prof. Julia Brumaghim

By Michelle Rogers

Prof. Julia Brumaghim was one of the 2014 WCC Rising star award winners for her research on the impact of metal ions on DNA damage and cell death at Clemson University. *Julia* received her Ph.D. in 1999 from the University of Illinois Urbana-Champaign and from there went on to a NIH postdoctoral fellowship at the University of California, Berkeley. Following her postdoctoral research, she joined the facility at Clemson University.



Julia loved chemistry all the way back to high school, where the concept of electron orbitals was especially interesting. In fact, *Julia* wrote one of her college application essays on why orbitals were so fascinating. During her undergraduate career, she was originally a biochemistry major, but switched to chemistry her junior year because of all of the questions she was asking. However, her interest in biological aspects of chemistry did not go away; therefore, following her Ph.D. in inorganic chemistry, she pursued a postdoc in bioinorganic chemistry followed by molecular biology. It is the combination of all of these aspects of her training that led her to pursue her independent career in DNA damage research.

Throughout *Julia's* career she has never officially had a mentor. However her graduate advisor, Professor Greg Girolami, was a great teacher and she learned how to be an effective teacher from watching him.

When asked what advice *Julia* would give to other people coming up in this career field she replied: "Make sure you love what you are doing because it will be hard at times, and sometimes you have to be your biggest cheerleader. Develop an unshakable resolve that you will succeed, and be persistent. The typical graduate

school/postdoc/faculty track is not a one-size fits all solution, so make sure you explore your options at every stage to make informed career decisions that are tailored to your needs and interests rather than following the beaten path of those around you."

Additionally for women in chemistry, *Julia* had the following advice: "If this is what you want to do, then do it. I have had an exciting time full of ups and downs, but I would not trade my career as a chemistry professor for any other. In addition, don't feel that you have to put your personal life on hold to be successful. As with many things in life, there will likely never be an ideal time to focus on family instead of a career, but if you want both, you should pursue both. Yes, a family can be time-consuming, but what matters more is how you manage your time, not how many hours you work. A good balance can make one happier and more productive, not less." Congratulations!

Prof. Lauren Benz

By Amy Balija

Prof. Lauren Benz's spark for chemistry came from her high school teacher, Mrs. Kathleen Sullivan. *Lauren* remembers "that she [Mrs. Sullivan] would dress up like a witch for Halloween and do chemistry demonstrations that captured everyone's interest (bubbling cauldrons, color changing reactions)...in order to demonstrate key principles to the class and garner interest. It worked for me!" After high school, *Lauren* attended the University of Rhode Island where she credits her older brother for teaching her good study habits and the magic of the dry-erase board



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to solve tough problems. She began her research career in the lab of Dr. William Euler, examining surface modification of alloys for use in prosthetic devices and later obtained a NSF-REU position at Santa Clara University working under Dr. John Thoburn.

After graduating from the University of Rhode Island, *Lauren* worked in the Analytical Research and Development Department at Pfizer for one year before enrolling at the University of California Santa Barbara (UCSB) for graduate school. At UCSB, *Lauren* worked with Professor Steven K. Buratto on atomic-scale mass-selected clusters. She then traveled to the East Coast to perform research with Professor Cynthia Friend at Harvard University examining reaction mechanisms, surface intermediate formation, and the role of defects in surface reactions. In 2009, *Lauren* accepted a position at the University of San Diego as the Clare Boothe Luce Assistant Professor. At this primarily undergraduate institution, *Lauren* teaches inorganic, general, and physical chemistry and maintains a research group which examines how large petroleum-relevant molecules interact with modified oxide surfaces and how effective surface-supported hybrid materials are in the absorption of gas.

Throughout her career, *Lauren* has had several excellent mentors. While in graduate school, Professor Buratto provided guidance in *Lauren's* research project while allowing for scientific freedom which helped her to think critically. Dr. Paul Kemper, an instrument specialist in Professor Michael T. Bowers's research group, taught her the basics of how to design and build research instrumentation which *Lauren* continues to use today in her group. Furthermore, Professor Ram Seshadri encouraged *Lauren* to become involved in international material chemistry workshops which has influenced her current research area. He also continues to be a voice of encouragement.

Lauren's post-doctoral advisor, Professor Cynthia Friend, mentors *Lauren*, particularly on how to improve her writing and honing her critical thinking skills. Now at the University of San Diego, *Lauren* credits her department and particularly Dr. Tammy Dwyer and Dr. Deborah Tahmassebi for their support in her career.

Lauren strives to inspire the love of chemistry and research in her students, similar to Mrs. Sullivan. "I am a big believer in intrinsic motivation—one should do what makes one happy, even if it is challenging!" As the Clare Boothe Luce assistant professor, *Lauren* sends two female students every summer to research experiences at Ph.D. granting institutions. She also hosts book clubs and movie nights on chemistry related media to allow the students to know her on a more personal level. *Lauren* explained that it is rewarding to work with undergraduates and watch them become critical thinkers. As one of the WCC Rising Star Award winners, *Lauren* has demonstrated how the spark from one high school teacher can influence many chemists. Congratulations!

Prof. Elizabeth Jarvo

By Ellen A. Keiter



It was in her high school Advanced Placement chemistry course that WCC Rising Star **Dr. Elizabeth (Liz) Jarvo** first realized her love for the subject. The next big step in her choice of chemistry as a career came at the end of her freshman year in college when she joined the research lab of Professor Youla Tsantrizos at Concordia University in Quebec as a visiting summer research student. As a result of that experience, she says she was "hooked."

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Liz, who grew up in Canada, earned a BS degree in chemistry, with honors, from Acadia University in Nova Scotia in 1997. She elected to further her education in the US, completing a PhD in chemistry at Boston College in 2002, followed by three years as a post-doctoral fellow at Harvard University. In 2005, she joined the Department of Chemistry at the University of California, Irvine (UCI) as an Assistant Professor, rising to the rank of Associate Professor in 2012.

At UCI, *Liz* leads a dynamic research group engaged in mechanism-based design of new reactions using organometallic catalysts and applying these transformations to complex target-oriented syntheses. In a collaborative effort with UCI Medical School researchers, new com-

pounds produced in her group having structural similarity to agents with known biological activity are tested for effectiveness against certain cancer cell lines. What *Liz* says she most enjoys about her current role is “working with talented graduate students and getting to ask questions about reaction mechanisms.”

According to *Liz*, she has benefited from a number of “fantastic mentors” throughout her professional development. She specifically named Prof. Scott Miller (her PhD advisor), Eric Jacobsen (her postdoctoral advisor) as well as Prof. Mike Kerr and Prof. Youla Tsantrizos (her undergraduate research advisors). She credits them with teaching her numerous lessons about conducting research “from the virtues of running a proper control experiment to how to choose and dissect problems.”

2014 Cope Scholar

Prof. Abigail Doyle

By Alice Lurain

Prof. Abigail G. Doyle received the 2014 Arthur C. Cope Early Career Scholars Award sponsored by the Arthur C. Cope Fund for her “discovery of mechanistically novel and synthetically useful methods for selective, catalytic C–C and C–F bond formation.” This award is designed to recognize and encourage the excellent work in organic chemistry by researchers who have fewer than 10 years of experience since their terminal degrees.

Prof. Doyle earned her undergraduate and master degrees in Chemistry and Chemical Biology from Harvard University in 2002. She began her doctoral studies at Stanford University developing gold catalysts for the hydration of unactivated alkenes in the laboratory of Prof. Justin Du Bois, and then returned to Harvard in 2003 to join Prof. Eric Jacobsen’s group.

Her research there included the discovery of a transition metal-catalyzed enantioselective alkylation of tributyltin enolates with alkyl halides and the development of a thiourea catalyst for enantioselective nucleophilic additions to prochiral oxocarbenium ions. A native of Princeton, NJ, she has been an Assistant Professor in the Department of Chemistry at Princeton University since July 2008.

As part of the Cope Scholars Symposium at the Fall 2014 National Meeting in San Francisco, *Prof. Doyle* presented a talk entitled “New reagents and strategies for catalytic nucleophilic fluorination.” She highlighted the importance of fluorinated organic molecules in medical, agrochemical and materials applications due to the unique chemistry of these compounds, while noting the relative paucity of practical synthetic methods for carbon-fluorine bond formation.

Successful Women in Chemistry Series—Continued

Dr. Rebecca Ruck

By: Kelly George



Dr. Rebecca Ruck recalls her first Organic Chemistry research project during the NJ Governor's School of Sciences program as the initial seed that started her career in chemistry, and eventually her interest in Organic chemistry grew as an undergraduate at Princeton University. Fast forward to August 2014, where *Dr. Ruck*

was recognized as one of the ACS Organic Chemistry Division Young Investigator Awardees.

While an undergraduate at Princeton, *Becky* conducted research on *tert*-Butylcarbenes from non-nitrogenous precursors with Prof. Maitland Jones, Jr., her research advisor and author of her favorite chemistry text book. After graduating *summa cum laude*, *Becky* ventured to Harvard University for her PhD with Prof. Eric Jacobsen. In the Jacobsen labs, her research focused on the development of asymmetric hetero-ene reactions: discovery and mechanistic analysis of chromium(III)-catalyzed ene reactions of aldehydes and enol ethers, mechanistic comparison of hetero-ene and hetero-Diels-Alder reactions.

Dr. Ruck then traveled cross-country to Berkeley, CA as a NIH Postdoctoral Fellow in the labs of Prof. Robert G. Bergman, where she focused on developing new imidozirconium-mediated reactions: discovery and mechanistic analysis of dimethylzirconocene-promoted dehydration of primary amides, discovery of zirconium-catalyzed imine-yne metathesis reaction. *Dr. Ruck* was given the opportunity to return to her New Jersey roots, where she joined the Merck Process Chemistry Department. During her career at Merck, *Dr. Ruck* has obtained sever-

al patents and over a dozen publications in high impact journals. It is no surprise that *Dr. Ruck* has quickly risen through the ranks at Merck, where she now serves as a Director, DPC Site Lead-Kenilworth, NJ. When asked about why she loves her job, *Dr. Ruck* answered that it is, "the people I get to work with. The types of chemistry challenges that we are able to tackle and solve are just inspiring. I can easily talk to prospective hires about how cool it is to do this job because I believe it."

Dr. Ruck stresses the importance of many mentors in her career, both past and present. "In particular, I truly admire a previous manager, whom I also consider a mentor. He was secure enough in his own abilities to provide opportunities for me that could take me at least to his level. I try to support my own group members in the same way." *Dr. Ruck* commented that women in chemistry often face challenges due to "the limited number of role models available...It's always valuable to be able to tap into colleagues who have overcome the same challenges you are experiencing. Without those role models, it can be a bit like being stranded at sea. This is the reason why I try to mentor and support as many young female chemists as possible and encourage all other experienced folks to do so" says *Dr. Ruck*.

Dr. Ruck champions a work-hard, play-harder mantra. Outside of work, *Becky* plays competitive soccer alongside her team, "The Skulls," and loves to travel. "My current work profile photo is of me zip-lining in Costa Rica!" says *Ruck*. As for career advice, *Dr. Ruck* encourages other chemists to, "Follow the breadcrumbs. [These] opportunities, that on the surface may appear uncomfortable or challenging, can be some of the most fruitful and career-defining." *Becky* would sum up that outstanding chemists combine "Intuition and Insight with a dash of stubbornness!"

Successful Women in Chemistry Series—Continued

Dr. Beth Cooper
By: Kelly George



As a child, *Beth Cooper* became enthralled with science, “I liked creating things and was fascinated with how things worked and wanting to create new solutions. My early dream of being a scientist continued to grow through high school as I participated in high school science competition.

After these early experiences, I was hooked—I knew I wanted to study polymers in college; the synthesis, the modification, and the performance.” *Beth’s* dream was realized, and she now works at Dow Chemical as an Associate Research Scientist in the Architectural Coatings division, located in Collegetown, PA. In August, Beth was recognized by the ACS Organic Chemistry Division as one of the 2014 Young Investigator Awardees, where she presented her research at Dow. When asked what she enjoys about her current work, Beth answered, “I work with a great multi-disciplinary team of people. Each day brings new successes and new challenges. We are involved with science from brainstorming and concept development through to product commercialization and working on current products. It is exciting to see the fundamental research as well as the product cycle and how each part of the team contributes to the overall product.”

Beth attended Carnegie Mellon University, where she majored in Chemistry and graduated with honors. She conducted research with Prof. Krzysztof Matyjaszewski and focused on the synthesis of PEO-SAN-PEO (poly(ethylene oxide)-poly(styrene-co-acrylonitrile)-poly(ethylene oxide)) block copolymers using atom-transfer radical-polymerization (ATRP), examined ATRP kinetics and determined the effect of solvent in reverse and normal initiation in ATRP. Says *Beth*, “I learned strong foun-

dational skills as part of my education at Carnegie Mellon University, not only as new information, but also an approach to problem solving which has enabled me to use my skills in all parts of my life.” She then worked in the labs of Prof. Todd Emrick at the University of Massachusetts – Amherst for her Ph.D in Polymer Science and Engineering. Her doctoral research focused on the synthesis of controlled multi-functional aliphatic polyesters and acrylates, examining the structure-property relationships of water-soluble hydrophilic and zwitterionic polyesters and studying micellization and solubility of cancer drugs using water-soluble polymers.

Beth’s career success story is even more impressive, considering significant health challenges and disabilities in her life. *Beth* explains, “My health became a significant challenge during my sophomore year in college, and one that I have had to consider continually along each step of my career. Having health challenges certainly shaped who I am as an adult, and I feel fortunate that I was able to balance my health difficulties with my education and now my career.” *Beth* notes that she has seen positive changes in the work environment, “I am encouraged to see even in the short time since I started, that the ‘work climate’ has become more accepting to women and people with disabilities. While I feel there is room for improvement, we are moving forward; each woman who demonstrates success will continue to change this climate. Initially, I was told a scientist who uses a wheelchair would not be successful. Thankfully, there are examples to the contrary, and people who saw my potential.”

Dr. Cooper’s advice to other women chemists: “I have been able to achieve my goal of being a scientist due in part to my own personal determination and my desire to create, problem solve, and lead; my strong coping skills in dealing with multiple health challenges; superb mentors throughout my life who have shared their knowledge, skills, and personal experiences; and the extensive support of family as well as colleagues. My