



Karin Ruhlandt | A CATALYST IN CHEMISTRY

AS A RESEARCH CHEMIST, KARIN RUHLANDT SPENDS A LOT of her time coming up with ideas, putting them to the test, and seeing what happens—in her lab, in the department she chairs, and in the larger SU community. In the lab, Ruhlandt—who last year was named Distinguished Professor, one of the University’s highest faculty honors—leads a diverse group of graduate students, searching for the perfect mix of calcium, magnesium, and other elements that could revolutionize joint replacement and bone reconstruction therapies. The goal is to create a material stronger and less brittle than ceramic, lighter than steel, and cheaper than titanium. As if meeting these standards wasn’t difficult enough, the material must also resemble natural material and be biocompatible, so the body won’t reject it. “Most importantly, we want it to be bioactive, which means bone cells can grow into it, or grow onto it, and actively connect to it,” Ruhlandt says. For two years, her group has been “playing around” with metals and ligands in various combinations, working to be able to predict the structure and properties of the resultant material, which she calls “the holy grail of solid-state chemistry.”

Ruhlandt’s group also does leading research in another area of chemistry with a holy grail of its own: ferroelectrics, the realm of semiconductors and superconductors. Superconductivity is associated with zero resistance—a state that, when realized, allows electricity storage without energy loss. Superconductivity typically requires extremely low temperatures, which are hard to achieve and maintain. So the search is on for materials that become superconductive at relatively higher temperatures, such as room temperature. “Technically, it’s a dream,” Ruhlandt says. But then, so were MRI machines not long ago. Her group also has created novel precursors for metal-organic chemical vapor deposition, the process by which a silicon chip is coated with a metal oxide. The new precursors will make preparation of high-temperature superconductors simpler, and could allow for less expensive fabrication of dynamic random access memory circuits, the main memory at the heart of personal

computers and game consoles. “We’ve made precursors that are significantly better than anything industry is using right now, and we just wrote a patent on that,” Ruhlandt says.

Ruhlandt has been a catalyst in two other areas close to her heart: creating research opportunities for undergraduates, and improving opportunities for women in the science, technology, engineering, and mathematics (STEM) disciplines. She resurrected the chemistry department’s Research Experience for Undergraduates in 2000, and has secured National Science Foundation (NSF) funding for the program every year since. “Our goal is to provide experience to students for whom it would make a significant difference,” she says. In 2004, the program added an international component, drawing students from Graz University of Technology in Austria. Today, the program includes a mix of students from SU, other colleges, and abroad. “We have 450 people applying for 12 spots, every year,” Ruhlandt says, “and 150 more applying for six slots in the international program.”

Ruhlandt is also working to provide both support and opportunities for women in the STEM disciplines. This fall, SU received a \$3.4 million Advance Institutional Transformation Award from the NSF to fund a five-year, campus-wide initiative to encourage recruitment, development, retention, and mentoring of female STEM faculty. Ruhlandt, who was involved in the grant proposal process, will help coordinate the initiative. “The lack of women faculty in STEM is a huge issue,” she says, speaking as one of only two women on the 21-member chemistry faculty, and the only full professor.

Ruhlandt does see progress. Two women doctoral graduates from her lab moved on to post-doctoral work at Notre Dame; another is headed to the University of Tennessee. Is it a coincidence many of her grad students are women? “Somebody commented, and I think it’s true, that research advisors and students sort of find each other because they have matching personalities,” Ruhlandt says. “And so, I happen to have a lot of really strong women who work with me, and that’s great.”

—Jim Reilly

Patrick J. Alvarez | AN APPETITE FOR GREATNESS

PATRICK J. ALVAREZ '12 DOESN'T GET A LOT OF SLEEP. He's too busy making the world a better place. The Bronx native, a communication and rhetorical studies major in the College of Visual and Performing Arts, not only carries a heavy course load, but also serves as president—and sparkplug—of the nonprofit agency Project Feed Me. The organization, which Alvarez founded in his freshman year at SU, provides food for those in need. In its first year, Project Feed Me—which counts many SU students among its volunteers—fed more than 500 people at the Frederick Douglass Center in Harlem. In 2009, the expanded program hosted Thanksgiving Day meals for more than 1,000 people, with events at the Southwest Community Center in Syracuse and the Frederick Douglass Center. This year, two Syracuse churches and the Douglass Center were the sites of Project Feed Me holiday dinners.

Alvarez knows from personal experience what it means to not have enough to eat, or a place to call home. “I grew up in poverty and violence,” he says. As a 5-year-old, he ran for help as his father physically assaulted his mother. To escape the domestic violence, he and his mother sought refuge in homeless shelters. “There were times we didn’t have food, didn’t even have access to food,” he says. “My mother and I struggled.” Frequent moves meant that Alvarez changed schools often. “Education was hard for me because I had to start over at so many new schools,” he says. “I was at a huge disadvantage.” It would have been easy enough for him to be among the 70 percent of students in his neighborhood who don’t finish high school, many of them taking to life on the street.

Instead, Alvarez, a talented athlete, learned discipline and teamwork on the basketball court. A born entrepreneur, he earned spending money by selling iced drinks and honey buns literally under the study hall and lunchroom tables in high school. In a moment of introspection, he looked in the mirror and asked himself how the world would have been improved by his life if he were to die the next day. His answer was to start Project Feed Me, which has garnered media coverage by such outlets as *The New York Times*, *The New York Daily News*, and Fox News. The New York Knicks, a corporate sponsor, presented him with a donation check during half-time of a game at Madison Square Garden—an incredible thrill for the self-described basketball fanatic.

Early on, Alvarez took his mother’s advice to introduce himself to anyone who visited his school wearing a suit. The strategy has paid dividends. Instrumental to his success are the people Alvarez has lined up as mentors and sponsors—among them prominent legal theorist and Harvard law professor Charles J. Ogletree and philanthro-



pist Kenneth Merin, chief executive officer of the Charles Hayden Foundation. Chancellor Nancy Cantor has also been a strong supporter of Project Feed Me, says Alvarez, who came to SU sight unseen. “I was captured by the University’s web site and the beautiful architecture of the buildings,” he says. “I love it here—the open space, so different from the projects I live in at home, where everyone is so crowded. I want to be a change agent. I figured if I could stand out here at SU among thousands, then I could stand out in the world.”

Future plans for Alvarez—an intense young man who believes in dressing for success, with a taste for mirror-shined penny loafers and Brooks Brothers shirts—include a law degree, followed by a run for political office. His ultimate goal is to be elected governor of New York. “We aren’t defined by the amount of resources we have,” he says with a smile, “but by how resourceful we are.” —Paula Meseroll

Erika Rodriguez | TAKING FLIGHT IN THE RESEARCH LAB

WHEN ERIKA RODRIGUEZ G'08 WAS IN ELEMENTARY school, she participated in a rocket-building program that captured her interest. Although the initial launch of her toy rocket wasn't successful, the project unveiled what would become her true passion: aerospace engineering. "I haven't stopped working since kindergarten," jokes Rodriguez, a doctoral student in mechanical and aerospace engineering at the L.C. Smith College of Engineering and Computer Science.

Her comment is anything but a joke. Instead of testing toy rockets, Rodriguez is now developing a special polymer that has

day," Rodriguez says.

While attending a seminar at Case Western Reserve University (CWRU) in Cleveland, she met Professor Patrick T. Mather, a polymers expert who now heads the Syracuse Biomaterials Institute (SBI) at SU. At the time, Mather was a CWRU faculty member who was in the process of joining Syracuse as the Milton and Ann Stevenson Professor of Biomedical and Chemical Engineering. "He invited me to join his research group in Syracuse," Rodriguez says.

She accepted. Now in her fourth year with Mather's group, Rodriguez has focused her time and energy on her research at SBI. Currently, she is working on the use of shape memory-assisted self-healing polymers—materials capable of returning to their original shapes after being damaged—for the aeronautics industry. Aircraft are typically made out of metallic surfaces that are subject to corrosion when exposed to extreme temperatures during flight. When surface damage occurs, repair costs can be substantial—upwards of millions of dollars, Rodriguez says. In hopes of preventing such damage, Rodriguez is developing a polymer that is durable in a variety of temperatures and may reduce corrosion. "The idea is to coat the surface of the aircraft with this polymer, so it serves as a protecting agent to minimize the degree of corrosion," she says.

To test the material, Rodriguez makes a tiny razor blade cut in the polymer, which looks like a paperclip-sized piece of dried glue. Then she exposes it to extremely cold and hot temperatures. These tests give Rodriguez an idea of what types of conditions the polymer can withstand and still maintain its shape or return to its original form after being damaged. Until she gets the desired results, she may modify the polymer's molecular structure.

As a skilled researcher, Rodriguez is a role model in the department for her younger female colleagues. "I try to be a resource,"

the potential to be used in making more durable surfaces and infrastructure for aircrafts. "Polymer is essentially a fancy word for plastics," Rodriguez says.

Rodriguez knew where she was heading on her career path while attending high school in Fresno, California. She enrolled in Smith College in Northampton, Massachusetts, to study engineering science. After graduating, Rodriguez spent a year at aircraft manufacturer Pratt and Whitney as a design engineer before deciding to return to school for graduate work. "I wanted to do more hands-on work and use my engineering skills for more practical applications, instead of sitting behind a desk all

she says. "Engineering is a very male-dominated field. But as a woman, you get so much attention as far as internships go and there are so many resources available to you."

In a typical week, Rodriguez and her fellow researchers can put in 40 to 50 hours of work. But she has also managed to learn the importance of taking time out for herself. In her spare time, she enjoys Latin and ballroom dancing, a passion she has had since childhood. "Aerospace engineering is a full-time job," she says. "We're always running labs 24/7. And you have to be passionate about your research because you can get burnt out so fast."

—Sierra Jiminez





Chris Uyehara | MASTERFUL CREATIONS

WHAT MOTIVATES A NATIVE HAWAIIAN TO SPEND 12- TO 14-hour days competing outdoors in sub-zero temperatures in ice and snow? While winning is a priority, it isn't the only focus for Chris Uyehara, a culinary specialist in the College of Human Ecology who is an internationally recognized master ice sculptor. "I want to be certain each sculpture is unique, so people remember it," he says.

Uyehara brings ice to life by skillfully capturing intricate details in his sculptures, which have been seen by thousands of spectators since he began competing internationally—and collecting medals—in 2008. Last January, he won a gold medal at the 26th Annual Harbin International Ice and Snow Sculpture Festival in China. He has earned medals at other prestigious competitions as well, including the Crystal Garden International Ice Carving Competition in Ottawa, and the World Ice Art Championships held annually in Fairbanks, Alaska, where he has his sights set on gold in February 2011. Uyehara pinpoints his interest in ice sculpting to an experience more than 30 years ago at the onset of his professional career. Working as a pastry chef at a hotel in Oahu, Hawaii, he found himself fascinated by the ice sculptures carved for special events and vowed to one day create his own ice masterpieces, just as he'd been doing with pastry and chocolate.

Chef U, as he is known on campus, grew up learning the fine art of pastry preparation at his family's bakery. His father, a master baker, was known for excellence in pastry skills and techniques. Consequently, chefs from the neighboring Hawaiian Islands and distances as far as Japan sought to train under Uyehara's father.

From a young age, Uyehara embraced every opportunity to learn from his father and the visiting chefs. "I can remember being 5 years old, standing on a bucket, and helping roll dough," he says. "I learned from the best."

Uyehara, who joined Syracuse University in 2006, teaches courses that include culinary arts, professional baking, and restaurant and food service operations to nutrition and hospitality management students. Known for his skills in cake decorating, preparing French pastries and Swiss candies, and chocolate pulling and casting, Uyehara has treated Mikhail Gorbachev, Yogi Berra, and Angela Lansbury to his confections, which have also appeared on such television shows as *Murder She Wrote* and *Magnum P.I.* Because mentors guided his career path in significant ways, Uyehara is committed to supporting his students, who describe him as someone who will go out of his way to help them succeed. They appreciate his industry experience, ability to explain complex concepts in understandable terms, and his sense of humor. Once summoned to make baklava for the Greek ambassador to the United States, Uyehara recalls the challenge with good-natured humor. "No doubt the ambassador had a fair share of really good baklava in his time," he says. "But he told me I made some of the best he's ever had. It was a very high compliment."

Uyehara acknowledges his personal philosophy was shaped by his father's work ethic, and he inspires his students to live by his own example: "Do what you love. Do it the best you can or don't do it at all because when you sign your name to your work, you should take pride in it."
—Michele J. Barrett



Reverend Tiffany Steinwert |

LIFELONG PASSION FOR JUSTICE

WHEN THE REVEREND TIFFANY STEINWERT WAS A young girl, she never imagined that one day she would be a minister, let alone the sixth—and first woman—inaugurated dean of Hendricks Chapel. In fact, she never went to church. “The call to ministry was something I always fought,” says Steinwert, who grew up in Cincinnati in what at the time was considered an interfaith family. “My mother was Protestant and my father was Catholic, so religion—especially institutionalized religion—was always a point of controversy and conflict for us. I was drawn to the church, while at the same time I was suspicious of it.”

Steinwert’s uneasy relationship with the church began to change in high school when friends asked her to join a Methodist youth group. Along with the fun activities and ski trips, she heard stories about Jesus, and for the first

time really listened to his message of compassion. “My family was one generation removed from poverty, so I’ve been passionate about justice all my life,” Steinwert says. At age 5, she was so determined to feed the hungry that she went door to door around her neighborhood, collecting canned goods for the local food pantry. But after filling her little red wagon with hundreds upon hundreds of items, Steinwert realized no matter how much food she collected, it would never be enough. “I wanted to stamp out world hunger by myself,” she recalls. “Jesus’ message taught me that we must pull the wagon together if we are to create real change in the world.”

After graduating from Williams College with degrees in women’s studies and psychology, Steinwert spent two years as a Methodist missionary in rural Nicaragua. Through her missionary work, she came to understand that theology is not just an abstract concept, but can address concrete societal needs. “I finally answered the call and said ‘yes’ to becoming a minister,” says Steinwert, who holds graduate degrees in divinity and practical theology from the Boston University School of Theology. “The United Methodist Church is a perfect fit for me because its founder, John Wesley, believed ‘there is no holiness, but social holiness.’”

Before moving to Syracuse with her partner, Joshua Arrowood, and their toddler son Grady, Steinwert was a teaching fellow at Boston and Harvard universities and served as a senior pastor with Cambridge Welcoming Ministries, a mission of The United Methodist Church that ministers to lesbian, gay, bisexual, and transgender (LGBT) congregants. She has extensive experience engaging communities of faith in projects that address such issues as urban renewal, global poverty, racism, and discrimination against LGBT individuals. “Dr. Steinwert’s strength in scholarship, counseling, and building understanding in diverse communities, and her unique combination of interfaith work and higher education experience, make her an excellent match for Hendricks Chapel,” says Thomas V. Wolfe G’02, former dean of Hendricks Chapel who now serves as senior vice president and dean of SU’s Division of Student Affairs. “I know she will lead the chapel into the future while continuing its long tradition of being a home for all faiths.”

As the spiritual leader of Hendricks Chapel, Steinwert says she is able to seamlessly integrate her roles as pastor, scholar, and community organizer because the University understands the dean must do more than offer Sunday services. “For me, there has always been a strong connection between practice and scholarship, and I’m anxious to explore creative ways the chapel can build upon SU’s vision of Scholarship in Action,” she says. “For 80 years, Hendricks Chapel has been the moral and ethical center of Syracuse University, and I feel privileged to be part of a network of caring individuals who work together to help all students find meaning in life that is greater than themselves.” —*Christine Yackel*

Marina Artuso | POETRY AND PARTICLE PHYSICS

MARINA ARTUSO HAS SPENT DECADES DEVOTED TO BEAUTY. This may not seem unusual for a woman born in Venice, raised and educated in Milan, and in love with poetry and art. But Artuso is a physicist, and beauty—with a small b—is the name of a quark. “It holds the key to a lot of things we are trying to understand, about the theory of fundamental particles, and why the universe is made of matter and not a combination of matter and antimatter. It has a lot of facets,” says Artuso, a faculty member of the high-energy particle physics group in the College of Arts and Sciences who has studied beauty, charm, and other less fancifully named subatomic particles since 1988. “So I guess you can say, it is a life devoted to beauty. But I still love poetry.”

A Fellow of the American Physical Society and an advisor to the U.S. Department of Energy and the National Science Foundation, Artuso is an international leader in developing, designing, and building detectors for elementary particle physics experiments. She is among more than 700 scientists from 15 countries collaborating on a beauty quark (b) experiment at the Large Hadron Collider (LHC) at CERN, the European Organization for Nuclear Research, near Geneva, Switzerland. The LHCb experiment—which aims to explain why nature prefers matter to antimatter, among other things—is one of several ongoing experiments at the LHC. The world’s largest (17 miles in circumference) and most powerful particle accelerator, the LHC sends two beams of protons speeding in opposite directions inside the circular accelerator to collide at very high energy and near the speed of light, effectively replicating conditions that existed one hundredth of a billionth of a second after the big bang. Experiments at the LHC are probing key unresolved questions in physics, including the nature of mass, the existence of dark matter and energy, and the possibility of hidden dimensions.

Artuso was there for the LHC’s big pop and fizzle in 2008, when a faulty joint led to a minor explosion and a major setback for the LHC, which was shut down a year for repairs. She was also there in November 2009 when the mammoth particle accelerator came back online, and has been collecting data since that may help explain the origins of the universe.

According to Artuso, she took a “bit of a winding way” to get there and here. As a girl, she was interested in art, nature, literature, and science, studying the humanities before switching to engineering at the Politecnico di Milano, a move considered odd for a woman at the time. She stuck with it, despite the “funny comments” she and a few other female students endured in lecture halls teeming with young men. Under the guidance of a professor, she gravitated toward physics, working with him on an early experiment at CERN. Eventually, she headed to Northwestern University to earn a doctorate in physics to complement her engineering background with some deeper knowledge of physics.

Searching for connections between disparate things—space and time, matter and antimatter, the micro- and macrocosm—keeps Artuso passionate about physics. Then, too, as an experimentalist, she loves to build exquisitely sensitive detectors that offer shadowy evidence of beauty—not the particle itself, but its decays and effects on other particles, the only proof beauty exists. She’s committed to bringing undergraduates into the lab to do research, and advocates for women in the disciplines of science, technology, engineering, and mathematics (STEM). Artuso is co-director of Women in Science and Engineering at SU, which hosted an international symposium this fall on the status of women faculty in STEM. “All over the world, women in the science and technology disciplines are still working toward equality,” Artuso says. “I can tell you, we still have work to do.” —*Jim Reilly*

