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Outstanding graduate student, Rebeca Rodriguez, brings passion and commitment to research, outreach, and advocacy

THERE ARE MYRIAD lenses and perspectives that Rebeca “Becky” Rodriguez brings to being an outstanding graduate student, researcher, outreach volunteer, and advocate. Forging her commitment to science and making a difference in all that she does, are Beckys experiences as a first-generation college student, female scientist, daughter of immigrants, person of color, social justice advocate, and so much more.

Becky is originally from Charlotte, NC, and obtained her bachelor’s degree from American University in Washington, D.C. Her parents came to the United States from Mexico in the 1980s to work. Her father completed sixth grade, and her mother finished middle school. Her mother has her own cleaning business and her father works maintenance at a church/private school. They work hard to put their three daughters through college, and now graduate school.

“My parents mean the world to me. They are my biggest inspiration,” said Becky. “They made a lot of sacrifices to help me achieve my dreams. My mom was willing to sell her...
message from the Department Head

AFTER ONE YEAR AS THE HEAD, I AM A LITTLE OLDER, I AM A LITTLE WISER. And every day I am incredibly impressed by the tremendous students, staff, faculty, and alumni that make this such an extraordinary department. I have spent a lot of time over the last year contemplating the common goals of this team, as expressed in our mission statement:

The Department of Chemistry is dedicated to excellence in education, research, and public service. We strive towards these goals through world-class teaching in the classroom and laboratory, research aimed at solving some of society’s most important human health, energy, and environmental problems, fostering an environment of safety, and embracing diversity of communities and ideas to benefit Minnesota, the nation, and the world.

We have certainly faced a few challenges such as space and resource limitations, but when I compare the efforts and accomplishments over the last year to this high standard, I can’t help but smile with pride, and a little amazement. There are far too many great stories of student, faculty, and alumni awards and accomplishments to fit in one ChemNews issue. In the following pages, you will find a few wonderful and compelling examples.

The opportunity to do directed research as an undergraduate is one of the most important experiences we can provide our chemistry majors. It allows our students to be integral participants in cutting-edge research. They experience the challenges and rewards of independent discovery while developing critical technique, communication, and problem-solving skills. On page 3, you can read how senior and recent Goldwater Scholarship recipient James Cox has been working for more than three years in the group of Professor Joseph Topczewski, developing exciting new synthetic chemistry.

Our graduate students continue to raise the bar as well. Rebeca Rodriguez, a first-generation college student and a current graduate student working with Professor Christy Haynes, combines impressive accomplishments in the lab with a talent and passion for outreach and student engagement (see story on page 1). The overall impact on the science, our department, and beyond is truly impressive.

Our faculty members continue to earn national and international recognitions and awards for discoveries across every area of chemistry. Two large research centers, focused on some of the most important challenges in energy science and led by our department, were successfully renewed this year. The exceptional leadership within our faculty has also been recently acknowledged with the appointment of Professor Christopher Cramer as the University’s next Vice President for Research, starting Nov. 12. Looking to the future, we are excited to welcome two new faculty members who arrived over the summer, Ambika Bhagi-Damodaran and Nicholas Race. You can read about their research plans on page 11.

After one year on the job, I am even more excited and optimistic than when I started as the Department Head. I cannot wait to see what our students, faculty, and alumni will accomplish in the coming year.
Research opportunities create windows for learning and excelling for top undergraduate chemistry major James Cox

JAMES COX ENJOYS CHEMISTRY, and his natural instincts, curiosity, hard work, and dedication are a perfect combination to spiral him into an outstanding scholar, researcher, and student.

James is a senior, award-winning chemistry major, conducting research with Professor Joseph Topczewski in the Department of Chemistry. He is a University honors student, received the Department of Chemistry’s 2018 Robert C. Brasted Memorial Fellowship, and was named 2018 Goldwater Scholar.

For James, his love for science began when he studied chemistry as an eighth grader through online courses. As a senior in high school, he was awarded a silver medal in the Science Olympiad. In the spring of his freshman year at the University, James kick-started his undergraduate research by joining Professor Topczewski’s lab.

**Allylic azide rearrangement**

His first major research project dealt with the effect of neighboring groups on allylic azide rearrangement. At room temperature, allylic azides undergo rearrangement to a variety of equilibrating isomeric compounds. The research goal was to understand how the functional groups around the allylic azide influenced the ratio between the various isomers at equilibrium. James helped synthesize eight allylic azide-containing substrates and studied their isomer ratios using proton nuclear magnetic resonance spectroscopy. All of those substrates were prepared from commercially available starting materials in two to three steps. James’ partners in this research were graduate student Mary Packard and undergraduate Victoria Suding who graduated in the spring of 2017.

From this research, James gained a lot of experience working with air-sensitive reactions and column chromatography purification. “I barely go a day in lab now without using one of these techniques; they are truly indispensable in the organic research lab,” he said.

This research led to James being second author on an article that appeared in the *European Journal of Organic Chemistry* in 2017.

“No matter how big or small, insightful or stupid, questions are worth asking.”

—James Cox
Becky believes there is much work to be done to encourage, support, and retain first-generation and people of color in college and graduate school. She hopes to let others know of resources that exist specifically to help them succeed and thrive.

In addition to her research and studies, Becky is an involved graduate student and social justice advocate. She is the Women in Science & Engineering representative on the Department of Chemistry’s Diversity & Inclusion Committee. She also is a graduate student mentor through the Society of Women Engineers, public relations officer for the American Chemical Society Division of Polymer Chemistry (POLY) and the Division of Polymeric Materials: Science and Engineering (PMSE) University of Minnesota chapter, the Department of Chemistry’s representative to the Council of Graduate Students, and a member of the Society of Hispanic Professional Engineers.

Becky is passionate about outreach and has been involved in doing science demonstrations for middle school and high school girls, with young people at the West 7th Community Center in Saint Paul, and a local Boy Scout troop. Recently, Becky and graduate student Natalie Hudson-Smith created shrinky dinks in English, Spanish, and Somali for young people to color and make necklaces and bracelets.

“My parents mean the world to me. They are my biggest inspiration.”

—Rebeca Rodriguez

“Becky believes there is much work to be done to encourage, support, and retain first-generation and people of color in college and graduate school. She hopes to let others know of resources that exist specifically to help them succeed and thrive.”

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—Rebecca Rodriguez
Detecting and capturing dangerous toxins

WORKING UNDER THE TUTELAGE of Professor Christy Haynes, third-year graduate student Rebeca “Becky” Rodriguez is focusing her research interests on detecting and capturing dangerous toxins.

Her current research involves detecting small molecule toxins that contaminate food with polymer affinity agents. Becky uses a technique called surface-enhanced Raman spectroscopy (SERS) to monitor vibrational changes after toxin and polymer bind. She is working with mycotoxins, toxins produced from fungus that contaminate crops such as corn, grain, and nuts. She has spent the last two years detecting Aflatoxin B1, the most potent, naturally made carcinogen known to man.

She is working to detect two different mycotoxins (ochratoxin A and deoxynivalenol) with the same polymer affinity agent that she successfully used to detect aflatoxin B1. Ochratoxin A (OTA) is a toxin that contaminates grain and pork products as well as wine and beer. OTA is carcinogenic and can cause neurological damage to humans. Deoxynivalenol (DON), or vomitoxin, contaminates wheat, grain, and corn. It is not carcinogenic, but can cause severe dehydration and death due to vomiting. The hope is to be able to detect these toxins in food matrices that they are commonly found in. Because the polymer affinity agent is less specific, it can potentially bind to all of these toxins due to their similar structures.

“Becky brings her naturally inquisitive nature, broad interests, and willingness to speak out to each seminar and group meeting,” said Professor Haynes, “where she asks deep scientific questions even when a topic is far from her research focus area.”

After Becky obtains her doctorate, she hopes to work for the government or a government contractor detecting chemical and biological warfare agents and, perhaps, some day working on chemical and biological warfare policy, or earning a master’s degree in global security.

is another platform where she writes about day-to-day life as a graduate student. “I had a tweet go viral and received a couple of death threats, but that has never deterred me from speaking my mind and standing up for what I believe in,” she said.

The further along Becky gets in her career, the more she realizes that there aren’t a lot of people like her in science, technology, engineering and math (STEM) fields—first-generation college students, children of immigrants, women, people of color, etc.—because of the lack of resources, support, and advocacy.

“That’s why I like to volunteer, working with kids of non-traditional backgrounds and girls of different ages,” said Becky. “I didn’t have access to things like that when I was younger. That is why I speak so frankly and openly about the difficulties women of color face in the workplace, in STEM, in graduate school. I want to work toward changing that. I want to encourage and retain people like me.

“Some days, I still feel as though I don’t belong,” said Becky. “But, I know that if one girl is inspired in science and pushes through the obstacles to get here, then I will have accomplished more than I would’ve imagined possible as a female, first-generation scientist.”

Professor Haynes said, “This positive attitude, in circumstances where it would be easy to become cynical or discouraged, are what makes Becky’s voice so important and impactful.”
Research opportunities create windows for learning and excelling… continued from page 3

The research was also featured on the journal’s cover. He was heavily involved in proof-reading the article, meticulously reviewing each spectrum for each compound involved in the project, ensuring that every peak could be rationalized by the compound’s structure, checking for any impurities, and contributing ideas for the design of the cover art.

James said that he valued the experience of seeing a project from its infancy to the pages of an international chemistry research journal. “I gained perspective on what being an academic chemist entails and what my future as a graduate student, post-doctoral scholar and, hopefully, professor will involve,” said James.

**Synthesizing new Porsche red**

For the past year, James’ focus in the lab has encompassed synthesizing an oxygen-18 labeled analog of perylenetetracarboxylic dianhydride (PTCDA), the dye responsible for the red color of many sports cars, which is sometimes known as Porsche red.

While PTCDA without the oxygen-18 label is cheap and commercially available, the addition of the oxygen-18 makes a compound that has never been synthesized before. Additionally, labeled PTCDA is challenging to synthesize in the lab. Oxygen-18 is also expensive. Essentially, James has to synthesize intermediates that will be soluble enough in organic solvents to undergo reactions, while installing the oxygen-18 late in the synthesis to avoid losing it in subsequent reactions.

Initial trial, error, and failure now appear to be leading to success. James investigated a synthetic route that eventually failed because of the insoluble intermediates. Knowing that solubility was a key issue with these compounds, Professor Topczewski and James revised the order of the steps for the original synthesis. Their hypothesis: by performing...

“I barely go a day in lab now without using one of these techniques; they are truly indispensable in the organic research lab.”

—James Cox

Professor Joseph Topczewski works with James Cox on column purification.
one of the two required coupling events, and leaving the second until the end of the synthesis, the intermediates should be more soluble. Success: using this approach, it appears that the researchers have solved the solubility-related reactivity issues.

James is an independent researcher on this project, solely responsible for carrying out all of the experiments, reading the relevant literature on the reactions, interpreting the data, and maintaining a steady rate of progress.

“I recognize that this is a unique experience to have as an undergraduate. It has definitely taught me a lot about time management and thinking critically as a researcher,” said James.

“James is an extremely talented student and researcher,” said Professor Topczewski. “He has a bright future moving forward, and I can’t wait to see what he does in graduate school.”

Summer research

During the summers, James gained additional hands-on, cutting-edge research experience as a Heisig/Gleysteen research fellow in the Department of Chemistry in 2017, and as an Amgen Scholar at the California Institute of Technology in 2018. At Caltech, he worked with Professor Robert Grubbs, a 2005 Nobel Laureate in Chemistry, on developing a new method to make aromatic 1,2-dithiols via arylene intermediates. Aromatic 1,2-dithiols are commonly found as ligands on olefin metathesis catalysts that the Grubbs lab has been developing since the 1980s. James’ method using arylene intermediates is supposed to be more efficient and tolerant to reactive molecules. While he was able to show that this new method is viable, he was not able to isolate pure dithiol product: additional optimization is needed to develop it into a practical synthesis.

“Perhaps the most valuable lesson I learned was about the importance of forming connections within the chemistry community,” said James. “I had the privilege of meeting chemistry professors, post-doctorates, graduate students, and undergraduates from Caltech and Stanford who provided in-depth advice about graduate school, critiqued my presentations and reports, and taught me new lab techniques. Many of the other visiting scholars with whom I worked and lived are also applying for graduate school this fall, so I will likely run into some of them later in my career.

“I feel much better connected within my field because of my time at Caltech,” James said. “Additionally, through this experience, I learned what it is like to adjust to a completely new research environment: new lab space, new equipment, new people, new facilities, etc. As a result, my summer was almost identical to the first few weeks of graduate school. Looking ahead to the start of my graduate school tenure next fall, I am reassured knowing that I can handle such an adjustment.”

Involved student

In addition to his studies and research, James is also an involved student, serving as president of the oSTEM student group, a national society dedicated to educating and fostering leadership for lesbian, gay, bisexual, transgender, queer, intersex, and asexual (LGBTQIA+) communities in the science, technology, education, and math fields, and on the Department of Chemistry’s Diversity & Inclusion Committee.

“All of science benefits from being inclusive of diverse people,” said James. “An accepting department sends a powerful message to its members and the community that everyone in it is free to be true to themselves, that they have no need to hide any part of their identity in the workplace. As a result, people in diverse, inclusive departments do not spend much of their energy worrying if they will...
be accepted by their peers and, instead, can focus on their work. Additionally, prospective students and faculty feel welcomed by seeing people who look, love, or identify like they do. So, an inclusive department loose fewer people who would have valuable ideas to contribute. Essentially, I take a very pragmatic approach to diversity and inclusion work: I believe people will be able to do their best work in a diverse environment."

All of these accomplishments and the awards and experiences that accompanied them were sought out by James. He learned a lot in the process, including:

• Stepping outside of his comfort zones as often as possible. “I secured my research position early on as an undergraduate because I put myself out there and asked for it,” said James. “I consistently think this was one of the best decisions I have made.”

• Learning how to think scientifically by becoming involved in research. “In academic research, there are very few procedures to follow or guiding worksheets as lifelines, there are just questions,” said James. “The job of the researcher is to intuit ways to answer these questions and get them.

“Research opportunities create windows for learning and excelling... continued from page 7

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—James Cox

Chemistry majors participate in real-world research experiences as Amgen Scholars

FOUR DEPARTMENT OF CHEMISTRY undergraduate majors—Medinat Akindele, James Cox, Annika Page, and Levi Palmer—were Amgen Scholars in the summer of 2018. The Amgen Scholars program allows undergraduates to participate in cutting-edge research opportunities at world-class institutions. (See story on James Cox on page 3).

Medinat Akindele spent her summer at Stanford University. Combining her experience in organic synthesis and the biochemistry of plants and enzymes, her project focused on “Evaluating thermal adaptaption in psychrophilic, mesophilic and thermophilic variants of the enzyme keto-steroid isomerase.”

“I learned essential skills to be a good scientist, and not just producing tons of data,” said Medinat. “I valued all aspects of the scientific process, from collecting data to reading papers and communicating my science through poster and oral presentations.”

Medinat is a senior chemistry major. After graduating in the spring of 2019, she plans to spend a year working in industry before pursuing a doctorate in environmental engineering.

Annika Page is a senior studying chemistry and political science, and conducting research in Professor Thomas Hoye’s laboratory. She is interested in synthetic organic chemistry, especially reaction discovery and methods as well as synthetic chemical biology. Annika enjoys learning how chemical processes work, particularly, mechanistic studies that combine experimental results with computational evidence for the pathway that a reaction follows. She is also interested in applying synthetic organic chemistry to biological molecules because of the many important implications for understanding how those molecules function in the body as well as how to better design therapeutics to treat diseases.
As an Amgen Scholar, Annika worked with Professor Dean Toste at the University of California, Berkeley, investigating new modes of bioconjugation reactions. Specifically, she worked to optimize a small molecule probe to be reactive and selective with nucleophilic amino acid residues, and researched what parameters affected the selectivity of the reaction toward histidine.

Annika hopes to attend graduate school for chemistry to work on organic methods or chemical biology. She is interested in many different career paths, including medicinal chemistry, intellectual property law, becoming a professor at an undergraduate institution, or combining her chemistry and political science interests to work in science policy at the federal level.

In the Department of Chemistry, Annika was a Heisig/Gleysteen research fellow in 2017, and received the 2018 Wayland E. Noland Award for Academic Excellence in Chemistry, and 2017 Robert C. Brasted Memorial Fellowship.

Levi Palmer is a junior majoring in chemistry with a minor in physics. His research adviser is Professor Renee Frontiera.

“Professor Frontiera welcomed me into her lab where I fell in love with physical chemistry and Raman spectroscopy, and I have been excited about various applications of spectroscopy ever since,” said Levi. “I’m hoping to apply knowledge of complex spectroscopic techniques to new, exciting science to discover properties of materials and interfaces,” he said. This past summer, Levi was an Amgen Scholar at the California Institute of Technology, working with Professor Harry Atwater. The title of his project was: “Optimization of Nanoporous Gold Antennas for In-Situ Carbon Dioxide Reduction Intermediate Detection.” The bulk of the work entailed fabricating and characterizing mid-IR resonant antennas from nanoporous gold. This was accomplished with several methods, including electron-beam lithography and evaporation, ellipsometry, and Fourier-transform infrared spectroscopy. The antennas are designed to enhance molecular intermediates during carbon dioxide reduction.

Levi said that he learned a lot from this experience. “I realized how much time it takes to start a new project. There is a lot of learning involved, especially for an undergraduate, which slows things down significantly. However, I learned that if you want something done, the best way to get it accomplished is to do it and not wait.”

Levi plans to pursue a doctorate in chemistry and, hopefully, become a professor at a research institution. However, he is keeping his options open. His main interests and goals are to work with people excited about what they are doing, explore exciting research, and create something beautiful. He wants to make an impact on something while also mentoring and instructing others throughout each part of the journey.

Levi received the Department of Chemistry’s 2018 Lloyd W. Goerke Scholarship.
Faculty honors and awards

Philippe Buhlmann
Philippe Buhlmann received the 2018 Janet Tarino Volunteer Award from the Minnesota Section of the American Chemical Society (MN ACS), honored for his commitment to outreach and service. Buhlmann is outreach chair of the MN ACS section and co-founded the Chemists-in-the-Library outreach series, which he continues to organize. He also annually hosts high school students from the MN ACS’ SEED program in his research lab.

Michelle Driessen
Michelle Driessen, director of the Department of Chemistry’s general chemistry program, received the American Chemical Society Minnesota Section’s Brasted Award for Excellence in College Chemistry Teaching, lauded for her excellence in college teaching, commitment to undergraduate learning, mentorship of future chemistry teachers, and innovation in redesigning and enhancing classroom and laboratory experiences. This award was named in honor of the late Robert C. Brasted of the University of Minnesota.

Renee Frontiera
Renee Frontiera received the 2018 JPC-PHYS Lectureship Award. The Journal of Physical Chemistry (JPC) and the Physical Chemistry Division of the American Chemical Society (PHYS) co-sponsor this award, which honors the contributions of investigators who have made major impacts on the field of physical chemistry.

Laura Gagliardi
Laura Gagliardi was honored with a prestigious Humboldt Research Award from the Alexander von Humboldt Foundation, which will enable her to conduct research with scientists in Germany in 2019. Gagliardi also was elected a Member of Academia Europaea, which is composed of scientists and scholars who collectively aim to promote learning, education, and research. In addition, she was given lifetime membership into the Israel Chemical Society.

Christy Haynes
Christy Haynes was awarded a 2018 Guggenheim Fellowship, enabling her to spend the 2018-19 academic year in the Instituto de Tecnología Química at the Universitat Politècnica de València, working with Professor Pablo Botella. Her project is “Characterization of the Molecular Corona acquired by Technologically Relevant Engineered Nanoparticles in Environmental Matrices.”

Haynes also received the Coblentz Society’s 2018 Craemer Award for her significant contributions in applied analytical vibrational spectroscopy. In addition, she received the 2018 Theophilus Redwood Award from the Royal Society of Chemistry, which honors leading analytical scientists who are outstanding communicators. Haynes is the first female chemist to receive this award. She also was named a finalist for the 2018 Blavatnik National Awards for young scientists.

Marc Hillmyer
Marc Hillmyer was appointed editor-in-chief of Macromolecules. Hillmyer previously served as an associate editor for the journal for 10 years. He succeeded Timothy P. Lodge in January 2018.

Valerie Pierre
Valerie Pierre is co-editor of a new practical reference guide for magnetic resonance imaging (MRI), Contrast Agents for MRI: Experimental Methods. Her co-editor was Professor Matthew J. Allen from Wayne State University. The book was published by the Royal Society of Chemistry.

William Pomerantz
William “Will” C.K. Pomerantz was named a McKnight Presidential Fellow by the University of Minnesota, which is targeted at exceptional mid-career faculty to recognize their accomplishments and support their ongoing research and scholarship. It is awarded to only five University professors annually. He was appointed to associate professor with tenure on July 1. He also received the 2018 Guillermo E. Borja Career Development Award from the College of Science & Engineering (CSE). This award is given to promising young CSE faculty members in recognition of their research and scholarly accomplishments during their probationary period as assistant professors. He is the first professor from the Department of Chemistry to receive this award.

Theresa Reineke
Theresa Reineke received the 2018 DuPont Nutrition & Health Science Excellence Medal from the Danisco Foundation for her achievements in advancing science and technology relevant to the future of food, nutrition, and health. She also was honored as a 2018 POLY Fellow by the American Chemical Society Division of Polymer Chemistry, recognized for her scientific accomplishments and service to the profession. In addition, Reineke was selected as a Big 10 Academic Alliance Leadership Program Fellow for 2018-19. This professional development program offers extensive experiences to develop the leadership and managerial skills of faculty who have demonstrated exceptional ability and academic promise.

Ian Tonks
Ian Tonks received the Thieme Chemistry Journal Award 2018 for promising work in chemical synthesis and catalysis. He is also the recipient of a University of Minnesota McKnight Land-Grant Professorship. This award is designed to advance the careers of assistant professors at a crucial point in their professional lives. The two-year appointment will enable Tonks to create organometallic catalysts, working to create environmentally friendly, sustainable, and practical chemical reactions that can be used in the manufacture of pharmaceuticals and biodegradable plastics.

Donald Truhlar
Donald Truhlar received the 2019 American Chemical Society Award in Theoretical Chemistry, honored for his creative contributions to theoretical chemistry, and developing new density functionals for practical calculations of thermochemistry, thermochemical kinetics, and non-covalent interactions. He will receive this award at the April 2019 American Chemical Society
CHRISTOPHER J. CRAMER was appointed the University’s vice president for research, effective November 12, 2018, and continuing through November 12, 2020. This term appointment will provide stability through the presidential transition.

Cramer earned his bachelor’s degree from Washington University in St. Louis and his doctorate from the University of Illinois. His professional career began with four years of service as an officer in the U.S. Army, including combat duty in Operation Desert Storm. He joined the University of Minnesota in 1992 and is now a Distinguished McKnight University Professor in the Department of Chemistry. He has served as the director of both undergraduate and graduate studies for the chemistry program, and he has received both of the University’s systemwide awards for outstanding teaching: the Morse-Alumni award for undergraduate education and the award for graduate and professional education. In 2013, he became associate dean for academic affairs in the College of Science and Engineering (CSE), and then served as CSE’s associate dean for research and planning. He also chaired the Faculty Consultative Committee in 2011-2012.

Cramer is a highly regarded researcher in chemistry with a strong track record of funding. From 1992 to 2018, he was awarded, as principal or co-principal investigator, approximately $14 million in individual and small-team grant support from such agencies as the U.S. Army Research Office, the National Science Foundation, the Department of Energy, and the U.S. Environmental Protection Agency. From 2012 to 2017, he served as director of a multi-institutional Department of Energy center focused on scientific discovery through advanced computing. He has been recognized as a fellow by the American Chemical Society as well as by the Alfred P. Sloan and John Simon Guggenheim foundations. He also wrote the textbook, Essentials of Computational Chemistry, and teaches a popular massive open online course, Statistical Molecular Thermodynamics.

As vice president for research, Cramer will oversee the University’s $900 million research enterprise across all its campuses and facilities, including the administration of sponsored projects, research compliance and regulatory offices, and key units dedicated to economic development and technology commercialization.
In memoriam: Professor Emeritus Wilmer G. Miller

PROFESSOR EMERITUS Wilmer Glenn Miller died on Jan. 20, 2018, at the age of 85. He was a professor of chemistry at the University of Minnesota from 1967 to 2001.

Miller was born on Aug. 28, 1932, in Mount Orab, OH, and graduated from Mount Orab High School in 1950. He received a Bachelor of Science degree in 1954 from Capital University in Columbus, OH, with majors in both chemistry and mathematics. An outstanding scholar, he received the American Institute of Chemists Outstanding Senior Award. He earned his doctorate in physical chemistry in 1958, working with Professor Robert Alberty at the University of Wisconsin-Madison in biophysical chemistry. He spent the next year at Harvard University as a U.S. Public Health Service Post-doctoral Fellow with Professor George Kistiakowsky, initiating studies on biodegradation of synthetic proteins. He continued these studies the next year as a post-doctoral associate at the University of Minnesota, overseeing the research group of Professor Rufus Lumry, who was on sabbatical.

In 1960, Miller started as assistant professor at the University of Iowa, teaching physical chemistry and polymer science. In 1964, he was awarded a Guggenheim Fellowship and spent the year with Professor Paul Flory at Stanford University, carrying out experimental and theoretical work on the physical chemistry of biopolymers. In 1966, he was promoted to associate professor at the University of Iowa.

Miller joined the faculty at the University of Minnesota as an associate professor of chemistry in 1967, and was promoted to professor in 1970. In 1972, he spent six months on sabbatical at The Institut Louis Pasteur, Strasbourg, France, with Professor J.M. Lehn, followed by six months as a USA/USSR Exchange Scientist at the Academy of Sciences of the USSR in Moscow with Professor O.B. Ptitsyn. In 1982, he was a visiting professor in the Department of Physics at Universidad Autonoma Metropolitana, Mexico, with Professor Roberto Alexander-Katz and, in 1990, he spent a sabbatical at the Department of Physics, Massey University, New Zealand, with Professor Paul Callaghan.

Miller was a conscientious and patient educator who taught freshman chemistry, undergraduate and graduate physical chemistry, and polymer chemistry. He was advisor to a number of undergraduates, graduate students, and post-doctoral associates. As a research mentor, he gave students broad freedom to pursue projects of mutual interest. His research group was always a nice mix of international and domestic students who found him compassionate and caring. His mentoring and high expectations led many students to success. He was also widely known as a great listener, willing to help students and colleagues alike with all manner of issues, both professional and personal. At various times, he served as director of graduate studies, department vice chair, industrial consultant, assistant journal editor, and grant committee member.

“He shared his time and expertise generously with students and colleagues,” said Professor Wayne Gladfelter who was chair of the Department of Chemistry when Miller served as vice chair.

Professor Miller also worked with Professor Emeritus W. Ronald Gentry during his tenure as department chair. “I remember him as a warm friend and an excellent colleague,” he said. “We became especially close when he served as vice chair during most of my 10-year term as chair of the department. He was quietly effective in everything he did, and was invaluable in navigating the sometimes troublesome waters of departmental administration while leaving the minimum wake. I will miss him.”

Miller’s research touched on a variety of important and interesting problems in polymer and surfactant solutions and dispersions, with a special focus on polymer phase diagrams and structure and dynamics of biopolymers, adsorbed/interfacial polymers, and liquid crystals. His work included the first quantitative test of the Flory-Onsager theory of the isotropic-nematic transition in rod-like polymer solutions. His expertise in light scattering, nuclear magnetic resonance, electron paramagnetic resonance, and thermodynamics made him a valuable resource to many graduate students at Minnesota. He collaborated for many years with colleagues L.E. “Skip” Scriven and H.E. “Ted” Davis in Chemical Engineering & Materials Science (CEMS), on surfactant self-assembly, microemulsions, and their use in what was then called “tertiary” oil recovery. This pioneering collaboration between Chemistry and CEMS also extended to co-teaching an introductory polymer course with CEMS colleagues Matt Tirrell and Chris Macosko. In similar fashion, he co-taught a course in biophysical chemistry with Professor Victor Bloomfield.

Wilmer retired to the North Shore of Lake Superior, where he assisted in building a home. On that site, he also rebuilt a barn that he transferred from his childhood home of Mount Orab. For a few years, he lived in Finland, MN, tending to a herd of reindeer with wife, Ellie.

“He shared his time and expertise generously with students and colleagues.”

—Professor Wayne Gladfelter
New Fellows

Christy Haynes and Jane Wissinger were named Institute on the Environment (IonE) Affiliates. Haynes was inducted as one of IonE’s Fellows, and Wissinger is an IonE Educator. The Fellow honors Haynes for her distinguished intellectual contributions, representing a range of disciplines and fields of professional expertise. As an IonE Educator, during her 14-month fellowship from December 2017 to January 2019, Wissinger will pursue her project, “Connecting Green Chemistry to the Pillars of Sustainability in the Classroom and Beyond.”

Virtual issue honorees

Erin Carlson and Christy Haynes were featured in Analytical Chemistry’s virtual issue, “Highlighting Selected Women in Analytical Chemists.” Haynes is an associate editor of Analytical Chemistry and co-wrote the editorial for the virtual issue. Carlson’s work with Research Specialist Andrew Johnson, “Collision-Induced Dissociation Mass Spectrometry: A Powerful Tool for Natural Product Structure Elucidation,” was one of the 36 advances highlighted in the virtual issue.

Theresa Reineke was featured in Bioconjugate Chemistry’s “Women in Bioconjugate Chemistry: Celebrating Women Scientists” virtual issue. The virtual issue features Reineke’s research, “Lipophilic Polycation Vehicules Display High

Plasmid DNA Delivery to Multiple Cell Types,” which was published in Bioconjugate Chemistry in 2017.

Highly cited researchers

Christopher Cramer and Donald Truhlar were honored on a 2018 Highly Cited Researchers list from Clarivate Analytics. During the last decade, they have produced multiple highly cited papers, which are defined as those ranking in the top 1 percent by citations for a publication field and year. Few researchers earn this distinction.

Department of Chemistry

The Department of Chemistry received the Larry Anderson Award from the Aurora Center for Advocacy and Education. This award is given annually to a community member or campus partner to recognize its partnership in the work of the Aurora Center. It honors those who have shown outstanding leadership as an ally in the Aurora Center’s work, programs, and services. The award emphasized the Department of Chemistry’s “intentional focus on improving the climate of the department, and making efforts to address, interrupt, and prevent sexual harassment.”

Will Pomerantyz promoted to associate professor

THE UNIVERSITY OF MINNESOTA Board of Regents approved the promotion of William “Will” C.K. Pomerantz from assistant professor to associate professor with tenure, effective Sunday, July 1.

Pomerantz has been a professor in the Department of Chemistry since 2012. He also is an affiliate faculty member in the Department of Medicinal Chemistry, Biochemistry, Molecular Biology and Biophysics, and one of the founding members of the Epigenetics Consortium on campus. Before coming to the University of Minnesota, he was a National Institutes of Health post-doctoral research fellow at the University of Michigan. He earned his doctorate in organic chemistry from the University of Wisconsin-Madison, spent a year as a Seydel/Fulbright Fellow at the Swiss Federal Institute of Technology in Zurich, Switzerland, and earned his bachelor’s degree in chemistry from Ithaca College.

Pomerantz’ research is interdisciplinary and mels spectroscopy, cell biology, organic chemistry, and biochemistry approaches. He collaborates with colleagues in the departments of Chemistry, Medicinal Chemistry, and Biochemistry Molecular Biology and Biophysics, and with industrial collaborators at Eli Lilly. A central focus of his research program is the development of new approaches for modulating protein-protein interactions in the field of chemical epigenetics.
We are grateful to the generosity of the donors who are supporting talented and deserving chemistry students through scholarships and fellowships.

Graduate Fellowships

3M Fellowships
Yavedzo Chipangura and Ellen Monzo

Newman and Lillian Bortnik Fellowship
Cecilia Douma

Robert and Jill DeMaster Fellowship
Ellen Monzo and Madeline Zumbach

Lester C. and Joan M. Krogh Endowed Fellowship Fund
Tana O’Keefe

Robert D. Amelar & Arthur St. Lodge Fellowship Fellowship for Outstanding Collaborative Research in Materials
Evan Anderson

Monsanto Franz Innovation Fellowship Award
Connor Frye

Wayland E. Noland Fellowships in Chemistry
McKenna Hanson and Shelby McGuire
Wayland E. Noland Fellowship in Organic Chemistry
Margaret Clapham and Emily Wilborn

Kenneth E. and Marion S. Owens Endowed Fellowship in Chemistry
Huakun Hu

College of Science & Engineering Fellowship
Ryan “Hunter” Wilson

Departmental Fellowships
Steven Butler, Ryan Leighton, and Janaya Sachs

Diversity of Views and Experiences (DOVE) Fellowships
Casey Selle Charging, Nicholas Garcia, and Eliza Herrera

First-year graduate student fellowship recipients for 2018-19 are, back row from left, Tana O’Keefe, Cecilia Douma, Ryan Leighton, Emily Wilborn, Ryan “Hunter” Wilson, Huakun Hu, Steven Butler, and Margaret Clapham; front row from left, Casey Selle Charging, Janaya Sachs, Shelby McGuire, Madeline Zumbach, McKenna Hanson, Nicholas Garcia, Yavedzo Chipangura, Connor Frye, Ellen Monzo, and Eliza Herrera.
Doctoral Dissertation Fellowships
Evan Anderson, Guilhem De Hoe, Grant Fahnhorst, Matthew Vollmer, and Yan Wang

Interdisciplinary Doctoral Fellowship
Shahnam Sharifzadeh

Undergraduate Scholarships

ACS-Hach Land Grant Chemistry Teacher Scholarship
Grace Couchey and Emma Corcoran

Astronaut Scholarship
Elizabeth Zudock

Peteris Auzins Memorial Scholarship
Steven Kelly and Yoonkwn Yi

George B. and Mary Ann Bodem Scholarship
Spenser Marting and Katrina Veit

Stanley G. Bonnema Scholarship
Duc Ho

Robert C. Brasted Memorial Fellowship
James Cox

Churchill Scholar
Merrick Pierson Smela

Thomas DuBruil Memorial Award
Meghan Cahill and Bailey Nebgen

Lloyd W. Goerke Scholarship
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Goldwater Scholar
James Cox

Professor Gary R. & Natalie W. Gray Chemistry Undergraduate Summer Research Scholarship
Samir Ahmed

Dr. Paul F. and Patricia Guehler Chemistry Scholarship
Spenser Marting

Sally Herz Memorial Scholarship
Kaisa Bornhoft and Kyle Topp

David A. and Merese H. Johnson Scholarship
Samir Ahmed, Taylor Davey, and Jarrett Mansergh

Betty A. Lewis Scholarship
Klarisse Andre De St Amant and Ariel Leisso

J. Lewis Maynard Memorial Prize in Advanced Inorganic Chemistry
Marquel Dresel, Sydney Schmidt, Rachel Staebell, and Kathleen Wang

Wayland E. Noland Award for Excellence in Chemistry
Annika Page and Kathleen Wang

Wayland E. Noland Scholarship Fund
David Potapenko

Wayland E. Noland Second Scholarship Fund
Emily Hughes, Katherine Klammer, Olivia Manion, and Joshua Patino

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M. Cannon Sneed Memorial Fund
Joshua Witt

Jane B. Spence Scholarship
Lincoln Brown and Tim Bui

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Jillian Brooks, Colin Bunner, Peter Buttery, Mark Dresel, Steven Kelly, Bailey Nebgen, Jose Valdex, Kathleen Wang, Joshua Witt, and Yoonkwn Yi

Awards

4.0 GPAs for 2017-18
Yukun Cheng, Stephanie Liffland, Celeste Rousseau and Yangzesheng “Andrew” Sun

2018 Gassman Graduate Student Research Symposium honors
Kajari Bera, Beth Dewing, Anna Luke, and Craig Van Bruggen

Honorable Mentions
Stephanie Mitchell, Matthew Porter, Debmalya Ray, and Wenyang Zhao

Robert Brasted Outstanding Undergraduate Teaching Assistant Award
Mark Dresel

Department of Chemistry 2017 Award for Doctoral Thesis Excellence
Jinbo Hu, Ph.D.

Graduate School’s Best Dissertation Award in Physical Sciences & Engineering for 2018
Jinbo Hu, Ph.D.

Honorable Mention Teaching Assistants for 2017-18
Christopher Chao, Ryan Daley, Katherine Jones, Siri Kanchanakungwankul, Noelle Olson, Riddhish Umesh Pandharkar, Claire Seitzinger, Rachel Swedin, and Rachel Voss

2017-18 Overend Award for Graduate Research in Physical Chemistry
Evgenii Fetisov, Ph.D., and Courtney Olson

Robert Ferm Outstanding Teaching Assistant Award
Julia Early, Meghan Knudtzon, and Cynthia Pyles
Students earn international, national honors for their research

Graduate students, post-doctoral researchers, and undergraduates in the Department of Chemistry receive a number of national and international awards for their research. Two of those award-winners are ANNA HUFF and COURTNEY OLSON.

Anna Huff

ANNA HUFF, a fourth-year graduate student working with Professor Kenneth Leopold, earned the Rao Prize at the International Symposium on Molecular Spectroscopy. Her research presentation was on, “Facile formation of acetic sulfuric anhydride in a supersonic jet: Characterization by microwave spectroscopy and computational chemistry.”

This research focused on using microwave spectroscopy to provide detailed characterization of molecules and weakly bound complexes with both fundamental interest and relevance to atmospheric chemistry. Specifically, Anna has been exploring the gas phase formation of carboxylic sulfuric anhydrides from the reaction of sulfur trioxide and carboxylic acids, which could have potential implications in the formation of atmospheric aerosol particles.

Anna is interested in understanding how the properties of molecules change as they evolve into macroscopic samples through molecular clusters. In her research, she accomplishes this by using microwave spectroscopy to characterize small gas-phase complexes and reveal precise experimental detail about their molecular and electronic structure. More specifically, her work involves the exploration of fundamental themes, including microsolvation, proton transfer, and large amplitude motions, often doing so using chemical systems relevant to various atmospheric processes. Recently, Anna has been investigating the hydration of acids and acid anhydrides and elucidating the internal dynamics associated with those systems.

In addition to the Rao Prize, Anna received the Lester C. and Joan M. Krogh Fellowship for 2017-18, an Honorable Mention for the National Science Foundation Graduate Research Fellowship in 2016, and an Honorable Mention for the Department of Chemistry’s Outstanding Teaching Assistant award in 2017.

After graduate school, Anna plans to stay in the Midwest, and pursue an academic position.

Courtney Olson

The Coblentz Society selected fifth-year graduate student Courtney Olson to receive the 2018 William G. Fateley Student Award. The Fateley Award was established in 2010 to honor the career and life of William G. Fateley. Awardees were identified as those who “most closely embody the spirit of Fateley’s desire to promote the science and society of spectroscopy.”

Courtney’s research in the laboratory of Professor Aaron Massari focuses on using two-dimensional infrared spectroscopy to study very fast molecular dynamics in polymer films. On these time scales, the motions of polymeric side chains facilitate liquid and gas diffusion through polymeric membranes and are believed to play an important role in facilitating polymer swelling in solvents.
Courtney’s general research interests encompass using the silicon hydride (Si-H) mode as the vibrational probe in polydimethylsiloxane (PDMS) cross-linked elastomer thin films. By implementing two-dimensional infrared (2D-IR) spectroscopy, she hopes to understand the role of the ultrafast structural dynamics of the polymer when the thin films are physically or chemically altered (like compression and cross-linking density). Her goal is to be able to connect a macroscopic change to the system to the dynamics of the polymer chains.

She is an award-winning graduate student, named one of the recipients of the Overend Award for Graduate Research in Physical Chemistry in 2017-18, and receiving a National Science Foundation Graduate Research Fellowship in 2016.

After earning her doctorate, Courtney hopes to become a post-doctoral researcher, moving toward her long-term goal of becoming a university professor.

**Additional award winners**

Some of the other national and international award winners (awards not given through the University of Minnesota, College of Science & Engineering, and Department of Chemistry) include the following:

- **Junwei “Lucas” Bao, Ph.D.:** 2018 Graduate Award in Theoretical Chemistry given by the American Chemical Society Physical Chemistry Division;
- **Undergraduate Kaitlin “Katie” Landy:** I.M. Kolthoff Enrichment Award from the American Chemical Society Division of Analytical Chemistry;
- **Amani Lee:** second place for two-minute elevator research presentation from the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers;
- **Jingyun Ye, Ph.D.:** top poster, “Computational Study of MOF-Supported Metal Catalysts for Ethylene Dimerization,” at the New Challenges in Heterogeneous Catalysis at the King Abdullah University of Science and Technology conference;
- **David Punihaole, Ph.D.:** Ford Foundation Postdoctoral Fellowship;
- **Spencer Reisbick:** Microscopy & Microanalysis Student Scholar Award;
- **Matthew Vollmer:** U.S. Department of Energy Office of Science Graduate Student Research award;
- **Michael “Joey” Lynch, Thais Scott,** and **Merrick Pierson Smela** received fellowships, and **Derek Batiste, Peter Clement,** and **Celina Harris** received honorable mentions in the National Science Foundation Graduate Research Fellowship Program; and
- **Fazel Zare Bidoky, Guilhem De Hoe, Samuel Stoneburner,** and **Annabelle Watts:** finalists in the 2017 Dow Sustainability Innovation Student Challenge Award competition.
Two important centers receive continuation-funding awards

The Inorganometallic Catalyst Design Center and Nanoporous Materials Genome Center, both located in the Department of Chemistry, have received funding awards to continue their important research.

Inorganometallic Catalyst Design Center

The INORGANOMETALLIC CATALYST DESIGN CENTER (ICDC) received a $12 million grant over four years from the U.S. Department of Energy to continue leading the discovery of a new class of materials used in energy research. Professor Laura Gagliardi directs the ICDC. Nationwide, U.S. Secretary of Energy Rick Perry announced $100 million in funding for 42 Energy Frontier Research Centers (EFRCs) to accelerate the scientific breakthroughs needed to strengthen U.S. economic leadership and energy security. The ICDC is one of only nine existing EFRCs that received renewal for the full four years.

The ICDC is devoted to the discovery of new classes of energy-science relevant catalytic materials, especially through the exploitation of computational modeling to identify underlying structure-function relationships that are critical to advancing further predictive catalyst discovery.

“An outstanding and diverse team of researchers has worked together to make enormous progress on this research over the last four years,” said Gagliardi.

The Inorganometallic Catalyst Design Center’s research partners include Argonne National Laboratory, Clemson University, Massachusetts Institute of Technology, Northwestern University, NuMat Technologies, Pacific Northwest National Laboratory, Stony Brook University, and University of California, Davis.

“We’re excited to have this chance to continue our research, which is opening new fields in catalysis and material science,” Gagliardi added. “Our achievements in the next funding period will further advance our fundamental discoveries that will contribute to energy science and the economy of our entire nation.”

Since 2009, EFRCs nationwide have produced more than 10,000 peer-reviewed scientific publications and generated hundreds of inventions at various stages of the patent process, fostering a range of new technologies that have benefited multiple private sector companies, both large and small.

The knowledge generated by the EFRCs is laying the scientific groundwork for future advances in solar energy, nuclear energy, energy conversion and storage, electronics and computation, production of fuels and chemicals, carbon capture, and control of the Earth’s subsurface. These centers integrate the talents and expertise of leading scientists in a setting designed to accelerate research toward meeting our critical energy challenges.

“America’s continued energy security and global competitiveness will depend vitally on a sustained effort in science and discovery,” said Secretary Perry. “By mobilizing the talents of our nation’s top scientists and forging them into powerful, proactive teams, the EFRC program will help ensure America’s leadership in the development of critical energy technologies and innovations.”

Nanoporous Materials Genome Center

The Nanoporous Materials Genome Center (NMGC) has been awarded a four-year continuation award from the U.S. Department of Energy Office of Basic Energy Sciences, Division of Chemical Sciences, Geosciences and Biosciences. Professor Laura Gagliardi is the founding director of the NMGC. Since 2014, Professor Ilja Siepmann has led the center.

NMGC researchers develop computational/theoretical chemistry methods and data-driven science approaches enabling de-novo design of functional nanoporous materials, discovery and selection of the most promising functional nanoporous materials from databases of synthesized and hypothetical framework structures, and microscopic-level understanding of the fundamental interactions underlying the function of nanoporous materials.

During the next four years, NMGC’s predictive hierarchical modeling toolbox will be applied to increasingly complex chemical separations and transformations in increasing-

“An outstanding and diverse team of researchers has worked together to make enormous progress on this research over the last four years.”

—Laura Gagliardi
ly complex nanoporous materials. Research will be directed toward liquid-phase adsorption and catalysis, multi-component mixtures, flexible framework structures that may undergo phase transitions or post-synthetic modifications and may contain defects, partial disorder, interfaces or be a composite material, and tunable electronic properties of nanoporous materials allowing for luminescence and desirable magnetic coupling and anisotropy.

NMGC involves a tight collaboration with leading experimental groups in the synthesis and characterization of nanoporous materials, which allows for validation of computational predictions for specific separations and transformations. Data management and computing will primarily use current petascale and future exascale capabilities at the Argonne Leadership Computing Facility, the National Energy Research Scientific Computing Center, and the Minnesota Supercomputing Institute.

At the University of Minnesota, the groups of professors Christopher Cramer, Laura Gagliardi, Jason Goodpaster, Ilja Siepmann, Donald Truhlar, and Michael Tsapatsis are part of the collaborative NMGC effort, which also includes researchers from Cornell University, Georgia Institute of Technology, Northwestern University, University of Florida, University of Southern California, University of Toronto, and Lawrence Berkeley National Laboratory.

Elizabeth Zudock receives prestigious Astronaut Scholarship

Elizabeth Zudock, a Chemistry and Chemical Engineering & Materials Science dual major, was one of two students in the College of Science and Engineering to receive a 2018-19 Astronaut Scholarship. This prestigious, competitive scholarship is awarded annually to outstanding sophomores and juniors who intend to pursue research-oriented careers in mathematics, engineering, and the natural and applied sciences.

Elizabeth plans to combine engineering and medicine to create cost-effective therapies that help resolve healthcare inequalities. In pursuit of this goal, she has been working with Chemical Engineering & Materials Science Professor Benjamin Hackel to engineer new proteins with clinical applications. She has already helped develop a cancer-targeting protein. That research is the basis of two articles, one of which has been published in Molecular Pharmaceutics. She is currently working on research with probiotic bacteria to target and kill antibiotic-resistant pathogens.

Elizabeth has also developed her commitment to health care as a licensed Emergency Medical Technician with the University’s Emergency Medical Services and as a Nursing Unit volunteer at Fairview Hospital. On campus, she is a member of the University Honors Program, vice president of the Microbiology Club, community service coordinator for Tau Beta engineering honor society, and a medic for the Pride of Minnesota Marching Band. She is a University of Minnesota Gold Scholar, and a University nominee for the Rhodes Scholarship.
## 2018 Donors

The Department of Chemistry thanks the many generous alumni, faculty, corporations, foundations, and friends listed below for their donations and commitments to support the Department of Chemistry, our faculty, and students. We are so grateful for your support.

This list includes gifts made year-to-date in calendar year 2018 (Jan. 1 – Oct. 30, 2018). Gifts received after those dates will be included in subsequent donor lists.

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For more information on giving or alumni involvement opportunities, please visit our web page at chem.umn.edu, or contact Kathy Peters-Martell at kpeters@umn.edu or 612-626-8282 in the College of Science and Engineering Dean’s Office.
Donations support students with scholarships and fellowships

BY KATHY PETERS-MARTELL

ANOTHER ACADEMIC YEAR is off to a great start and our bright and motivated students are engrossed in their classes and projects. Many of these students are fortunate to be scholarship and fellowship recipients, thanks to the donations of our generous alumni, faculty, and friends.

The importance of student support cannot be overstated. Scholarships and fellowships help the college compete for high-performing students considering other institutions, provide finances to allow students more time to focus on their studies, and put a college degree within reach for students who may not otherwise have the resources to attend the University of Minnesota.

We are so grateful for the many ways our alumni and friends support the Department of Chemistry by funding scholarships and fellowships, volunteering through the mentor program and Chemistry External Advisory Board, and making donations to enhance the academic program. Gifts to the annual fund, along with the support of other alumni and friends, all add up to make a big difference in providing our students with a premier educational experience.

Your support is instrumental to the department and our students. If you have questions or need assistance in making a gift to the department, please contact Kathy Peters-Martell, External Relations Officer for Chemistry, at kpeters@umn.edu or 612-626-8282.
Devarajan Thirumalai receives 2019 Irving Langmuir Prize in Chemical Physics

Alumnus DEVARAJAN "DAVE" THIRUMALAI received the 2019 Irving Langmuir Prize in Chemical Physics, which recognizes outstanding interdisciplinary research in chemistry and physics. The award cites his work on the statistical mechanics of protein folding and the glass transition and analytical and computational approaches to soft-matter systems.

Professor Thirumalai received his doctorate from the Department of Chemistry in the research group of Professor Donald Truhlar. For many years, he served as professor of chemistry at the University of Maryland. Since 2016, he has been chair of the Department of Chemistry at the University of Texas at Austin.

Angela K. Wilson named to Michigan Women’s Hall of Fame

MICHIGAN WOMEN FORWARD named Department of Chemistry alumna Angela K. Wilson, Michigan State University (MSU) Hannah Professor of Computational Chemistry, to the 2018 class of the Michigan Women’s Hall of Fame. This award recognizes Wilson for her career achievements in chemistry and for her efforts in promoting science, technology, engineering, and math for women and girls.

A computational, theoretical and physical chemist, Wilson received her doctorate in chemistry and chemical physics at the University of Minnesota in 1995, under the tutelage of Professor Donald Truhlar. She is internationally renowned for her research in computational chemistry, and is a world leader in the development of quantum mechanical methods. This year, Wilson received a prestigious National Science Foundation Early CAREER Faculty Award. Wilson, who joined MSU in February 2016, also served as director for the Division of Chemistry at the National Science Foundation from March 2016 through July 2018.
Nicholas Race

Nicholas “Nick” Race was born in London and grew up in the city of Leicester in the East Midlands. In 2006, Race began his undergraduate studies in chemistry at St. Edmund Hall, Oxford. As part of his degree, he undertook a final year research project with Professor Timothy Donohoe exploring olefin cross metathesis as a method for the synthesis of substituted pyrroles, for which he was awarded the Brian Bannister Prize for “best final year project thesis.”

In 2010, Race graduated with a First Class MChem degree in chemistry. In addition to his studies, he was also an organ scholar at St. Edmund Hall and performed in numerous recitals on both the organ and piano throughout his time in Oxford.

Race earned his doctorate in organic chemistry in 2015 from the University of Bristol. Under the tutelage of Professor John Bower, he worked on the development of aza–Fleck cyclizations for the synthesis of chiral nitrogen heterocycles. He was also a member of the Bristol Chemical Synthesis Centre for Doctoral Training and received a Faculty of Science Commendation for his graduate work.

After graduate school, Race moved across the globe to Utah where he was a post-doctoral researcher with Professor Matthew Sigman. There he worked on the enantioselective, intermolecular coupling of oxygen nucleophiles and alkenes. This work has resulted in the first highly enantioselective “Wacker-type” oxidation of allylic alcohols.

At Minnesota, Race’s research interests lie broadly in the area of asymmetric catalysis and reaction mechanism. The overall goal of his research projects will be to develop new methodologies for the synthesis of medicinally-relevant “3D” scaffolds. Mechanistic investigation will closely accompany new reaction development such that a deep understanding of the transformation is obtained and the acquired knowledge applied in new synthetic directions.

Outside the lab, Race is an accomplished pianist and organist. He has performed in many concerts in the United Kingdom, including performing two Mozart Piano concertos with the Leicestershire Sinfonia. He has also been privileged to play for services in many cathedrals around the United Kingdom, notably Bath Abbey, Wells Cathedral, and Gloucester Cathedral.

Jeannette Brown writes second book on African American chemists

ALUMNA JEANNETTE E. BROWN, chemist, historian, advocate and author, has written a new book, African American Women Chemists in the Modern Era, which focuses on contemporary women who have benefited from the Civil Rights Act and are working as chemists or chemical engineers. This book tells the stories, taken by oral history, of 18 women who are leaders in their fields and how they succeeded.

This is the second book Brown has written profiling the lives and accomplishments of African American Women chemists. Her first book, African American Women Chemists, which was published in 2012, features outstanding chemists from the earliest pioneers to the late 1960s—a time when an explosion of career opportunities opened up to African Americans due to the passage of the Civil Rights Acts. Each mini-biography is a thorough account of the chemist’s passion for the field, what inspired her, and what she accomplished in her career. Brown rounded out that study with the inclusion of a narrative of her own life story and achievements, and looked at what’s in store for the future of African American women chemists.

Brown, herself, is a pioneer. She was the first African American to receive a degree from the Department of Chemistry’s graduate program, earning her master’s degree in 1958. She received her bachelor’s degree in chemistry from Hunter College. She is a former faculty associate in the department of Pre-College Programs at the New Jersey Institute of Technology. For 25 years, she worked as a research chemist at Merck. She started her industrial career as a junior chemist at CIBA Pharmaceutical, working there for 11 years. She is the 2004 Société de Chimie Industrielle (American Section) Fellow of the Chemical Heritage Foundation, and is a member of the first class of American Chemical Society Fellows (2009).

In addition, Brown is an advocate for science education, and is passionate about serving as a mentor to and role model for underrepresented students. She has participated in countless scientific outreach programs and career days for students at all educational levels—elementary through college. For her work as a mentor to minority students and science education advocacy, she was elected to the Hunter College Hall of Fame in 1991; was honored by the University of Minnesota with an Outstanding Achievement Award in 2005; and received the American Chemical Society national award for Encouraging Disadvantaged Students into Careers in the Chemical Sciences in 2005.

She was featured in the College of Science & Engineering’s spring 2017 edition of Inventing Tomorrow, an edition focused on women scientists including alumnae like Brown who have inspired future generations of women in science, technology, engineering, and math.
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