2023

Chemistry

Shuai Sun

2023 HOPE Award Winner

KU THE UNIVERSITY OF KANSAS

Message from the Chair

Greetings and happy holidays from KU Chemistry. We hope that you enjoyed the holidays and made merry with family and friends. Our Department had an excellent year, and we are eager to share the accomplishments of our students, faculty, staff, and alumni.

This year we welcomed Dr. Mary Beth Carter as Director of Organic/Inorganic Chemistry Labs. Nathan Swank joined us as a new academic advisor, and we welcomed Lizbeth Villanueva as Administrative Assistant for the Center of BioModular Multi-Scale Systems for Precision Medicine. Our wonderful Research Experience for Undergraduates program celebrated its 35th year. (That program is older than some of our junior faculty!) A dedication ceremony marked an official name change in our building from the Integrated Science Building to Gray-Little Hall.

Our annual awards banquet in May provided a time of celebration for students, family, and friends. The new Executive Dean of the College of Liberal Arts and Sciences, Professor Arash Mafi, was the invited speaker. Awards given at the banquet recognized excellence in the classroom and lab and provided critical support for our students. At this year's banquet, we gave out our first Distinguished Alumni Awards to Don Leedy (retired from Procter & Gamble, Ph.D. 1968), Dale Boger (Scripps Research Institute, B.S. 1975), and Michelle Buchanan (U.S. Department of Energy, B.S. 1973).

This year we celebrated those who helped establish the outstanding reputation and collegiality of our Department. Kristin Bowman-James and alumnus Rebecca Roesner organized a symposium in honor of our late colleague Prof. Daryle Busch at the Spring ACS meeting. At a symposium reception, we announced the launch of fundraising for the Daryle Busch Distinguished Professorship. At the 2023 PITTCON meeting, Bob Dunn, Steve Soper, and Sue Lunte organized a reception in honor of our late colleague Prof. Theodore "Ted" Kuwana. This reception included a slideshow honoring Ted and was attended by numerous alumni, faculty, and students. The PITTCON reception also saw the launch of the Theodore "Ted" Kuwana Chair in Chemistry. These two fundraising campaigns offer an exciting opportunity to honor the legacies of Daryle and Ted.

Bob Dunn ended his four-year term as Department Chair in June. I offer Bob heartfelt thanks for his excellent leadership. When he became Chair in 2019, he had no idea he would navigate the Department through a global pandemic, lab shutdowns, and online classes. Even with these challenges, our Department rose to new heights under Bob's leadership. We established the Givens and Wilner Chairs in Chemistry, initiated a Summer Scholars program, and continued our excellence in research and teaching. I have big shoes to fill! I am grateful to Bob for allowing me to shadow him as Chair for a semester. The knowledge and wisdom of our Associate Chairs Jon Tunge and Dave Benson, and of our front office staff of Angie Erdley, Lindsey Roe, Stephanie Chamberlain, and Avery Meadows, have helped for a smooth transition. And, of course, it doesn't hurt to have the most collegial and caring group of faculty you will find.

Rock Chalk Jayhawk!

Best Regards,

Timothy A. Jackson
Professor & Chair

OUR STAFF

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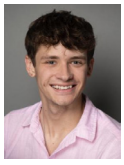

Max Waltmire
Communications Student Assistant
mcwaltmire@ku.edu

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2023 BY THE NUMBERS

19,281
student credit hours taught

#39
chemistry graduate program among public universities

108
graduate students

71
papers published

10
Ph.D. degrees conferred

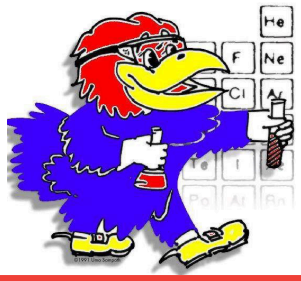
3
M.S. degrees conferred

19
B.S. & B.A. degrees conferred

141
undergraduate chemistry majors

$8,286,292
in research expenditures

$313,000+
in scholarships distributed at annual awards banquet

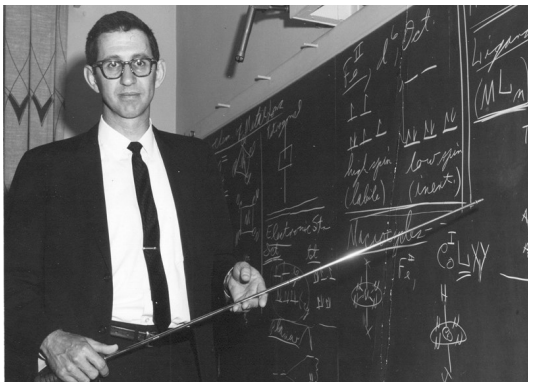


Introducing our new ChemHawk!

This year we held a contest among undergraduate and graduate students challenging them to create an updated design of our beloved ChemHawk. The original ChemHawk (pictured left) was designed in 1991 by Uma Sampath who was a graduate student at the time. Much like the Jayhawk has evolved over the years, so has the ChemHawk. Undergraduate student James Bi won the design contest and we look forward to sharing his creation with our alumni and friends.

Celebrating a Remarkable Legacy

At the spring ACS meeting in Indianapolis, the symposium "Remembering the Legacy of Synthetic Aza Macrocyles" honored our former colleague Daryle Busch. Daryle was a faculty member in KU Chemistry from 1988 to 2013. He passed away in 2021.



Daryle's influence as a scientist and educator was vast. As a researcher, he was the founding father of the field of synthetic macrocyclic chemistry. As a teacher, he inspired his students with the possibility of what one could achieve through hard work and a passion for science. Above all, he was kind and generous. The symposium was organized by former students and post-docs from Daryle's lab: current KU Distinguished Professor Kristin Bowman-James, KU alumnus Rebecca Roesner (Illinois Wesleyan University), Tom Meade (Northwestern University), and Ken Takeuchi (Stony Brook University). The symposium featured talks from students and post-doctoral associates from Daryle's lab and from colleagues during his time at KU. In addition to presentations of outstanding science, the speakers each expressed how they benefitted from Daryle's warm support, either as a mentor or a colleague. A common sentiment was that Daryle made everyone around him better.

One of the final speakers at the symposium was KU's Dan F. Servey Distinguished Professor of Chemical Engineering Bala Subramaniam. Bala spoke fondly of how Daryle served as a critical mentor and collaborator. One of the most influential outcomes of the relationship between Daryle and Bala was the establishment of KU's Center for Environmentally Beneficial Catalysis (CEBC) in 2003.

To honor Daryle Busch's amazing legacy, the KU Department of Chemistry has officially launched a fundraising campaign for the Daryle H. Busch Distinguished Professorship of Chemistry. This fund will establish an endowed Distinguished Professor position in Daryle's name. We hope that you will consider a gift to this fund. Gifts can be sent to the department by using the envelope included in this newsletter, scanning the QR code on this page, or by visiting chem.ku.edu/giving.

Left to right: RV Chaudhari, Daryle Busch and Bala Subramaniam enjoying a CEBC seminar.

Give to the Daryle Busch Distinguished Professorship Fund

20 YEARS AND COUNTING!

The CEBC that Daryle Busch and Bala Subramaniam began in 2003 has blossomed into an internationally recognized research center consisting of 25 affiliated faculty. In September of this year, the CEBC held a 20th Anniversary Celebratory Symposium. The event featured a keynote talk by Prof. Ive Hermans from the University of Wisconsin-Madison and included a 20th Anniversary Address by Bala Subramaniam. To date, the CEBC has provided unique, interdisciplinary training opportunities for more than 50 Ph.D. students. Research projects have resulted in 23 patents and 6 licensed inventions. Company partners, who see clear value in the research of KU faculty at the interface of chemistry and chemical engineering, have invested more than $15 million in this Center!

PITTCON RECEPTION LAUNCHES THE THEODORE KUWANA CHAIR IN CHEMISTRY

The KU Chemistry Department hosted a reception for alumni and friends at the 2023 PITTCON meeting. Attendees enjoyed hors d'oeuvres and drinks at the Hilton Garden Inn Philadelphia Center City. In addition to offering a time for alumni and friends of the department to reminisce and reacquaint, the event served to launch fundraising for the "Theodore Kuwana Chair in Chemistry."

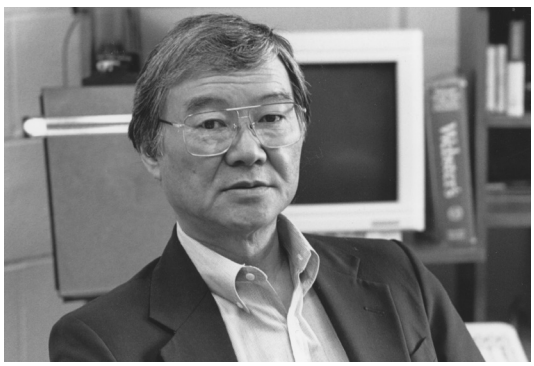
Current KU Chemistry graduate students pose for a photo at the reception.

Theodore "Ted" Kuwana joined the KU Chemistry faculty in 1985 as the Regents Distinguished Professor of Chemistry and Pharmaceutical Chemistry as well as the Director of the Center for Bioanalytical Research. Ted had a truly remarkable career. He authored more than 200 publications, was a leader in the field of bioanalytical chemistry and helped establish the Analytical Sciences Digital Library. He won several awards, including the ACS Division of Analytical Chemistry's J. Calving Giddings Award for Excellence in Education (2004) and the ACS Division of Analytical Chemistry Award in Electrochemistry (1995). A 1964 publication by Ted, R.K. Darlington, and Don Leedy described the unique use of transparently coated tin-oxide glass electrodes to combine optical measurements with electrochemistry. This landmark publication founded the field of spectroelectrochemistry.

The Theodore Kuwana Chair in Chemistry will be an endowed Chair funded through the income generated from the Theodore Kuwana Chair in Chemistry endowment fund. The Theodore Kuwana Chair will initially be a rotating chair awarded every three years to a deserving faculty member in Chemistry in recognition of outstanding work in teaching, research and service. When the invested balance of the fund reaches a certain level, the Department of Chemistry will initiate procedures to establish an endowed Distinguished Professorship to be named the Theodore Kuwana Distinguished Chair in Chemistry. We invite you to help us honor Ted's exceptional legacy as a teacher-scholar by providing a gift to this fund. Gifts can be sent to the department by using the envelope included in this newsletter, scanning the QR code on this page, or by visiting chem.ku.edu/giving.

Give to the Theodore "Ted" Kuwana Chair in Chemistry Fund

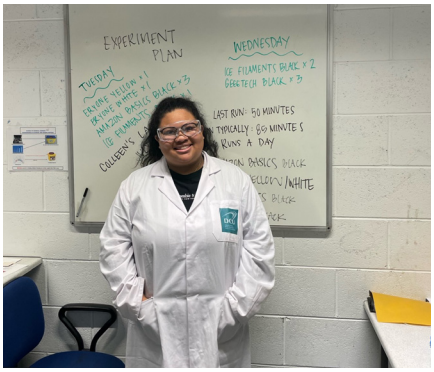
Sue Lunte (left) with Dr. Peter Willis, current PhD student Emily Kurfman, and alumna Kelci Schilly.



Dublin City University Exchange

COLLEEN THACH REFLECTS ON HER SUMMER IN IRELAND

It was the Friday before Spring Break when I found out I was selected for the Dublin City University (DCU) exchange program. This was one of the most exciting moments I have experienced in my time at KU. I first heard about the program through an email from Lindsey Roe and thought I would apply in the hopes I could be chosen to represent the KU Chemistry Department.



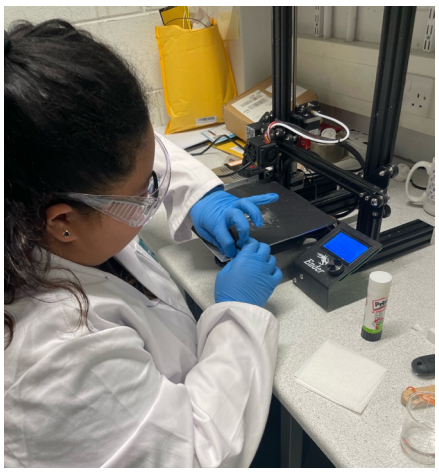
Colleen in Dr. Morrin's lab in front of her schedule of experiments.

Dr. Sue Lunte of KU, her late husband Dr. Craig Lunte of KU, and Dr. Aoife Morrin of DCU, established this program 11 years ago. The opportunity given to me to do a research project abroad was an amazing, life-changing experience. This trip couldn't have happened if it weren't for the generous donations made to the department from alumni and others. These much-appreciated donations make it possible for students like myself and others to dive headfirst into research and strengthen our skills as scientists. Unlike other students before me, this was my first experience in academic research.

My time at Dublin City University, in Dr. Aoife Morrin's lab, taught me a multitude of skills and concepts. I learned how to develop an experimental procedure, use Gas Chromatography-Mass Spectroscopy (GC-MS) instrumentation, WIBS instrumentation, and data processing using programs such as NIST libraries, Agilent Technologies, R Studio, and Excel.

Dr. Morrin's lab primarily had a focus in using analytical methods to identify and quantify various volatile organic compounds (VOCs) from skin as biomarkers for disease and age and VOCs emitted from home 3D printers. In her lab, I worked with a Creality Ender-3 Home 3D printer where I measured and identified various VOCs and the fluorescence of the particulate matter that were emitted from the printer after a print with polylactic acid (PLA) filament. The goal of this research is to educate the public on some of the VOCs and particulate matter that are released from home 3D printers. With the help of Dr. Melissa Finnegan, an analytical chemist at DCU, I was able to create a solid set up of the 3D printer and learn the analytical techniques. At the end of my experience, I am proud to say I am going to have authorship on a paper published in the journal *Sensors*, titled, "Characterisation of volatile and particulate emissions from home 3D printers."

The skills I have learned in this lab are some I hope will be useful in the James Blakemore lab here at KU and beyond. Being able to learn new skills and network in a global city such as Dublin has boosted my confidence to be a good researcher and has left me with unforgettable memories and connections that I will cherish for the rest of my life. I hope all chemistry students see the value in being able to perform research abroad and will apply to be the 2024 student representative. It is truly a life-changing experience and will leave you with memories of a lifetime!



Pictures, top to bottom:

1. Yellow Brick Road Crystal Shop in Dublin near the River Liffey.

2. Colleen with Dr. Melissa Finnegan.

3. Colleen changing the plate on her 3D printer.

4. Beautiful scenery on Colleen's walk along the coast in Dún Laoghaire.

Presenting Our 2023 Summer Scholars

Back row, left to right: Alec Lininger (Schowen Scholar), Evelyn Pinedo (Landgrebe Scholar), Miyuru De Silva (Metrohm Scholar), Joe Mandigo (Marsi Scholar) and Colin Waller (Berger Scholar).

Front row, left to right: Prabhavie Opallage (Berger Scholar), Lindsey Penland (Berger Scholar), Eliza Hanson (Lee Scholar), Georgii Griaznov (Hall Scholar) and Nishama Mohotti (Marsi Scholar).

Not pictured: Neiley Karns (Hall Scholar), Joseph Karnes (Lee Scholar) and Chien-Wei Wang (Lee Scholar).

In the summer of 2021, the department initiated a program to recognize and support the research of outstanding undergraduate and graduate students over the summer. To date, funds generated from the support of our donors have provided tuition, fees and a stipend to 47 students. We appreciate the generous support of our alumni and friends who make programs like this possible.

SCHOLAR SPOTLIGHT: MIYURU DE SILVA

Metrohm Scholar

Congratulations to Miyuru De Silva of Professor (and former Chair) Robert Dunn's group on being selected as this year's Metrohm Summer Scholar. This is the second year of a partnership between KU Chemistry and Metrohm. Since 2022, Metrohm has provided a stipend to support the research of a deserving graduate student over the summer.

Miyuru's research aims to advance capillary electrophoresis techniques for biomarker analysis in metabolic disorders, with the goal of integrating them into an affordable, portable device. The device utilizes a short, metal-coated capillary for efficient separation, employs optimized backscatter interferometry for universal detection, and incorporates a dual detection mechanism using fluorescence for added specificity. Additionally, Miyuru is working on miniaturizing the fluid exchange mechanism with digital microfluidics, which promises to automate sample preparation steps and reduce the overall time and effort required for analysis.

Thank you Metrohm

a look inside...
PROF. WARD THOMPSON'S SABBATICAL

Beginning in general chemistry, students learn how increasing temperature accelerates the rates of reactions. As part of this lesson, they usually do a lab experiment where they construct an Arrhenius plot to quantify this effect in terms of an activation energy. The Thompson group has been developing methods that enable, at least in simulations, the calculation of an activation energy without an Arrhenius analysis. In a nutshell, the idea is to determine at a given temperature how much the reaction dynamics speed up (slow down) when the system has more (less) energy than the average value. This correlation gives the activation energy. During his sabbatical in Spring 2023, Ward visited two collaborating research groups to advance these approaches.

First, he spent two weeks visiting Drs. Christopher Mundy and Gregory Schenter at Pacific Northwest National Laboratory in Richland, Washington. They are working with him to understand the other, less talked about side of the thermodynamic factors controlling reaction rates: the activation entropy. Unlike the activation energy, there is no rigorous way to calculate or measure the activation entropy. Often one is left with approximations or hand-waving arguments that are hard to test. With Chris and Greg, Ward worked on developing methods for directly calculating the activation entropy for a reaction. Combined with knowledge of the activation energy, this would give all the key factors determining the rate constant. Ward's visit enabled some advances in this direction, particularly with respect to long-standing questions about the origins of entropic effects in solvation.

Second, Ward traveled to Paris, France to work with a long-time collaborator, Prof. Damien Laage, at École Normale Supérieure. Visiting Paris is a tough job, principally because it is not easy to choose which pastries to select to power through the hard scientific work. The not widely appreciated answer is: one of each, but start with the chausson aux pommes.

Prof. Laage is an expert in hydrogen-bond dynamics, a topic on which he and Ward have now collaborated for over a decade. On this sabbatical trip, they worked on ideas for how calculating activation energies can help flesh out an exhaustive picture of how hydrogen-bond dynamics determine all the different processes in water, such as diffusion, solvation, and reactivity. As part of this, they completed a manuscript that described a detailed picture of proton transport in water. This is a topic that has spawned many arguments since competing proposals by Eigen that excess protons exist as H_3O^+ and by Zundel that they are delocalized between two water molecules in an $H_2O_5^+$ structure. They found that the protons move through water in a manner gated by hydrogen-bond exchanges. A hydrogen bond is first lost from a water molecule neighboring an H_3O^+ which allows it to share the proton (though it is not delocalized as suggested by Zundel) and then the original water molecule that had the proton gains a new hydrogen bond that locks the proton onto its new water molecule.

The visit also provided an opportunity to pick up past efforts that began when (now Dr.) Zeke Piskulich from the Thompson group traveled to Paris to work with Damien in March, 2020. The planned three-month visit lasted only two weeks thanks to the emergence of the pandemic. Ward's sabbatical visit enabled completion of some of this collaborative work. In particular, Zeke has shown that structural properties of water (which can be obtained from X-ray scattering experiments) are strongly correlated with the water dynamics, including the timescale for the exchange of hydrogen-bond partners (which so far cannot be measured). This insight enables use of the X-ray-derived water structure for inferring the hydrogen-bond exchange time. The sabbatical trip, along with plentiful pastries, enabled Ward and Damien to put the finishing touches on a manuscript describing this development.

Espresso et deux chausson aux pommes. Key fuel for research.

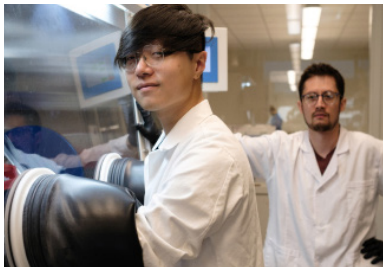
Memorial at KU in honor of Theodore "Ted" Kuwana

The family of Theodore "Ted" Kuwana held a memorial reception at the Lied Center on KU campus on August 5th. Many current and emeritus KU Chemistry faculty were in attendance to pay their respects to the former professor. KU Professor Steve Soper, alumnus Don Leedy and Ted's son and daughter (Eric and Ellen) were among those who shared memories of Ted.

CHEMISTRY REU PROGRAM CELEBRATES 35 YEARS

For the 35th year, the chemistry REU program brought students from primarily undergraduate institutions from around the country to KU for ten weeks of full-time chemistry research, professional development activities and educational programming focused on sustainability.

Back row, left to right: Javan Surtan, Tan Lin, Carben Weghorn, Gabriel Graf, Matthew Will.
Middle row, left to right: Jodie Kearney, Nathalie Moro, Ashlynn Elliott, Kathryn Fore, Reagan Shippy.
Front row, left to right: Favour Oyebadejo, Bridget Ferris, Gabriella Herrera, Cecilia Paranjothi.



Top left: Gabriel Graf in Prof. Tim Jackson's lab with graduate student Sam Brunclik.

Bottom left: Favour Oyebadejo in Prof. Minae Mure's lab.

Bottom center: Tan Lin in Prof. Jon Tunge's lab with graduate student Rafa Diaz Hernandez.

Welcome, Dr. Mary Beth Carter!

Director of Organic/Inorganic Labs

Mary Beth Carter is originally from a small town just outside of Boston, MA and went north to the University of New Hampshire to initially study botany. Tiring of identifying dead twigs, she finally settled on studying chemistry. She earned her M.S. from Barry Trost studying palladium catalyzed cyclizations and her Ph.D. from Steve Burke working on the total synthesis of Scytophycin C at the University of Wisconsin in Madison. Following a short post-doctoral position with Laura Lerner at UW-Madison involving hyaluronic acid synthesis, Mary Beth moved to the Massachusetts Institute of Technology for a NIH postdoctoral fellowship with Steve Buchwald in titanocene chemistry. At the end of her postdoctoral fellowship, Mary Beth moved across Kendall Square to Biogen as a medicinal chemist. After 10 years of working on a variety of small molecule templates for targets such as TGFBR1 (transforming growth factor B receptor 1), CD40L, and VLA4 (very late antigen-4), Mary Beth moved to the intellectual property end of science.

After passing the USPTO patent bar, Mary Beth moved to Lawrence to work as a patent agent at Deciphera, a small pharma company. A five-year stint as a patent agent at Hovey Williams, a boutique IP legal firm in Overland Park, broadened Mary Beth's IP experience beyond small molecule pharmaceutical compounds to include topics such as semiconductors, steel alloys, asphalt, catalysts, polymers, devices, fertilizers, and pre-prepared foods. Mary Beth returned to the pharmaceutical industry as the patent agent and COO of Design-Zyme, a small biotech company in Lawrence in 2015. At Design-Zyme, in addition to her IP work, she learned the joys of grant proposals.

Finally, in August, Mary Beth joined her son Matthew, who is a junior in computer science/journalism, and her husband Peter, who is an Adjunct professor in Molecular Biosciences, at KU as the Director of Organic/Inorganic Chemistry Laboratories.

OUR CHANT RISES

GRADUATE STUDENTS

Degrees (2022 - 2023)
Hayley Blockinger, M.S.
Ashley Borkowski, Ph.D.
Kristen Burns, Ph.D.
Ian Freed, Ph.D.
Piyanka Hettiarachchi, Ph.D.
Ebbin Joseph, Ph.D.
Alex Meier, Ph.D.
Hasini Senanayake, Ph.D.
Yuqi Shi, Ph.D.
Priya Singh, Ph.D.
Chase Stucky, Ph.D.
Sachindra Thippala Gamage, Ph.D.
Chad Vietz, M.S.
Dimuthu Vithanage, Ph.D.
Dhanushka Weerasekara, Ph.D.
Jenna Williams, M.S.
Kaihua Zhang, Ph.D.

NIH Chemical Biology Training Grant Program
James Martinez

Self Fellowships
Elle Bartlett (2023-2027)
Aleesa Chua (2022-2026)
Patrick Connelly (2020-2024)
Madeline Isom (2021-2025)
Natalie Lind (2023-2027)

Outstanding Master's Thesis Award
Jenna Williams

Best Poster Award - 29th Rare Earth Research Conference
Riddhi Golwankar

Best Poster Award - 2023 Great Plains Catalysis Society Fall Symposium
Riddhi Golwankar

Dept. of Energy Office of Science Graduate Student Research Award
Emily Mikeska

ACS Division of Inorganic Chemistry Travel Award
Priya Singh

KU 3-Minute Thesis Finalist
Riddhi Golwankar

UNDERGRADUATE STUDENTS

Degrees (Spring 2023)
Claire Dopp, B.S.
Spencer Einhaus, B.A.
Thomas Finn, B.S.
Evie Gruenbacher, B.A.
Samara Haenggi, B.S.
Zijian (Boris) He, B.S.
Caden Kussatz, B.S.
Taryn McNickle, B.A.
Carolyne Muriu, B.A.
Riley Stegmaier, B.S.
Gaven Stuhlsatz, B.S.
Gavin Wolfmule, B.S.
Elaine Yeh, B.A.

Bricker ChemScholars
Abigail Butler
Brian Faintich
Samara Haenggi
Trisha Nair
Brandon Nguyen
Maya Torres

Kansas ChemScholars
Caden Kussatz
Riley Stegmaier
Gavin Wolfmule

Landgrebe Summer Scholar
Cecilia Paranjothi

KU Astronaut Scholarship
Audrey Rips-Goodwin

KU Campanile Award
Claire Dopp

KU Undergrad Research Award
Cecilia Paranjothi

Award of Excellence for Undergraduate Poster Presentation at PITTCON
Riley Stegmaier

FACULTY

University Scholarly Achievement Award
Tim Jackson

2024 Ralph N. Adams Award in Bioanalytical Chemistry
Sue Lunte

Grant Goodman Undergraduate Mentor Award
James Blakemore

Promotion to Full Professor
Marco Caricato

Sabbaticals
James Blakemore
Ward Thompson

Best of Lawrence: Teacher at KU
Shuai Sun

ACS PRF Award
Rachael Farber

2023 Hope Award
Shuai Sun

Welcome, Nathan Swank!

Undergraduate Academic Advisor

Nathan Swank officially joined KU in October 2022 and the Chemistry Department in November 2022 as an undergraduate advisor. He is originally from Meriden, KS and has resided in Topeka since 2016. He earned his B.S. in Secondary Education in 2007 at Kansas State University. Before joining KU he has worn many hats throughout his professional career. He has worked in the foster care system, with Child Support Services and as an Admission Counselor with Flint Hills Job Corps. When he is not helping the awesome students he supports, he is running around Northeast Kansas attending as many baseball games as possible to support his son. When they have a minute to relax, they love to watch action movies, play video games and attend KU basketball games. He also enjoys working on his home and doing various projects. He looks forward to working and engaging with all of the amazing students that want to earn a degree in Chemistry from KU.

GSO UPDATE

The chemistry graduate student organization (ChemGSO) started off 2023 with a new set of officers who were excited to continue GSO's mission to maintain communication within the chemistry department as well as to promote professional development opportunities for all chemistry graduate students. In both February and August, successful baked goods fundraisers were led to help GSO raise funds for future professional development and social events. In early March, the department organized GROW, the recruitment weekend for incoming graduate students, with help from graduate student representative Elle Bartlett. Later in March, ChemGSO partnered with the Physics GSO to organize the third annual PALOOZA, a one-day local symposium where students were given the opportunity to give a talk or present a poster on their research. This was a great opportunity for graduate students to discuss their work and to learn about the interdisciplinary research happening within the physics and chemistry departments. In April, ChemGSO hosted KU alum Dr. Mary

Krause as part of an industry visit from Bristol Myers Squibb. Here, graduate students were offered opportunities for mock interviews as well as a panel discussion with Dr. Krause to learn more about industry jobs. In June, the department welcomed the Summer 2023 REU students with a picnic that ChemGSO helped put together. Later in the summer, ChemGSO helped to organize another picnic to welcome the incoming chemistry graduate students to KU. In September, ChemGSO organized a research open house where every chemistry research group put on a poster to display their research to the incoming graduate students and undergraduate students who were interested in research. In early November, a second industry visit from Bristol Myers Squibb was organized by hosting KU alum Dr. Kelci Schilly. This visit gave graduate students another opportunity to learn about industry jobs and to get one-on-one time with Kelci to gain interviewing skills and résumé advice. Finally, ChemGSO is planning to put on the annual T-shirt design contest where the graduate students get to display their creativity by coming up with graphic designs for the 2023 ChemGSO t-shirt. If you would like to get involved with or collaborate with GSO, please contact us at kuchemgso@gmail.com and check out our webpage at https://chem.ku.edu/chemgso.

CONGRATULATIONS, TOM LINZ!

Tom Linz, a 2013 graduate from the Ph.D. program and former member of the Sue Lunte Group, received the 2023 Satinder Ahuja Award for Young Investigators in Separation Science. Tom Linz is currently an Associate Professor at Wayne State University.

SAM BRUNCLIK ELECTED TO ACS PRIDE SUBDIVISION

Sam Brunclik, 5th year PhD student and member of the Tim Jackson Group, was recently elected the chair-elect of the American Chemical Society (ACS) Pride Subdivision of the ACS Division of Professional Relations (PROF). Sam will serve as chair-elect for 2024, as chair in 2025, and as past-chair in 2026. In this position he will advocate for fellow LGBTQ+ chemists both inside and outside of the ACS.

"I've always been interested in advocating for more LGBTQ+ representation in chemistry as it was something I didn't see very much of in my undergraduate education. I am very excited to begin my work at a national level, where I hope to make lasting and impactful change on attitudes and policies, both inside and outside of the American Chemical Society," Sam said.

ALUMNI SPOTLIGHT: MASA TAMAKI

We recently heard from Masa Tamaki, a 1974 graduate of the KU Chemistry Ph.D. program.

Masa completed the Ph.D. program in just three years - a feat he is very proud of. After graduation, Masa worked for the Dow Chemical Company in Tokyo, Japan for 30 years, travelling the world to create new businesses.

When asked who his favorite professor was Masa said, "By far, Prof. Earl Huyser." He noted Prof. Huyser's good sense of humor, warm demeanor and the fact that he was a family man.

These days, you'll find Masa playing piano and singing opera, both activities he took up in retirement.

ANNUAL CAAB MEETING

The Chemistry Alumni Advisory Board (CAAB) met on campus in May, the day after the annual awards banquet and graduation recognition ceremony. The CAAB meets twice a year, once virtually and once in-person, to strategize with KU Chemistry leadership on opportunities for advancement for the department and its students.

Left to right: Donald Leedy, Ben Spry, Katie Mitchell-Koch, Sriram Naganathan, Keith Wilner, Ivan Mefford, Lisa McElwee-White, Jeff Johnson, Nancy Winchester and Dale Boger. **Not pictured:** Michelle Buchanan and Osborne Wong.

PROF. SHUAI SUN RECEIVES HOPE AWARD FOR TEACHING

During halftime at a KU football game on November 18th, Prof. Shuai Sun received the HOPE (Honor an Outstanding Progressive Educator) Award. Prof. Sun has been a member of the KU Chemistry Department since 2016, and he regularly teaches multiple general chemistry courses each semester. These courses consistently enroll 300 – 600 students. During that time, Prof. Sun has established himself as one of the most popular educators at KU, and he has made a difference in the educational journey of hundreds of students. Students appreciate Prof. Sun's upbeat lecture style and the dedication and compassion he provides to help students succeed both in and out of the classroom.

Prof. Sun has also won first place as Teacher – University of Kansas in the yearly Best of Lawrence competition for five years in a row (2019 – 2023)!

The Chemistry Department has a history of success with the HOPE Award. Prof. Clark Bricker, who was legendary for his skill as a teacher, won the HOPE Award a remarkable four times. Current KU Professor Paul Hanson won the HOPE Award in 2006, and Profs. Tim Jackson and Chris Elles were finalists for the HOPE Award in 2014 and 2016, respectively. The HOPE Award was established in 1959 and is given each year by the senior class through the Student Alumni and Endowment Board.

Photo by Missy Minear.

Alumni Profile

Dr. Chelsea Comadoll

Assistant Professor of Chemistry
MidAmerica Nazarene University

Dr. Chelsea Comadoll attended the University of Kansas as a grad student, earning her Ph.D. in chemistry in 2021 under the direction of Prof. James Blakemore. Currently, she is an Assistant Professor of Chemistry at MidAmerica Nazarene University in Olathe, Kansas. Born and raised in North Carolina, she was attracted to KU for three main reasons: encouragement from a professor who is a KU alum, admiration for former professor Mike Clift's research group, and a love for the Jayhawk and KU basketball.

Chelsea Comadoll with Emily Mikeska during her class's visit to KU.

"Chemistry just makes sense to me... it always has. I find that studying chemistry continually gives me a glimpse into the mind of God and the intricacies of His created world," she says. Pursuit of the unknown is a great passion of hers, and passing that love on to future generations of scientists is something she finds incredibly rewarding.

In January, Dr. Comadoll brought her inorganic chemistry lecture students to KU to collaborate with the Chemistry Department for an activity. "I collaborated with my former lab mate, Emily Mikeska, to teach my inorganic chemistry lecture students about x-ray crystallography. Emily is very passionate about x-ray crystallography, and I knew she could teach my students about this technique much better than I could have!"

"Chemistry just makes sense to me... it always has."

This collaboration between the two universities included a visit to MNU from Emily to give a lecture on the theory of x-ray crystallography, as well as a visit of the students to KU for a tour of Gray-Little Hall's crystallography lab. Students viewed crystals under microscopes, harvested and mounted those suitable for diffraction, and were shown how to work up the data collected. "The collaboration was a big hit with my students!" She was very happy to introduce her students to both the technique itself and the high-quality facilities here at KU.

Having been an assistant professor for three semesters (just finishing her fourth), Comadoll says she has already achieved many of her goals. "This past spring, I helped five of my chemistry majors get into top REU programs across the country, and a sixth worked with Prof. Steven Bloom last summer in the Medicinal Chemistry department at KU." She says she has also gone on to work with eight different undergrad research assistants, with several deciding to continue their work and get their Ph.D.

Comadoll still has much more on her bucket list to complete even after all this progress – "My outstanding goals at this point are to publish my first paper as a corresponding author, to get my first student into graduate school, to submit at least one grant proposal, to continue improving my teaching style ... and to eventually be promoted to associate professor." Clearly, she is far from finished in her chemistry journey.

This journey of growth will look different for everybody, she says. She advises to embrace setbacks and failures as a learning experience – learn from your mistakes. Success is never easy, so embrace hardships and develop resilience. "If you do your best and give it your all, then give yourself grace and find a way to be proud of yourself, regardless of the outcome."

An Interview with Prof. Sue Lunte

You serve as the Director of the Adams Institute at KU. Can you give us some historical background on the Adams Institute and what work is currently being done there?

The Adams Institute and the Ralph N. Adams Professorship were envisioned by Ted Kuwana and Don Leedy and they were established in 2006. Ralph was a pioneer in bioanalytical chemistry and was known for collaborating across disciplines. In 2006 when I became the Adams Professor, I also assumed the directorship of the Adams Institute. The goal of the institute is to promote bioanalytical Chemistry at the University of Kansas. The official statement is on our website:

"The Ralph N. Adams Institute for Bioanalytical Chemistry is an interdisciplinary consortium of researchers dedicated to achieving international leadership in bioanalytical science by fostering the highest quality research and education in the field of bioanalytical chemistry."

The institute helps with seminars and short courses. It is in charge of several fellowships and travel awards given through the institute by Adams alumni including Ted Kuwana, Don Leedy, and Eddie Seo. The Adams Lectureship is also run through the institute.

Currently the Adams Institute administers the COBRE Center for Molecular Analysis of Disease Pathways, which provides funding for seminars, faculty recruitment, start-up, and research projects. We hope to have a 100th birthday symposium in honor of Buzz (and Ted) next fall.

What do your responsibilities as Director of the Adams Institute include?

My main responsibility is to promote and advocate for analytical chemistry at KU. Since the institute budget initially only consisted of funding for a half-time assistant, my primary goal when becoming director was to identify funding to support the institute. We accomplished this in 2012 with the funding of the COBRE Center for Molecular Analysis of Disease Pathways, which is run through the Adams Institute (CMADP). CMADP also increased the presence of analytical chemistry throughout the university with the establishment of three analytical core labs: KU nanofabrication facility, genome sequencing core, and the molecular probes (synthetic chemical biology) core. These three cores provide analytical tools to KU researchers and other researchers in the region.

Prof. Sue Lunte (fourth from the left) joined for dinner by KU Chemistry alumni, faculty, and friends.

How have you seen the Institute change during your time as director? What are you most proud of?

A key moment was the funding of the COBRE, since that significantly increased the resources available to promote analytical science at KU. I am probably most proud of the fact that the Adams Institute/CMADP has helped many faculty at KU and throughout the state with competing successfully for NIH funding. It has also helped attract several faculty members to the chemistry department including Steve Soper, Meredith Hartley, Aaron Teator, Rebecca Whelan, and formerly Mei He and Yong Zeng.

While in San Francisco at the fall ACS meeting, you had dinner with KU Chemistry alumni as well as Gus Manning, whose contribution helped establish the Adams Institute and Adams Professorship. Can you talk about who was there and what that gathering meant to you?

At the dinner we had a bunch of alumni from my group and Craig's (late husband and former KU Chemistry faculty member) research group. Many of them are very successful faculty members in analytical chemistry (Scott Martin, Chuck Henry, Lisa Holland, Tom Linz, Julie Stenken, and Rachel Saylor). Others who were there are in industry (Galina Bulgakova, Ryan Johnson, Dulan Gunasekara, and Michael Hogard). It was gratifying to be able to show Gus some of the individuals that he has helped by giving money to KU to establish the Adams Institute. It was an opportunity also for me to personally thank him for his generosity and support.

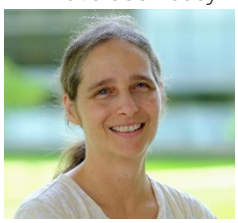
Out of all of the achievements and awards throughout your career, which one are you most proud of?

Ralph N. Adams Professorship, Adams Award, CMADP, the successes of all my former graduate students, postdocs, visiting scientists and undergraduate researchers. And most importantly, being a mother of two incredible daughters and a new grandmother of baby Jack Craig Lunte.

Sutton Family Research Impact Awards

Every month the peer-reviewed papers published by chemistry faculty from the three previous months are reviewed by the Chemistry Department Chair and Associate Chairs and a winner is named. The monthly recipient of the Sutton Family Research Impact Award receives a cash prize of $500 thanks to the generosity of the Sutton family who initiated the endowment fund that supports this monthly competition.

THE HEATHER DESAIRE RESEARCH GROUP

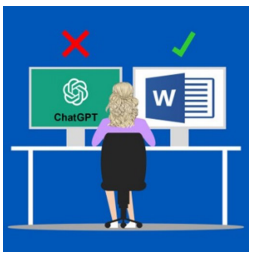


Researchers in the Desaire group have been busy this year using ChatGPT. Fascinated with the speed with which ChatGPT generates authentic-sounding text, even on obscure topics, the Desaire group immediately wondered if they could develop a tool to differentiate AI-generated text, made by ChatGPT, from the writing of a real human scientist.

Some journals allow ChatGPT to be used for assisting the writing process, while others do not. Even in cases where ChatGPT is allowed, researchers are supposed to disclose its use. Very few disclosures are being made. Without a tool to accurately distinguish human writing from AI, nobody knows the extent to which this tool is already infiltrating academic literature.

The Desaire group leveraged their expertise in machine learning and developed an AI tool to distinguish AI writing from human writing. (Yes, there is some irony here.) Their approach was shown to be over 99% accurate on hundreds of example documents and was recently published in Cell Reports Physical Science. The manuscript is available open-access at: http://bit.ly/Desaire_ChatGPT

Since its publication, the study has piqued the interest of reporters and science writers, and Desaire has fielded questions from journalists from across the globe who wanted to know more about the work. Their stories appear in news articles in Brazil, Japan, Israel, Australia, England, and the US.



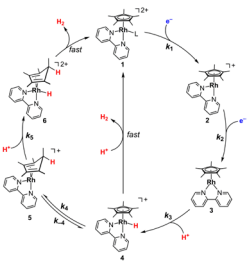
Prof. Desaire won the July 2023 award with this paper. Congrats!

THE JAMES BLAKEMORE RESEARCH GROUP

Hydrogen could be the "fuel of the future," powering fuel cell cars and other devices. However, much of the hydrogen currently used is generated by steam reforming of methane, a fossil fuel. Thus, even though hydrogen is a clean fuel, the use of methane to produce hydrogen generates carbon dioxide. The development of electrocatalytic approaches to generate hydrogen from water, with only gaseous oxygen as the co-generated byproduct, would yield "green" hydrogen without carbon dioxide.

In a recent paper, the Blakemore lab explored the chemical steps involved in hydrogen generation for a rhodium catalyst. The study revealed a Cp* ligand helps bring together the two protons (H^+) and electrons (e^-) that ultimately produce hydrogen, H–H. In 2016, the first evidence appeared that a Cp* ligand could be involved in holding one H^+ in an intermediate. (This intermediate differs from the more common intermediate where the H^+ reacts to yield a rhodium hydride.) Studies of the interconversion of such hydrides and protonated ligand complexes occupied a great deal of the Blakemore Group's research efforts between 2016 and 2022. This most recent study in Proc. Nat. Acad. Sci. unpacked the elementary reactions in the transfer of e^- and H^+ to the rhodium catalyst, as well as the reactions that bring them all together in the product.

This work was a collaboration between KU and Brookhaven National Laboratory (BNL). The KU team prepared the metal complexes and starting materials and completed kinetic studies using stopped-flow UV-visible spectroscopy. Former graduate students Wade Henke and Yun Peng took the lead on this work. At BNL, collaborators David Grills, Dmitry Polyansky, and Etsuko Fujita led pulse radiolysis and time-resolved UV-visible and infrared spectroscopic experiments. The joint work represents a powerful combination of expertise that enabled study of a very unusual catalytic system using cutting-edge techniques.



Prof. Blakemore won the June 2023 award with this paper. Congrats!

STUDENT AWARDS BANQUET & GRADUATION RECOGNITION CEREMONY May 7, 2023

KU CHEMISTRY HONORS THREE ALUMNI WITH DISTINGUISHED ALUMNI AWARD

Dale L. Boger, B.S. 1975
Richard & Alice Cramer Professor of Chemistry, Scripps Research Institute

Michelle V. Buchanan, B.S. 1973
Senior Technical Advisor to the Deputy Director for Science Programs, U.S. Department of Energy's Office of Science

Donald W. Leedy, Ph.D. 1968
Retired, Procter & Gamble

New in 2023, the Distinguished Alumni Award is presented to a KU Chemistry alumnus/alumna who has distinguished themselves in their career and in their contributions to the University, state, or country. The three recipients were honored at the annual awards banquet and graduation ceremony.

UNDERGRADUATE STUDENTS

Owen W. Maloney Scholarship
Nicole Giam
Bijan & Mary Taylor Amini Scholarship
Ethan Le
Ben Mosier
Frances Gayetta Hanna Lenser Scholarship
Darya Moiny
Leonard V. Sorg Scholarship
Abigail Butler
Michelle & A.C. Buchanan Scholarship
Allison Babbit
Kenyon Latham Oopportunity Award
Stanslaus Kariuki
James P. & Sharon A. Elrod Scholarship
Chase Courbot
K. Barbara Schowen Scholarship
Hannah Chern
Jacob Kleinberg Award
Trisha Nair
Roger Munsinger Scholarship
Roy Manns
Adrienne Hiscox Mitchell Scholarship
Celine Khalife

Emily V. Berger Award
Evie Gruenbacher
Elaine Yeh
Gini Adams Research Award in Analytical Chemistry
Taryn McNickle
Frank Newby Physical Science Award
Claire Dopp
Spencer Einhaus
Thomas Finn
Gaven Stuhlsatz
Wakarusa Valley ACS Section Award
Caden Kussatz
American Institute of Chemists Award
Gavin Wolfmule
Richard J. Bearman Chemistry Award
Samara Haenggi
Alpha Chi Sigma Award
Riley Stegmaier
ACS Analytical Division Award
Riley Stegmaier
ACS Inorganic Division Award
Claire Dopp
ACS Organic Division Award
Gaven Stuhlsatz

Burton & Cheryle MacKenzie Scholarship
Indika Warnakula
Chien-Wei Wang
Maximillian Chibuike
Hanna Nguyen
Ian Freed
Drs. Walter & Roy Cross Memorial Award
Emily Mikeska
Matthew Zupan
Kristina May Paquette Scholarship
Patrick Connelly
Robert & Emily Williams Community Service Award
Kasun Wekasinghe
Steve & Susan Snyder Chemistry Award
Naviya Schuster-Little
Reynold T. Iwamoto Scholarship
Nishama Mohotti
Takeru & Aya Higuchi Award in Physical Chemistry
Hasini Senanayake
Bijan & Mary Taylor Amini Scholarship
Miyuru De Silva

The student awards banquet and graduation ceremony took place on Sunday, May 7th this year. We were joined by the Chemistry Alumni Advisory Board members who were in town for their annual meeting as well as several donors, faculty, staff, and families of students being recognized for their achievements. It was a very special celebration as always. We also awarded Prof. Bob Dunn with his very own Jayhawk statue to thank him for his service to the department for the past four years as Chair.

John Shapley Award for Excellence in Research
Brandon Nguyen
Leland & Jill Weigel Scholarship
Cecilia Paranjothi
Brian Faintich
Burton & Cheryle MacKenzie Scholarship
Eden Brenneman
Ralph E. & Esther Weik Badgley Award
Jiani Osborn
Kristina May Paquette Scholarship
Marcus Stevenson
Steve & Susan Snyder Award
Audrey Rips-Goodwin
Walter Gubar Memorial Scholarship
Colleen Thach
Keith & Dona Darlington Scholarship
Theresa Read
Floyd & Ruth Fassnacht Memorial Scholarship
Eleazar Abraham
Jack & Carolyn Landgrebe Summer Undergraduate Research Scholarship
Cecilia Paranjothi

GRADUATE STUDENTS

Dains Memorial Scholarship
Elizabeth Bartlett
H.P. Cady Award
Aleesa Chua
Richard & Sue Givens Scholarship
Deshkanwar Brar
Ray Q. Brewster Award
Joe Mandigo
Cornelius McCollum Research Scholarship
Fynn Cooper
Alex Ervin
Katie White
Taylor Parsons
Elmer McCollum Research Scholarship
Davis Curry
Thomas Milne Scholarship
Madeline Isom
Adrienne Hiscox Mitchell Scholarship
Jenna Williams
Dami Fateru
Neiley Karns
Shreyaa Brahmachari

Women in Chemistry Opportunity Award
Prabhavie Opallage
Charles & Beatrice Kulier Scholarship
Emily Kurfman
Glen & Karen Cox Chemistry Scholarship
Prasenjit Srivastava
George & Beverley Wilson International Student Support Award
Sachindra Gamage
Frank B. Dains Award in Organic Chemistry
Ebbin Joseph
Ernest & Marvel Griswold Award in Inorganic Chemistry
Riddhi Golwankar
J.K. Lee Award in Analytical Chemistry
Piyanka Hettiarachchi
Paul & Helen Gilles Award in Physical Chemistry
Ashley Borkowski
Takeru Higuchi Doctoral Progress Award
Priya Singh

CHEMISTRY + BIOLOGY | WORKING TOGETHER

Left to right: James Martinez, Robert Cichewicz, Matt Russollilo, Brian Ackley, Rebecca Whelan and Erick McCloskey.

The Chemistry Department at KU has a long history of research excellence at the chemistry-biology interface. That legacy is exemplified by the long-running NIH Training Grant in Chemical Biology, which provides research funding to graduate trainees and interdisciplinary coursework and professional development opportunities to graduate students across several departments. Chemistry faculty such as Dick Schowen, Kristin Bowman-James, Paul Hanson, and Tim Jackson have worked with colleagues in the Departments of Molecular Biosciences, Pharmaceutical Chemistry, and Medicinal Chemistry to administer this program. Currently, the program is led by Brian Ackley (Molecular Biosciences) and Rebecca Whelan (Chemistry). More recently, Jon Tunge (Chemistry) and Scott Hefty (Molecular Biosciences) established the NIH Center of Biomedical Research Excellence (COBRE) focused on the Chemical Biology of Infectious Disease. One of the aims of the center is to provide support to junior faculty working in this research area. Given the complementary aims of the NIH Training Grant and COBRE programs, it was natural for them to join forces for an annual symposium. This October saw the second annual KU Chemical Biology Symposium, held in Lawrence, KS. This two-day event included a keynote lecture from Dr. Robert Cichewicz, Regents' Professor in the Department of Chemistry and Biochemistry at the University of Oklahoma. His talk entitled "Assessing Continental-Scale Fungal Natural Product Diversity to Enhance Bioactive Lead Discovery" highlighted the discovery of natural products from fungi to fight infectious disease. The symposium also provided an opportunity for junior faculty and graduate students to present their research to a diverse audience. A poster session and lightning talks provided graduate students with opportunities to share their exciting discoveries in chemical biology and hone their communication skills.

The symposium was held at the new Jayhawk Welcome Center, pictured below.

2023 SCHOWEN LECTURES: PROF. CATHERINE DRENNAN

Professor Catherine L. Drennan from the Massachusetts Institute of Technology presented the 9th Biennial Richard L. Schowen Lectures in Bioorganic Chemistry on April 6 and 7. The Lecture Series was established by former students of Prof. Dick Schowen and has featured preeminent bioorganic chemists over the last twenty years including the 2022 Nobel Prize Winner, Professor Carolyn Bertozzi.

Prof. Drennan is a true teacher-scholar and has won recognition for both her scientific and educational endeavors. Most notably, she has been named a Howard Hughes Medical Institute Investigator (for scientific research) and a Howard Hughes Medical Institute Professor (for education research). Prof. Drennan studies the structure and mechanism of metalloproteins using a combination of x-ray crystallography and cryo-electron microscopy. Her scientific lecture focused on her work determining the structure and mechanism of ribonucleotide reductase, which carries out a unique, long distance radical transfer. Her education interests were featured in the public lecture, in which she discussed resources that she has developed to improve lectures in general chemistry. She developed a series of 2 minute videos in which MIT researchers talk about how concepts from general chemistry are important for their research. Prof. Drennan's passion for education was clear from her entertaining and informative lectures.

Prof. Drennan's visit included meetings with faculty from across KU including the Center for Teaching Excellence. She was also enthusiastic to meet with undergraduate and graduate students on campus during lunch and the Schowen Lecture Reception. Dick and Barbara Schowen attended both lectures and introduced Prof. Drennan to KU with the official "Schowen" campus tour followed by dinner.

Welcome, Lizbeth Villanueva!

Administrative Assistant, Center of BioModular Multi-Scale Systems for Precision Medicine

Lizbeth Villanueva is a Kansas native and moved to Lawrence in 2021 to attend the University of Kansas after receiving her associate's degree in liberal arts & sciences from Johnson County Community College. During her time as a student at the University of Kansas, Lizbeth was an active member of both the KU Filmworks and KU Screenwriters Club. She was also the student assistant for Digital Production at the KU School of Social Welfare. Lizbeth was a 2023 Mike & Lynette Robe Screenwriting Finalist and a recipient of KU Film Career Week in LA 2023. Lizbeth has also been awarded multiple grants to support her passion for video creation. Her work is driven by an unwavering commitment to producing digital media that focuses on human health and social issues. Now, equipped with a B.A. in Film and Media Studies with a focus on production and a minor in Psychology, Lizbeth is excited about embarking on a new journey as the Administrative Assistant for Dr. Soper in the Center of BioModular Multi-Scale Systems for Precision Medicine (CBM²) within the KU Chemistry Department. Her mission is to enhance the visibility of the impactful work being conducted by CBM², using her skills in digital media to achieve this goal. In her free time, you can find Lizbeth either immersed in the pages of a good book while basking in the sun at a local park, or cozily nestled in a coffee shop, enjoying the simple joys of life.

Prof. Rachael Farber Elected Vice Co-Chair of Conference

In 2025, Prof. Farber will assume the position of Vice Co-Chair of the Dynamics at Surfaces Gordon Research Conference along with Prof. Kurt Kolasinski of West Chester University. In 2027, they will be Co-Chairs. Congratulations to Prof. Farber!

2023 Midwest Retreat for Diversity in Chemistry

It was another successful year for the Midwest Retreat for Diversity in Chemistry (MWRDC)! Ph.D. Student Indika Warnakula represented KU on the planning committee and played a major role in planning the retreat and recruiting sponsors.

The MWRDC focuses on groups that are underrepresented in chemistry careers and aims to help graduate and postdoctoral chemists in their career search. This event was founded by and is currently advised by Dr. Robbyn Anand at Iowa State University. Retreat attendees are connected to a network of colleagues and mentors and are taught strategies for career success and advancement into leadership roles.

This year's retreat took place June 23-25 at Park University in Parkville, MO. The retreat had record attendance with more than 50 graduate students and postdocs from throughout the Midwest, as well as early-career chemists from academia, industry, government, and other fields, who were recruited to serve as mentors for attendees. The retreat featured workshops on science communication, reducing bias, and promoting wellness in STEM, as well as several breakout sessions on topics such as CV/resume writing, effective communication in the workplace, and inclusive design and science policy. Dr. Chris Bannochie from Savannah River National Laboratory delivered the keynote presentation, and Dr. Miranda Paley from Noblis and Dr. Anne Lynn Gillian-Daniel from the University of Wisconsin-Madison served as workshop leaders. "We aim to continue growing the MWRDC community with each retreat, and hope attendees will return in the future as mentors who can share a positive, proactive approach to career success and diversity, equity, and inclusion with the next generation," Indika said.

THE CARNIVAL OF CHEMISTRY 2023

The second in-person Carnival of Chemistry since the end of the pandmemic was another success for the department with more than 700 in attendance. With stations including (but not limited to) oobleck, strawberry DNA extraction, and an elemental scavenger hunt, families flocked to see our volunteers facilitate fun and informational activities.

Hosted by the Chemistry Department, the annual free Carnival also contains some physics, engineering and geology stations. With a wide range of experiments and activities we hope to inspire young future scientists in attendance. The Carnival was held the Sunday before Thanksgiving, November 19th from 1 to 4 p.m.

Summer Undergraduate

ELEAZAR ABRAHAM

Earlier this year, I had the opportunity to perform research at the Cancer Prevention & Research Institute of Texas (CPRIT) Summer Undergraduate Program. This program was held by MD Anderson Cancer Center (MDACC) in Houston, Texas. The program ran 10 weeks (Jun 5 – Aug 11), and I was assigned a mentor to work on a cancer research project throughout the summer. I was mentored by Albert C. Koong, MD, PhD, in the Department of Experimental Radiation Oncology.

My project was to investigate the role of the HBEGF-XBP1s signaling pathway in pancreatic cancer. Signaling pathways with XBP1, which are involved in the unfolded protein response, are also involved in tumor proliferation. Heparin-Binding EGF-Like Growth Factor (HBEGF), a member of the epidermal growth factors (EGF), upregulates the expression of XBP1 in pancreatic cancer. However, the way this HBEGF-XBP1s pathway specifically promotes pancreatic cancer progression is still largely unknown. We found that Siah2, a molecule known to be regulated by XBP1s, was also upregulated by HBEGF. I learned methods like immunohistochemistry, flow cytometry, clonogenic assays, and quantification through ImageJ to procure my results. As a chemistry major, these intricate analytical methods were the highlight of my work.

The experience exposed me to a new frontier of research. The summer deepened my fascination that cancer is paradoxically one of the simplest yet most complex diseases. I am mesmerized by the complexities that arise in cancer from such fundamental causes. I learned that signaling pathways play a central role in cancer. This program honed many skills and increased my motivation in my career path to become a physician-scientist in the field of cancer.

In addition to scientific research, my experience in Houston created lifelong memories. I remember my excitement when I received promising results from the days-long ex-

periments and the adrenaline rush of presenting them to respected physician-scientists. Outside of my work at MDACC, I made new friends from many different colleges (e.g., UT Austin, Harvard, Oklahoma, UCLA) and shared with each other interests in music, sports, and movies. I toured around Houston with my new friends, visiting the Houston Zoo, the NASA Space Center, The Galleria, and the Museum of Natural Sciences. Although the Texas heat was scalding, Houston was a lovely city to spend a summer in (with plenty of shade!). I will remember my experience at MD Anderson for the rest of my life.

AUDREY RIPS-GOODWIN

Audrey Rips-Goodwin (second from left) and friends.

Last summer was a very mathematical one! I participated in the mathematical sciences Research Experience for Undergraduates (REU) at Lafayette College in Easton, PA. My summer was filled with rigorous mathematics, fun excursions, and cookie baking.

Under the mentorship of Dr. Allison Lewis, I worked with a team of two other undergraduate students to build an agent-based model (ABM) to examine voter apathy. ABMs are useful for simulating behaviorally charged problems where agents (individuals) interact and make decisions. To inform the model, we looked to the fields of psychology, sociology, and political science to learn what influences an eligible voter's likelihood to participate in an election. Fueled by discrepancies between pre-election polls and election outcomes, my group developed a simulation of voting habits to examine how a person's voting behavior may shift based on their perception of whether their vote will impact the election outcome.

I honed skills in mathematical modeling, programming, and sensitivity analysis that I hope to carry into future work. We are currently preparing a manuscript to be submitted to a peer-reviewed journal and will be presenting at the Joint Mathematics Meetings in January 2024!

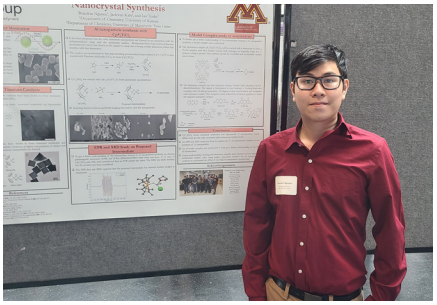
My favorite part of this REU project, and what I believe sets it apart from other research programs, is the community building aspect. Outside of Pardee Hall (where we worked), all ten of us REU students lived together in an old fraternity house. While this sounds chaotic (and most definitely was), I would not trade the experience for anything. I made some life-long friends and wonderful memories. We also went on a hike, had numerous barbeques with the math department, and explored Easton, PA! My favorite memories include baking cookies and playing Just Dance on Friday nights, designing our REU t-shirt, and going to minor league baseball games!

Research Experience Reflections

BRANDON NGUYEN

This summer I participated in the University of Minnesota REU program. I worked in Professor Ian Tonks's lab studying how titanocene catalysts affected the synthesis of aluminum nanoparticles. Metal nanoparticles have unique plasmonic properties that can be used in a variety of optical applications. Aluminum nanoparticles are of interest because they are far cheaper than gold or silver nanoparticles. The synthesis of the aluminum nanoparticles can be hard to control, but it has been shown that titanium catalysts can be used in the synthesis to tune the size, shape, and morphologies of these nanoparticles. Temperature and catalyst concentration have been shown to tune the size and shape of the aluminum nanoparticles, while the identity of the catalyst can affect the morphology of the nanoparticles. I worked with one of the titanocene catalysts to synthesize the aluminum nanoparticles. I also worked on the synthesis of an aluminum model complex to understand the synthetic mechanism of the nanoparticles.

What I enjoyed the most was learning about a field of chemistry with which I wasn't familiar. The work exposed me to work in catalysis and chemical materials. I enjoyed learning how to plan and execute a research plan from talented graduate students. I was also instructed to use instruments I haven't used before, such as a scanning electron microscope (SEM). The REU program had weekly lunches with talks by different professors about their research. Overall, the program helped reinforce my desire to pursue a career in chemistry.



The UMN REU program hosted plenty of events during my stay. One week we were able to watch a musical at the Guthrie Theatre and the next week we watched a Twins baseball game. These events were fun, and I got to do a lot of things I normally wouldn't have done.

GRAY-LITTLE HALL DEDICATION

Formerly named the Integrated Science Building, KU Chemistry's home was built in 2018. Although our building has been informally called Gray-Little Hall for some time, a formal dedication ceremony was held on October 26, 2023 to make the name change official. Our building is named after Chancellor Emerita Bernadette Gray-Little, who served as the 17th Chancellor at KU from 2009 to 2017.

PROF. DAVE BENSON RECOGNIZED FOR OUTSTANDING UNDERGRADUATE MENTORING

At the end of 2022, leadership from the University Career Center recognized Prof. Dave Benson for his work in supporting our undergraduate students in their career plans. Congratulations, Prof. Benson! Thank you for all you do for KU Chemistry.

KU DEPARTMENT OF CHEMISTRY
College of Liberal Arts & Sciences

Department of Chemistry
University of Kansas
Room 1140, Gray-Little Hall
1567 Irving Hill Road
Lawrence, KS 66045

Please Support Chemistry at KU

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