SOONER ELEMENTS

OU Department of Chemistry and Biochemistry

IN THIS ISSUE:

HIGHLIGHTS

Faculty: *Laura Clifford, Yitong Dong, Laura-Isobel McCall*

Recent PhDs: *Tielyr Creason, Ally Fairman, Sydney Newsom, Thilini Peramuna, Theo Rusmore*

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Alumni: *Rachel Mason, Matthew Meredith*

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CHAIR'S MESSAGE

Dear Friends of the Department of Chemistry and Biochemistry,

Greetings from the Department of Chemistry and Biochemistry at the University of Oklahoma! I am excited to rejoin my alma mater (Class of '89) as the new Department Chair, and to share news and updates on department activities in this newsletter. This newsletter highlights the accomplishments of teaching and research faculty, recent PhD graduates, department staff, as well as alumni, and I encourage you to follow our highlighted work by checking the department's website periodically (chem.ou.edu).

Several faculty and students within the department have been recognized for their contributions to the scientific community in leadership, research excellence, and education and outreach. We are excited to congratulate Dr. Laura-Isobel McCall and Dr. Shanteri Singh on receiving tenure and promotion to Associate Professor and Dr. Ann West's NIH COBRE Program in Structural Biology Phase III grant. This grant provides key infrastructure for research in structural biology and provides seed funds to establish new avenues of biomedical research at OU.

This fall we welcomed 17 new incoming graduate students and initiated a national search for multiple new faculty positions in areas of synthetic chemistry. We have already one new colleague signed and are in the negotiating process for several others. These new hires will provide new opportunities in undergraduate and graduate training for students with interests in synthetic chemistry and for funded research in biomedical and materials science. We are also searching for staff support in the NMR core and the machine shop, as well as expanding our capacity in instruction. In addition to personnel and research growth, we are excited about the reopening of the Elements Café located in the Stephenson Life Sciences Research Center.

The people, research, and community all make this department a life-changing experience for anyone who walks through these doors. We are proud of those who are a part of it as they engage in meaningful work and community. We are very interested in the activities and accomplishments of the broader Chemistry and Biochemistry community. We thank you for your interest and support. Please feel free to contact us at any time.

John W. Peters, '89
Chair of Chemistry and Biochemistry
Associates Second Century Presidential Professor

FACULTY/STAFF NEWS

2021

February

Dr. Bayram Saparov won the NSF CAREER Award (after winning the 2020 DOE CAREER award)

May

Dr. Laura-Isobel McCall won the Burroughs Wellcome Investigators in the Pathogenesis of Infectious Disease Award

July

Dr. Rakhi Rajan was appointed as the Graduate Learners and Apprenticeships Director

October

Dr. Yitong Dong joined the department as an Assistant Professor

2022

January

Dr. Ann West was elected fellow of the American Association for the Advancement of Science

April

Dr. Laura-Isobel McCall won the OU Award for Excellence in Research in the Natural Sciences

August

Drs. Bayram Saparov and **Yihan Shao** were awarded tenure and promotions to Associate Professor

September

Dr. Luca Fornelli won the NIH Maximizing Investigators' Research Award

October

Dr. John Peters returned to OU as the department chair with **Amelia Beste** serving as the Administrative Support Specialist

2023

March

Drs. Shanteri Singh and **Laura-Isobel McCall** were awarded tenure and promotions to Associate Professor

April

Dr. Laura Clifford won the General Education Teaching Award. **Dr. Si Wu** won the Neal Lane Award for Excellence in Research in the Natural Sciences

GRADUATE STUDENT NEWS

Fall 2022 Incoming Graduate Students:

Pictured (from left to right): Tamanna Pinky, Deepti Bhusal, Shakya Wije Munige, Lexi Rinne, Kanika Parashar, Linda Lieu, Nathan Colwell, Andy Powell, Deacon Herndon, Sohom Chandra, Gavin Gee, Walter Galie, Rishav Mukherjee, Lamia Hidayatova, Kole Long, Anshi Pandey, and Izzie Dancer.

2021/2022 Master's Degree Recipients:

Bilal Almutwalli, Morgan Harris, Michelle Holt, Bryce Johnson, Baylee Lacy, Melvyn Mangione, Ryan Oates, Leena Nabulsi, Natalie Nguyen, Kriti Shukla, Allison Wright.

2021/2022 PhD Recipients:

Quentin Avila, Anae Bain, Xingxiu Chen, Danya Dean, Eric Gardner, Jessica Gardner, Hannah Lamb (Panlillio), Jaspreet Singh, Stewart Younger-Mertz, Jeremy Zink.

Fall 2022 Master's Degree Recipients:

Ji Kang, Jiaxue Li.

Fall 2022 PhD Recipients:

Tielyr Creason, Ally Fairman, Sydney Newsom, Thilini Peramuna, Theo Rusmore.

UPCOMING EVENTS

- **OU Giving Day** (04/13)
- **Department of Chemistry and Biochemistry's Spring Awards Banquet** (05/20)
- **Re-opening of the Elements Café** (TBD)
- **Spring 2023 Departmental Seminars:**
  - Yan Jessie Zhang (04/14)
  - Erica Ollmann Saphire (04/21)
  - Brian Schoichet (04/28)
  - Ying Ge (05/05)

STUDENT ACHIEVEMENTS

Graduate Student Achievements:

External Fellowships

- 2023 National Science Foundation Graduate Research Fellowship: **Carly Wickizer**

External Awards

- 2023 American Society for Microbiology Missouri Valley Branch Regional Meeting 2nd place poster presentation: **Jeff Tu**
- 2023 American Society for Mass Spectrometry Student Travel Award: **Yanting Guo**

University of Oklahoma Fellowships

- 2022-2023 Dodge Family College of Arts and Sciences Dissertation Completion Fellowship: **Tielyr Creason, Mulin Fang, Yanting Guo**
- 2021 Kenneth M. Nicholas Graduate Fellowship: **Chance Lander**

University of Oklahoma Scholarships

- 2021-2022 Belle W. Goodman Scholarship: **Hannah Lamb**
- 2021-2022 Kenneth and Joye Harwell Endowed Scholarship: **Samin Anjum, Trishika Chowhury, Mulin Fang, Chance Lander, Anju Teresa Sunny, Carly Wickizer**
- 2021-2022 Lloyd E. Swearingen Scholarship: **Yanting Guo, Sydney Newsom**
- 2021-2022 Roger E. Frech Scholarship: **Mulin Fang**
- 2021-2022 Roland E. Lehr Scholarship: **Zhu Zou**
- 2021-2022 Sherril D. Christian Scholarship: **Tielyr Creason**

University of Oklahoma Awards

- 2021-2022 Outstanding Graduate Teaching Assistant Award: **Tsitsi Kapfunde, Kriti Shukla**

Selected Undergraduate Student Achievements:

External Scholarships & Awards

- 2023 Barry Goldwater Scholarship: **Oliver Wu**
- 2023 American Society for Mass Spectrometry Student Travel Award: **Oliver Wu**

University of Oklahoma Scholarships & Awards

- 2021-2022 John Laing Award: **Maya Ferrell**
- 2021-2022 Dick Van der Helm Scholarship: **Oliver Wu**

FACULTY HIGHLIGHT: Dr. Laura Clifford

Dr. Clifford joined the Department of Chemistry as an Assistant Professor in 2005 and she now serves as the General Chemistry Coordinator. She engages students in her CHEM 1315 and 1415 courses using exciting examples from her background in food science, natural product chemistry, and toxicology.

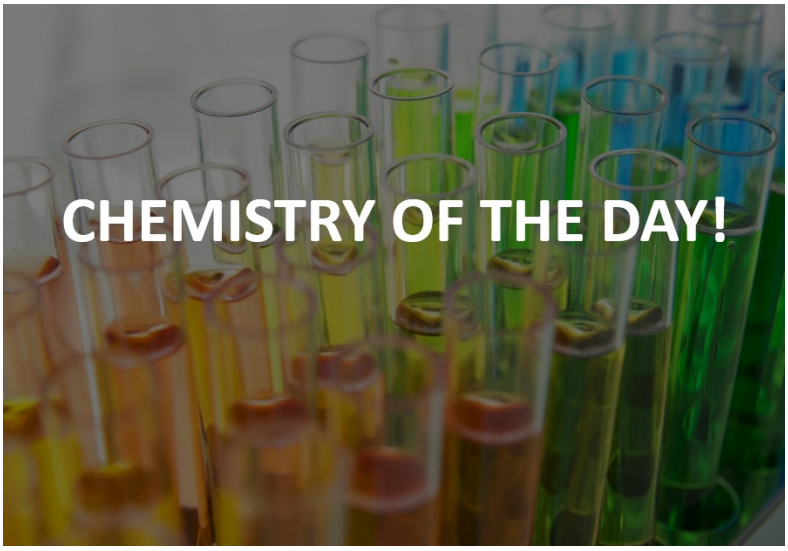
Q&A with Dr. Clifford

Q: What is an overview of your teaching philosophy?

A: My philosophy is to make people feel comfortable and to make sure that I'm approachable. I think the most important thing for me as an instructor is to remember what it's like to be a student, and to keep in mind how hard it is to ask for help—especially when you're new and you're nervous. I want to be the kind of professor I never had, not someone who says, "Well, did you do the reading?", or makes you feel stupid no matter what you ask. I always correct students when they start a question with "Sorry"; there's no reason to apologize for getting your education and having questions.

Q: What are some of your strategies for getting students interested in chemistry?

A: For each of my classes, I include a "Chemistry of the Day" section where I mention lots of toxicology and food chemistry to help students see the relevance of what we're learning. I also try to discuss recent events, like the Flint, Michigan water situation a few years back; then you can tie that back into acidity, monitoring pH, treating with certain things to help coat the pipes. Just things that help make it interesting, because it can be dull otherwise and I think that's not how it has to be. Of course, we have a set curriculum, but you can still find time to work some fun topics in there.



Q: What are some unique strengths of the general chemistry program at OU?

A: The general chemistry program has a core group of people that we've had for a long time, so we've worked together to improve the program over the years. We also have an increased effort on training Teaching Assistants on how to teach.

FACULTY HIGHLIGHT: Dr. Laura Clifford

Q: What is your favorite aspect of teaching at OU?

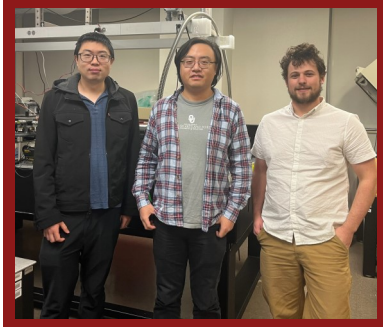
A: I think it's the success stories, especially when you hear from students so long after the fact. After finishing medical school, residency, and becoming a fellow, an old student emailed me saying "I'm not only a minority, but I'm the only female in a lot of these panels. I just wanted to say that I never realized what it was like for you having to go through science and you were such an awesome role model". I've gotten a couple emails like that, and some about a Chemistry of the Day that they re-

Dr. Clifford receiving the OU General Education Teaching Award from OU Provost Wright

Q: What is your advice for students who are considering a career in chemical education or as a lecture professor?

A: A chemical education degree can be somewhat limiting, because you'll only ever teach general chemistry. If you have a research degree, you can teach general chemistry, but also many other courses. I don't think you really understand what is involved in being an instructor until you teach solo. I found that encouragement can be more important than actual instructional delivery; saying, "You can do that! You have those skills!" has always been a large focus of my teaching style.

FACULTY HIGHLIGHT: Dr. Yitong Dong



Dr. Dong joined the Department of Chemistry as an Assistant Professor in Fall 2021. His research group belongs to the Inorganic Chemistry Division and focuses on the design of novel Quantum Dots for energy and materials applications.

Pictured (from left to right): Chenjia Mi, Dr. Dong, and Matt Atteberry.

Q&A with Dr. Dong

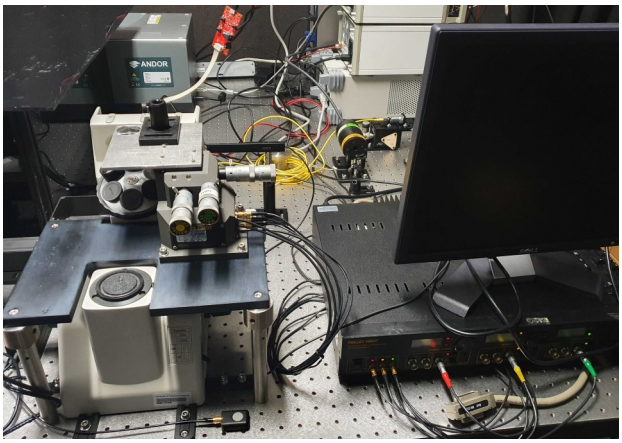
Q: What is an overview of your research?

A: In a nutshell, we're making nanocrystals; this includes the design, synthesis, and a proper treatment of their surfaces. Then we carry out spectroscopic characterization of these nanocrystals to measure their specific properties for their applications in single photon emission. We feed these measurements back to the materials design and chemically modify/tune these nanocrystals. Through this, we are organically combining spectroscopy, which is more physics, with chemical synthesis to rationally design new crystals for important applications, such as single photon emitters, quantum emitters, and photocatalysts.

Q: Tell us a little bit about your lab members?

A: I came here in October 2021, so I missed the first round of rotations for the incoming graduate students. But Matt [Atteberry] dropped in one day and decided to join my lab for a rotation. Matt is a very good worker. The two of us played with the chemicals in our lab and Matt was able to make batches and batches of nanocrystals, as well as quite a few new discoveries. That's the good side of being a graduate student; you can play with it and keep discovering new things. Matt always has brilliant ideas like "Okay I found this in my spectrum, could it be this, could it be that" and he would drag me to the lab to see it right away. It is a very good sign, because curiosity is the driving force of science.

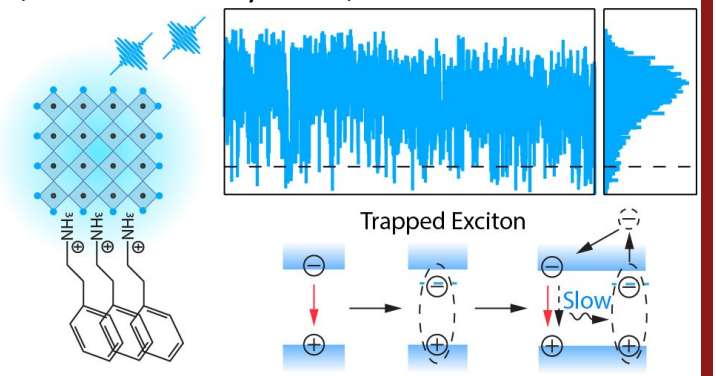
My postdoc, Chenjia, joined last April. Matt and I already set up our wet lab, but we had yet to start our optical lab. I was quite worried at the time—with a broken leg (after falling on ice), I couldn't set it up myself. Chenjia came in and built our entire laser lab—a very complicated custom design, within 2 months. We were able to acquire exciting data throughout the summer and we already submitted a paper together. I feel lucky to have Matt and Chenjia helping me build the lab in my first year. We are now welcoming 3 new graduate students. They all did a very good job in their rotations and made some initial promising observations.



FACULTY HIGHLIGHT: Dr. Yitong Dong

Q: What's the latest exciting progress in your group?

A: I am quite excited about two new discoveries. First, Matt found a magic sized cluster that we believe is guiding the synthesis pathways of the nanocrystals. Especially for this crystal perovskite, which is very fragile, it was the first time that this kind of cluster was discovered; that is very intriguing and impressive. The second is Chenjia's latest work. We were able to suppress the fluorescence intermittency of our perovskite nanocrystals, which are very small, 4-4.5 nm in diameter. They tend to have defects, traps, and messy surfaces; we were able to suppress all that and get very bright single photon emission. It was a very exciting moment when I saw several dots, like bright stars shining, on our single photon sensitive digital camera. No one else had seen that before for crystals this small!



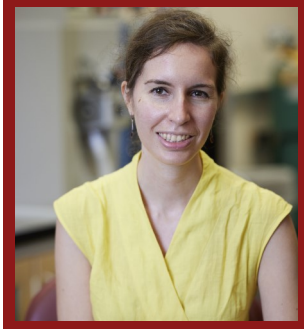
Q: What long-term impact will your research have on society?

A: I hope for at least 3 aspects. First, I hope we can build a room-temperature quantum emitter that can be used in real photonic circuits. It will allow us build room-temperature quantum networking and quantum communication bases even for quantum computers. I always make an analogy that we are not making quantum computers—we're providing the photons needed. Just like the power supply regulating the electricity, we're regulating the photons. Secondly, we want to design the photocatalyst that is—from a quantum mechanical perspective—more efficient. We will find out where the bottleneck is, then modify structures to boost the efficiency of energy-demanding photocatalyzed reactions—such as nitrogen fixing. Lastly, I hope we can design more environmentally friendly nanocrystals. Currently, most nanocrystals contain toxic heavy metals, which display fantastic optical properties. When you switch to nontoxic metals the optical properties are not as good; we hope we can find out why and fix that.

Q: Before working at OU, what was the most interesting experience you've ever had?

A: One of the works that I value most was actually an accident. At the time, 5 or 6 years ago, it wasn't possible to make these very small perovskite nanocrystal quantum dots like we do now. It wasn't my intention, but one day I accidentally made one. I wasn't that excited at first because I thought, "it's too good to be true, I must've made a mistake"; I verified it several times and kept thinking about it. One day, when I was in Walmart buying peaches, I suddenly came up with an idea about why it happened. I called my boss at 9 or 10 PM, we found a coffee shop and discussed it until the next day. Even though it was late at night, we were so happy that we nailed down the idea; such enthusiasm really drives me to this field. The paper that we wrote was one of the most cited papers in our group and of my career.

FACULTY HIGHLIGHT: Dr. Laura-Isobel McCall

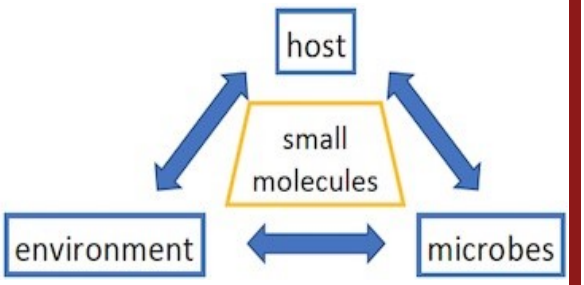


Dr. McCall joined the Department of Chemistry as an Assistant Professor in 2017 and was recently awarded tenure. Her research group belongs to the Analytical and Biochemistry Divisions and focuses on using her pioneered chemical cartography approach to study the metabolomics of host-microbe interactions.

Q&A with Dr. McCall

Q: What is an overview of your research?

A: The core of my work is understanding where small molecules go in 3D space—usually within a body of an animal model, though we've done buildings and environmental locations as well. We use mass spectrometry to answer questions such as: within that space, where are small molecules of interest? How does that relate to things like pathogen distribution or drug levels in tissue? How can we use that to understand disease? Essentially, the fundamental aspects of chemistry intersecting biology and then feeding into drug development.



Q: How did you become interested in chemical cartography?

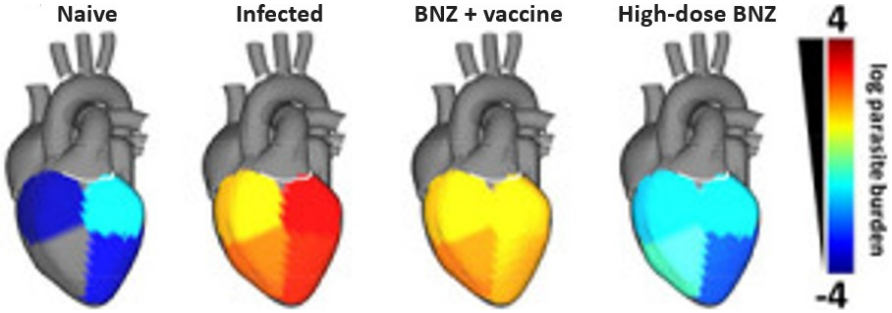
A: That's actually a good story about chance and random things that happen in your life. For my postdoc, I joined a lab that was doing high-throughput screening for parasitic diseases at UCSF, then moved to UCSD in the 1st year of my postdoc. The department we moved to was also home to Pieter Dorrestein's lab, who does a lot of metabolomics and really pioneered a lot of those 3D model techniques. When I went to meet him, I was actually interested in doing imaging mass spectrometry of proteins; he convinced me that small molecules were the way to go. He let me work with and basically parasitize his lab, and I haven't looked back—all because of a random move. My PI could've gotten a job at a different school—maybe I still would've done metabolomics, but who knows? There's a lot of random luck there and very kind people who gave me opportunities too.

Q: What is the latest progress that you're most excited about?

A: Probably the most exciting paper is one that we just submitted from the work of Zongyuan, a 4th year PhD student in my lab. A big problem in Chagas disease is that we have drugs that kill the parasites, but people still don't get better. Understanding why is a big question—if we don't understand that, how can we find better drugs? Zongyuan showed that if we give mice the standard treatment (benznidazole), the parasite levels go down—but the metabolism doesn't go back to normal. This can help explain why it's not helping people. They're stuck in this negative metabolomic state. Then, our collaborators at the Baylor college of medicine built a new therapeutic vaccine to try to shift the immune response after infection, rather than before infection.

FACULTY HIGHLIGHT: Dr. Laura-Isobel McCall

We showed that this treatment didn't reduce the parasite levels as much, but it improved cardiac metabolism more than benznidazole. It's a whole new way of thinking about infectious disease treatments. You don't necessarily need to get rid of the pathogen; you need to improve metabolism and try to get back to how you were before. I think that's one of the most exciting things we've been doing; it opens up a lot of other questions and opportunities.



Modified from Liu, *et al*, Res. Sq. [Preprint] 2023

Q: How do you hope your research will change the way that people think about metabolomics?

A: My PhD is not in chemistry; I was actually trained as a microbiologist, so I think I always look at metabolomics from the users point of view. The overall technique might seem a little scary with all this instrumentation and data analysis, but I hope that our work is making it more approachable. We take time making sure that all of the standards are met because there are different ways to interpret metabolomics data.

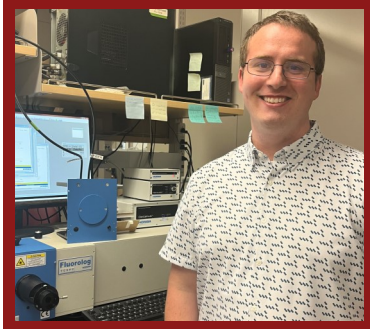
Q: How has the environment at OU contributed to your success?

A: I think OU is unique with its very welcoming environment. Everyone here is very friendly. When I first got here, people helped a lot. At the mass spectrometry core, Dr. Foster helped me figure out what kind of bench I needed for my mass spec, what kind of ventilation, and other installation-related questions that I needed to ask. It helped a lot because installing a new mass spectrometer is not something you do every day. Without Dr. Foster's help, we wouldn't have a functional instrument, then none of the cool science could have happened. Also, many colleagues at OU are super willing to collaborate and interact and exchange ideas. I think that's how most exciting things happen; when you bounce off your ideas and magic happens, things synergize.

Q: You have been extremely successful in securing research funding, what is your secret?

A: I think my secret is something that Dr. Cichewicz told me: "You don't win if you don't get shots on goal"; I think that's true. That has been my road to success—just working hard and submitting as many grants as I possibly can. You know the success rates are 10%, so I think that my approach is to just try to think of as many diverse ideas as possible. You get better at it; I think the first things I wrote were nowhere near as good or as fast to write as things I did later—so just try and try again. Try not to take the comments personally—I think a lot of comments are well intentioned; people want you to succeed and get funded. Take the quality advice and learn. So that's how I've done it. Just trying over and over and over again.

RECENT PhD HIGHLIGHT: Dr. Tieylr Creason



Dr. Creason received his PhD in December 2022. As a member of Dr. Saparov's lab, Tielyr's research focused on targeted materials design. Tielyr is continuing his work in materials design and development as a Postdoctoral Researcher at Sandia National Lab in New Mexico, where he has been joined by his wife, daughter, and their miniature Australian Shepard.

While Tielyr initially pursued computational chemistry research, he was drawn to hands-on experimental work studying luminescent materials in the Saparov Lab. Through studying the structural effects of metal halides on their optical properties, he made great strides in developing guidelines for designing novel photoluminescent materials. Tying down the relationships between structural and optical properties of copper and silver halides was among his biggest accomplishments at OU.

The collaborative atmosphere was Tielyr's favorite part of studying at OU; he especially enjoyed collaborating with Dr. Glatzhofer, Dr. Dong, and their research groups. When asked about the best advice he's received, Tielyr offered an insightful quote: "In Science, it's all about getting lucky, but the more attempts you make, the more chances you have to get lucky". Another piece of advice he has for new graduate students: find a good time management system that works for you.

RECENT PhD HIGHLIGHT: Dr. Ally Fairman

Dr. Fairman received her PhD in September 2022. As a member of Dr. Yip's lab, Ally's research focused on hyper-doped TiO_2 thin films as an anode material for dye-sensitized solar cells. Ally is currently working as a lab instructor at OU while applying for jobs in the industry. While not working, she enjoys baking, reading, and various crafting endeavors.

Ally joined the Yip lab to pursue hyper-doped sol-gel research, excited for the opportunity to do wet-lab physical and materials chemistry. Her rotation research grew into a full project, from creating a recipe for a TiO_2 sol-gel that worked with the kinetic doping process developed by the Yip lab, to finally creating a prototype dye-sensitized solar cell. One of Ally's biggest accomplishments at OU was developing high-performing crystalline TiO_2 thin films containing dye concentrations up to 1.9 M.

In addition to her research, Ally distinguished herself as one of the most dedicated and effective TAs. During her time as the Physical Chemistry Lead TA, she took initiative working to improve the lab assignments and organization. Her advice for new TAs and those considering a teaching career is: a) your goal is to help students learn and retain the material, not just pass the class, b) the syllabus is your lifeline, and c) don't procrastinate on grading, putting it off just makes it harder to do.

RECENT PhD HIGHLIGHT: Dr. Sydney Newsom

Dr. Newsom received her PhD in December 2022. A member of Dr. Rajan's lab, Sydney's research focused on modifying a protein used for gene editing so it would be safer for clinical use in gene therapy. She is spending the next few semesters in Norman as a post-doctoral fellow in Dr. Rajan's lab. Sydney also enjoys playing soccer, turning Bible verses into songs, and cooking with friends.

Sydney joined OU with a blooming interest in bioinformatics, which aligned well with the Rajan lab's research on gene-editing. She further developed her bioinformatics skills through her work on a DNA sequencing project with the support of Dr. Rakhi Rajan and Dr. Fares Najar. Sydney's advice for new graduate students is to persevere in practicing lab work. In her experience, it wasn't until her 3rd year in the lab that she felt confident enough in her experimental skills to contribute significantly to the advancement of the research.

Sydney's appreciation for scientific research increased throughout her doctoral studies at OU. Perhaps even stronger is her appreciation for her fellow scientists—she feels that 100 years-worth of newsletters couldn't afford enough space to express her thanks to the members of the department who have been wonderful mentors and colleagues.

RECENT PhD HIGHLIGHT: Dr. Thilini Peramuna

Dr. Peramuna received her PhD in December 2022. As a member of Dr. Cichewicz's lab, Thilini's research focused on secondary metabolites from fungi. She is continuing at OU as a post-doctoral fellow in Dr. McCall's lab working to find ways to expedite the process used to identify bioactive compounds. Outside of work, Thilini enjoys painting, reading, and taking road trips.

Thilini's passion for science originated from her upbringing in the natural resource-rich environment of Sri Lanka. Thilini's curiosity about nature and what was being produced by the organisms in her surroundings led her to pursue natural products research in Dr. Cichewicz's lab. During her graduate studies, her research interests evolved to isolating natural products from fungi and finding bioactive compounds against infectious diseases. One of her most exciting discoveries was active metabolites against a new bacterial condensin target.

After joining OU in 2018, Thilini quickly adjusted to her new environment and prospered in developing projects and presenting her work. While obtaining her PhD in only 4 years was certainly a major achievement, Thilini feels her biggest accomplishment was maintaining a strong work-life balance while pursuing research—an important but difficult task for anyone in graduate school.

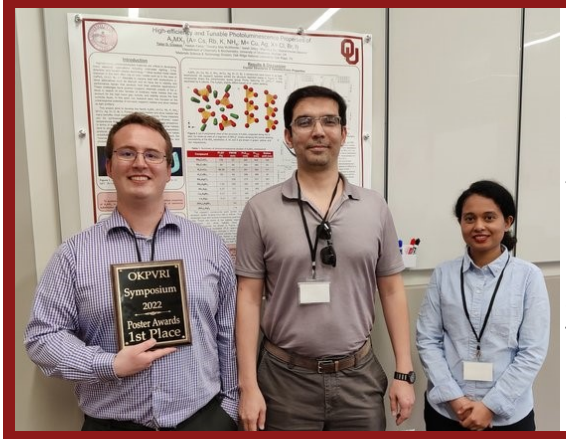
RECENT PhD HIGHLIGHT: Dr. Theo Rusmore

Dr. Rusmore received their PhD in December 2022. As a student in the labs of Drs. Ken Nicholas and Dan Glatzhofer, Theo's research focused on oxygen atom transfer reactions involving molybdenum complexes, employing both experimental and computational methods. While not working, Theo enjoys spending time with their dog, Artie, rock climbing, and enjoying beers afterwards.

Theo's initial research interest in organometallic synthesis and properties of transition metal complexes developed into a fascination with atom-transfer reactivity and ligand-metal electronic effects. After their 1st rotation with Dr. Yihan Shao, Theo's research developed into a joint experimental-computational venture. Taking advantage of known reactivity to produce new products and mechanistic insights, Theo uncovered some of the little-explored and surprisingly-complicated details of reactions between molybdenum and diatomic oxygen

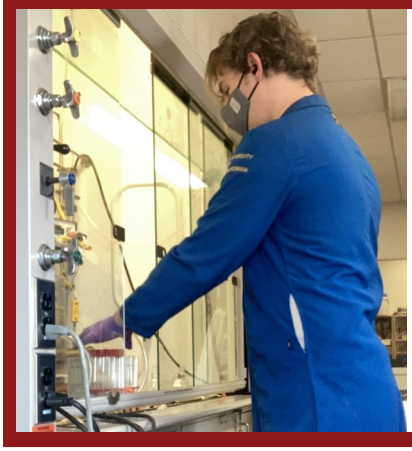
Theo's advice for more junior students is to take ownership of your projects: you know more about what you've done than anyone else—use that to drive the conversation around the project forward. In addition to their research, Theo revamped the Chemistry of Beer class, which focuses on the chemistry of beer production and skills students can use to brew their own creative concoctions.

RECENT PhD HIGHLIGHTS



Dr. Tielyr Creason (right), Dr. Bayram Saparov (middle), and Dilruba Popy (left) at the April 2022 Oklahoma PV Research Institute Symposium, where Tielyr won the best poster award.

Dr. Sydney Newsom (right) and Dr. Rakhi Rajan (left) in the lab.



Dr. Theo Rusmore working in the lab.

Dr. Thilini Peramuna (right) and her doctoral advisor, Dr. Robert Cichewicz (left) photographed for an interview with ACS Central Science in collaboration with C&EN. Source: *ACS Cent. Sci.* 2020,6, 1, 6-7.

STAFF HIGHLIGHT: Doug Powell

Doug Powell was a postdoctoral researcher in the OU Chemistry department from 1981-1983, then returned in 2005. He is currently the Manager of the Chemical Crystallography Laboratory, and will be retiring this year. Doug's favorite aspect of his position and what he'll miss most after retirement is working with students.

Q&A with Doug Powell

Q: Tell us about your role as the Chemical Crystallography Laboratory Manager?

A: Mostly, people submit small-molecule crystal samples and I analyze them. First, I look at them under the microscope—if they're suitable, I put them on the diffractometer, collect data, and solve and refine the crystal structure. I also teach students to use the instrument if they're interested.

Q: How did you become interested in crystallography?

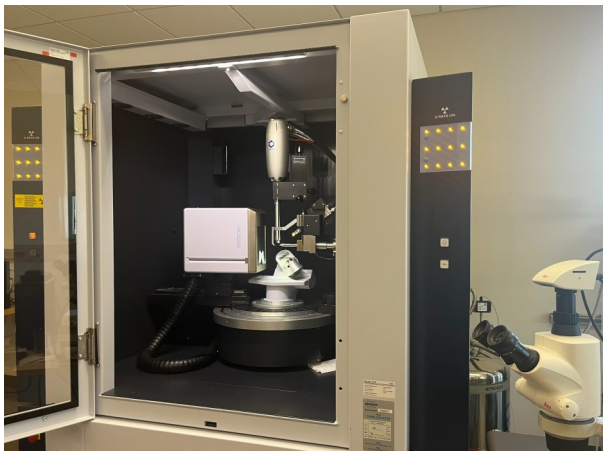
A: A total whim! When I first went to graduate school I was asked, "Well, what do you want to study?" and I said, "I don't know." And they said, "Well, our crystallographer needs graduate students so how about there?" That sounded good to me so that's how I became a crystallographer.

Q: Can students use the instrument on their own?

A: They can. We have a course that teaches theory and another that teaches the practical side of things. If students want to go on to learn how to work with the instrument, they can bring their samples and we collect data and work through processing those data sets. I continue with that until we're both comfortable with them using the instrument independently. Safety is the top priority, X-ray equipment is potentially harmful and you can hurt yourself if you don't know what you're doing.

Q: What are some fun facts about the crystallography lab that you think students should know?

A: This is a very simple lab, but crystallography is one of the few areas of analysis that gives you as much or more data than you need to solve a problem—no matter how many variables you have or how many unique pieces of information you need. That's one of the beauties of crystallography. There have been more Nobel prizes awarded in crystallography than any other area of chemistry. Also, part of our microscope is the same one I used as a postdoc [at OU], so it was a really great purchase!



Q: What has been your favorite aspect of working at OU?

A: I have enjoyed working with the students most. My job is to aid the graduate students, and to help as many as I can to get their degree. I usually try to talk to students, especially as they get ready for graduation, because I want them to know what to expect as they prepare for their career. I also enjoy helping the faculty to further their research interests.

STAFF HIGHLIGHT: DeAnna Stone

DeAnna Stone joined the Department of Chemistry in 2012. As the Manager of the Scientific Materials Stockroom, she oversees all inventory-related processes within the department, from transactions to ensuring that regulations are followed. Her favorite aspect of working at OU is the people and all the different cultures, styles, and languages.

Q&A with DeAnna Stone

Q: Tell us about your role as the Scientific Materials Stockroom Manager?

A: This is so all-encompassing of what goes on. Buying and selling inventory is a major part of my job. Otherwise, it's managing the chemical inventory, the stockroom inventory, abiding by all the rules and regulations, and making sure everything gets done in a timely manner. Aside from lab equipment, we manage everything in the building that is over $5,000, including broken and surplus equipment. I have to know everything about it: where it is, who has it, and if it is moved. We carry the database for all of that. We also manage all the cardboard recycling.

Q: What are some fun facts about the materials stockroom that you think more people in our department should know?

A: We're just fun! We don't take things too seriously because everyone else in this department is way too serious. We try to just be really light and make it a place where people are not afraid to come. People come down here to destress. We have people who come here and will just walk the aisles just to get out of the lab and chill.

Q: What do you enjoy most about your position?

A: The craziness of it all, some days are just insanely busy. Yesterday I placed 15 orders and today is just chill, no 2 days are the same.

Q: What is the most memorable experience you've had working at OU?

A: We have an external bunker that carries massive amounts of chemicals and we had a water line break inside it in the middle of January a few years ago. When I got to work I pulled in through the loading dock area, which was basically ice-skating rink, it was totally ice covered! I came in, put my stuff down, and ran to the office to get some volunteers. We were wading in water to get all the chemicals out of the bunker while water is rushing out of the broken line, it was so cold even with the heater on. We had to get everything out of the bunker because if we lose the labels, we lose the chemicals. It was insane, but we got it all done and people came out to vacuum out the water. Later on, I went up to the office and the ladies in the office were literally blow drying their feet because they were cold!

ALUMNI HIGHLIGHT: Dr. Rachel Mason

Dr. Mason graduated from OU in 2009 with a PhD in Chemistry. As a graduate student in Dr. Frech's lab, her work focused on the structure and design of polymer electrolytes for energy storage applications. She is currently an Associate Professor at the University of Texas at Tyler, where she has been for 12 years now.

Q&A with Dr. Mason

Q: Tell us about your current position?

A: I am an Associate Professor in the Department of Chemistry and Biochemistry at the University of Texas at Tyler. I also serve as the Director at the Academy of Future Health Professionals, our office that supports students with pre-health interests and helps them develop into competitive candidates for professional schools. It's really fun and it gives me the opportunity to work with a wide range of students, from first year psychology majors to our chemistry masters students.

Q: Tell us about your time at OU?

A: My research focused on utilizing rotational and vibrational spectroscopy to probe local structures in polymeric and oligomeric electrolytes with an eye towards designing solid state polymer electrolytes for energy storage applications. The work was really cool for me because I had a non-traditional route to graduate school. My undergrad and masters degrees were in chemical engineering, and then I worked for six years at a defense contractor where I made batteries for military and aerospace applications, so my transition into Roger Frech's group was kind of a natural continuation. I had done the applied research and then I did the more theoretical research with Roger.

I also worked closely with Dan Glatzhofer's organic synthesis group; Richard Hough and Matt Meredith made all of the polymers that I characterized and played with and studied, which was really cool. I also got to work closely with Ralph Wheeler's group, and they did a lot of computational work to help me figure out what was going on structurally and correlate that to the spectra. I even got to do a project with Chuck Rice's group, looking at crystalline and amorphous phases with his solid state NMR. All of that collaboration was really fruitful and great to have all of these people from different ways of thinking on how to approach all these different problems.

Q: What is your favorite memory from your time at OU?

A: ACS was doing this phase about, "Are women being supported in PhD programs?", so Dr. Halterman was interviewing the female graduate students about their experiences. Right before my interview, one of my colleagues babysitter cancelled and she needed me to watch her son so she could attend a divisional seminar. As Dr. Halterman and I were speaking about if I felt the department was equitable, the baby woke up screaming. Luckily, he had a swing that we were able to put the baby in and continue the meeting. The fact that we were having this conversation around a baby that belonged to neither of us sort of showed how the department really was so supportive.

ALUMNI HIGHLIGHT: Dr. Matt Meredith

Dr. Meredith graduated from OU in 2010 with a PhD in Chemistry. As a graduate student in Dr. Glatzhofer's lab, Matt started out working on polymeric membranes for hydrogen fuel cells before shifting his focus to developing polymer scaffolds to immobilize enzymes inside biological fuel cells. He is currently the Director of Formulations R&D at Rosen's Inc.

Q&A with Dr. Meredith

Q: Tell us about your current position?

A: I work for a family owned agricultural chemicals company called Rosen's Inc. I am essentially the chemist in charge of developing products, so I work on what we call formulation chemistry. This includes working with businesses to get their product into a formulation, and making that formulation stable on the shelf. I started my career at a multinational, large chemical company called Huntsman Corporation. For most of my time there, I was a staff chemist working on different surfactants, dispersants, and solvents. In my last 3 years there, I managed a group of chemists and engineers.

Q: What drew you to industry?

A: The main draw for going into industry was work-life balance; everyone goes home at 5 o'clock and you aren't expected to do anything outside of that. There are still deadlines, and every company is different, but by far I think that is the biggest benefit I saw. I also saw industry as a faster way to make an impact. Making products that are going to be on the market in a certain application area, the difference I'm making seems much more immediate. I will say one of the cons is that the chemistry overall is not quite as exciting as doing things for the first time and publishing original research, like you do in academia.

Q: How did your experiences at OU aid you in your career journey?

A: For me, getting my PhD wasn't so much about the exact work I did, but the mindset and process to become an expert in a field that I've never worked in before. I've been able to apply that in different areas that I've worked on in the industry. Instead of being completely overwhelmed with a process I've never done before, I can read some patents and papers, and a month later feel pretty good about my knowledge on it.

Q: How did your experiences at OU aid you in your career journey?

A: Collaborate as much as possible with groups at your school or even at other schools. Learn as many different techniques in different areas as possible — those experiences can really help out later on. Go to conferences, present your work, make connections. The chemistry world is pretty small and you never know who you'll interact with. If you don't like research, then stop and find something else to do. I ended up getting a job in industry with a good salary, but I started graduate school because I liked doing research. With that being said, there are so many research adjacent jobs for people with PhDs in chemistry that don't involve sitting in labs or running reactions all day.