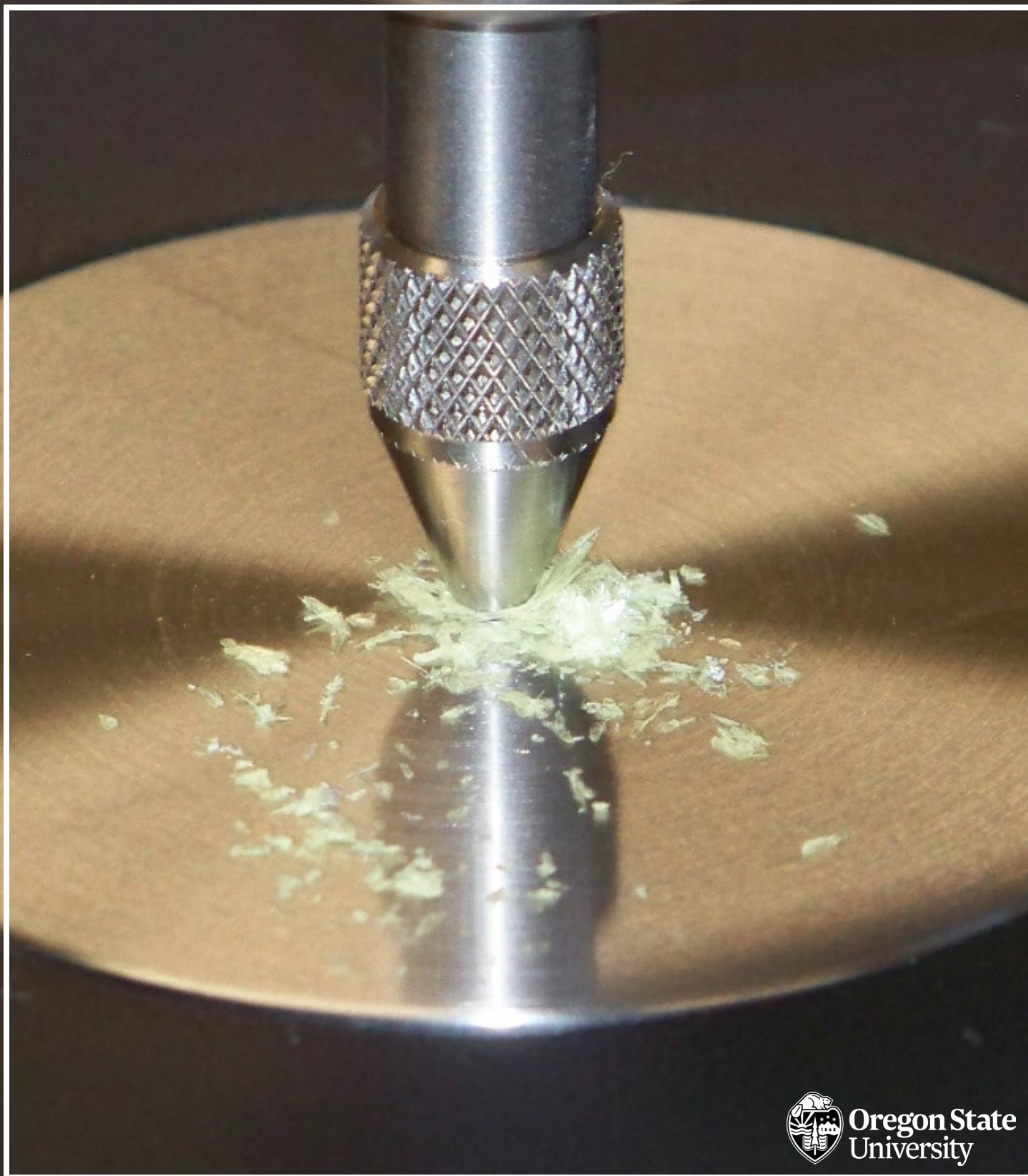


Department of Chemistry

Chemistry Newsletter

Summer 2022





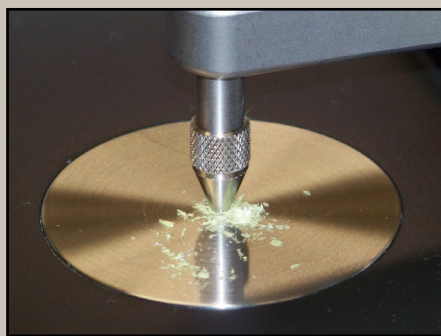
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On the cover: The yellow crystalline



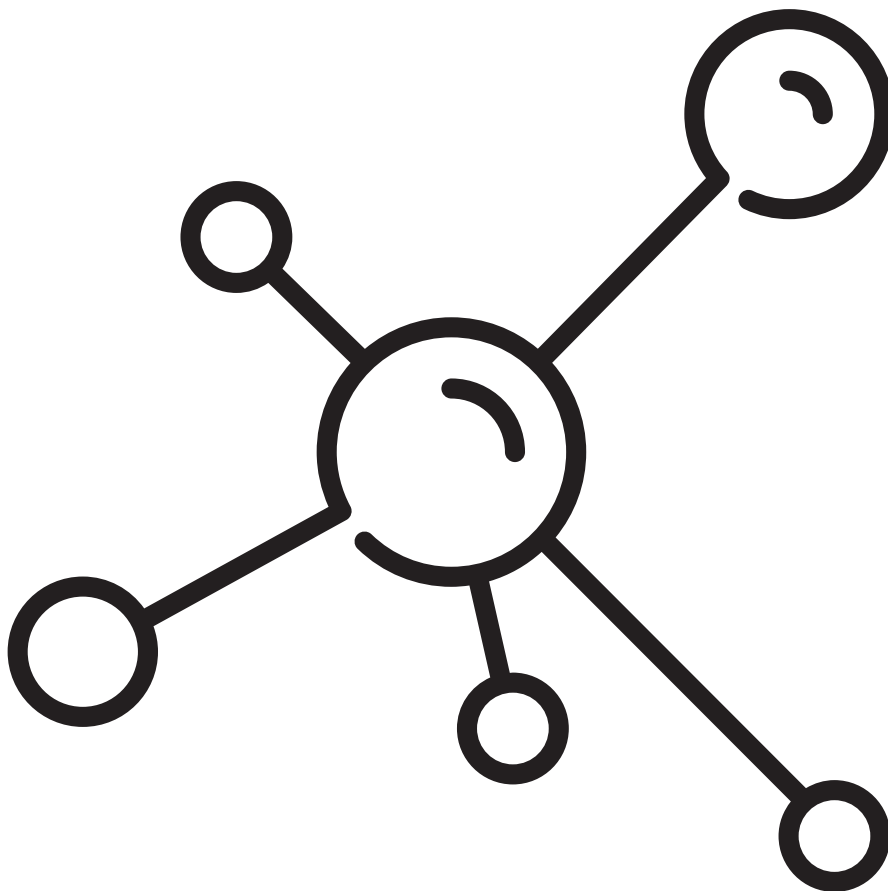
flakes shown here are the purified organic molecule called E,E-dibenzalacetone (aka E,E-DBA) as synthesized by a student in Jeff Gautschi's CH337 Organic Chemistry Lab course. The E,E-DBA is mounted on the diamond-equipped sample plate of a ThermoFisher Nicolet iS10 Fourier-Transform Infrared Spectrometer (FTIR) that students use to measure the energy that can be absorbed by the chemical bonds.

Photo Credit: Mike Ball

Expanded stories available online:
blogs.oregonstate.edu/erlenmeyer

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A MESSAGE: From The Department Head



Becoming a scientist has been my plan since I was a few years old, however, becoming a professor, a teacher and a researcher, did not come to my consciousness until one year after my postdoctoral training. Certainly, becoming a departmental head never occurred to me... until Fall, 2021. My life's lesson is to just "go with the flow" today, but the cautionary tale is that one may be completely unprepared for tomorrow.

Surprise is an understatement when many of us learned of our former head Dr. **Mike Lerner's** decision to retire and to move to Ford Motors – we wish him well in his new adventure. Following the announcement were a few phone calls and emails, some encouraging and some inquisitive, addressed to me, a new empty-nester, enjoying the tranquility of life. Taking on the job, as warned by Mike, not just a former head but also a dear personal friend, means that my research life will suffer. What is in it for me, a long-time hermit, easily ignored, and often a silent person in the room? Not much. Then why apply? Maybe it was sheer stupidity, or maybe it was a sense of responsibility to help, protect, and give-back to the place that gave me my first and only job, allowed me to grow and to flourish, gave me the space and time to grieve for the loss of my daughter, and made me who I am today as a mother, teacher, and researcher.

Long cocooned in my own sphere of simple life, I came to the head's position with naivety and trepidation, but I was also eager to serve and to advocate, as many of you probably have noticed in the past few months. Thankfully, previous departmental chairs and other members of the OSU community have volunteered to be my mentors, and our Dean, **Roy Haggerty** – we miss you dearly – has also been extremely supportive. With the good wishes from our faculty members – even though I have ruffled many feathers in the very short several months since February 1, I am feeling increasingly optimistic that we will survive and thrive in the next few years.

We are still in the midst of COVID, so I cannot really say that Mike led us "out of" COVID almost unscathed. However, because of Mike's insistence of developing online classes, we were well positioned to teach in a virtual capacity. His persuasion lead Dr. **Chong Fang** and me on the path of developing online physical chemistry just prior to COVID, and lo and behold, physical chemistry not only survived the lock down but also accumulated a library of videos to help on-campus students. In this we owe a huge "thank you" to our former head, Dr. Mike Lerner!

Under Mike's leadership, the chemistry department has flourished not just in online teaching, but also in research and scholarly activities. Almost every faculty member in the department has a sizable research grant(s), and innovation has woven into the fiber of our identity. Our fixed term instructors are developing new teaching pedagogies and trying out new technologies. Our wonderful staff, particularly the staff in the chemistry stores, has helped the whole campus navigating COVID and offering personal protection equipment and sanitizing solutions. Commencement 2022 conferred 78 degrees for chemistry, including 48 BSc degrees for chemistry majors.

Mike also spearheaded the fund-raising effort of replacing or upgrading the instruments in the teaching labs. I am happy to report that by this Fall, we will have finished this task, thanks to the generosity of our donors and the final contribution from the dean's office for the gas chromatographers and new computers. We owe a special shoutout to the director of integrated labs, Dr. **Christine Pastorek** for choosing the right model and managing the details, and a shoutout to Mr. **Chadd Armstrong** for working out a solution to the computer interface problem. Unfortunately, Chadd has left us for a promising career path, and we wish him the best.

The scale of our success, the size of our operation, and the challenges are both exciting and daunting. What keeps me up at night? How to teach effectively and to train the next generation workforce, how to reach equity in opportunities and workloads, how to celebrate individuality and yet not to compromise collective goodness, but most importantly, how to create a sense of belonging for our faculty members and students. I remember almost three decades ago when I just started my independent career, one of my mentors told me that "people" are the most valuable asset of a research group. With talented people, results can be obtained, and research grants can be funded.

Starting with "people", we are lucky that the Dean has agreed with our priority staffing plan, and we are hiring two new tenure-track faculty members, one in analytical chemistry, and the other semi-open, in either physical or organic. We look for candidates whose research activities span many disciplines and scales, from microscopic to macroscopic, from biological to material, and from energy to environmental. We are also hiring two more fixed-term instructors, one for organic, and the other for upper-level laboratory courses. Thanks to the diligent work of the four recruiting committees, the ads are already out, and we will be very busy this Fall with interviews and faculty discussions.

In the meantime, we have created a Teaching Equity Committee, to ensure an equitable distribution of teaching loads. Graduate students are being asked to submit a work journal documenting the loads of each assignment as teaching assistants. Several members of the department, including Dr. **Chris Beaudry**, Dr. **Chong Fang**, Dr. **David Ji**, and Dr. **Continued on page 6**



ARCHITECTS OF ALL THINGS SMALL:

Some recent research in the Mackiewicz Group

by: Dr. **Marilyn Mackiewicz**

In the wake of the COVID vaccine development, the world was saved using mRNA vaccine development, but perhaps not known to many, the delivery and speed of it were because of a nanosized vehicle that got the mRNA to where it needed to go in the body. Delivery by nanoparticles, the other hero in the story.

Although lipid-based nanomaterials have existed for over 30+ years to improve the efficacy of drug delivery for many diseases, there are many other types of nanomaterials, organic and inorganic, that are emerging solutions to some of the most challenging human health issues. With a continuous steep upward trajectory towards clinical translation, tailored and well-studied nanomaterials can be used as drug delivery agents, imaging agents, diagnostic assays, and research tools in a wide array of medical applications. To emerge as potential clinical tools, they must overcome several barriers to clinical translation, which requires smart design and study of materials that are quite complex compared to single molecules.

Towards overcoming the barriers to the clinical translation of nanomaterials, the Mackiewicz lab works at the chemistry-biology interface bridging several fields of chemistry with biology and engineering to study and design safe nanomaterials. Our research is centered around 4 major themes that include: 1) designing nanoscale materials using green synthetic approaches for biomedical and environmental applications, 2) studying nanoparticle-biological interactions and nanotoxicology, 3) developing diagnostic assays and systems to monitor disease states and therapeutic response and 4) systems for imaging and targeted drug delivery. Our long-term goal is to advance our bench side chemistry to translational applications in cancer, Alzheimer's disease, glaucoma, and macular degeneration.

We have been working on a variety of nanotechnology platforms, one of which is an innovative bioinspired nanomaterial to address knowledge gaps in ophthalmology – particularly as related to age-related macular degeneration (AMD). AMD is the leading cause of vision loss in the world caused by deterioration of the central portion of the retina and for which there is no cure.

While AMD is currently considered an incurable disease, previous animal studies have shown that stem cells can be transformed into retinal cells and injected into the eye as a possible cure for blindness. Presently, the limiting factor continues to be a lack of technology to track stem cell migration and survival in the eye to determine the treatment's long-term efficacy. The Mackiewicz lab, recently funded by an NSF CAREER Award earlier this year, is working on nanotechnology that would allow us and our collaborators to label-retinal stem cells to track their migration and survival in vivo in real-time. In collaboration with OHSU ophthalmology professors **David Huang** and **Renee Ryals**, the Mackiewicz lab will develop gold nanoparticle-based probes that could bind to stem cells and provide enough contrast that the movement of single cells could be detected using optical coherence tomography (OCT). Developed by Huang, OCT is a non-invasive test that uses light waves to take detailed pictures of the retina and is currently used in millions of procedures around the country. The Mackiewicz lab will specifically focus on optimizing the optical and light scattering properties of the nanomaterials so that nanoparticle-labeled cells are more reflective and can be detected in a highly reflective biological environment. We will also design surface coatings that allow us to covalently attach the nanoparticle labels to the interior or exterior of the cell, which will minimize probe dilution and migration to other endogenous cells within the retina.

Recently, we have designed nanoparticles that are compatible with current OCT retinal imaging technology to label prospective therapeutic cells used for retinal disease. In the development of this technology, it became apparent that many variables impact the biological interaction between the nanoparticles and prospective therapeutic cells. We found that the surface coatings and charge of nanomaterials have a pronounced effect on the stability, cellular uptake, and toxicity of the cells. Hybrid lipid-coating we developed to shield the nanoparticles produced stable materials with no impact on cell health, an important feature for labeling therapeutic cells (Figure 2).¹ Thus far, we can upload 3000 nanoparticles/cell with no cellular impact and we plan to continue to increase the amount for effective labeling with nanoparticles. Lastly, our in vivo and in vitro studies of nanomaterials of varying sizes, shapes, and metal core compositions show these hybrid lipid-coated nanomaterials are safe.²⁻⁵ These are the first steps towards the successful design of stem-labeling and OCT imaging agents.

Our current and future efforts to continue the development of this cell labeling technology include confirmation of visualization in vivo and evaluation of the

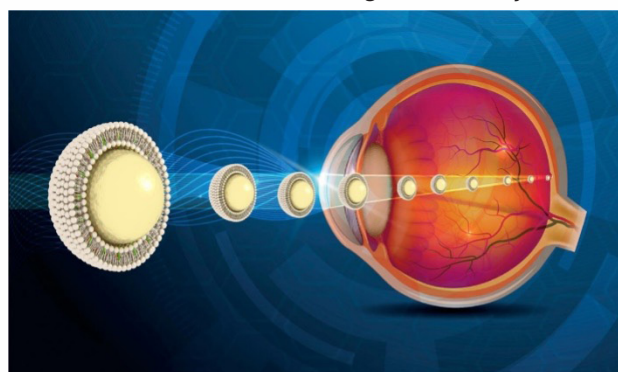


Figure 1: Nanoparticles for Imaging inside of the eye

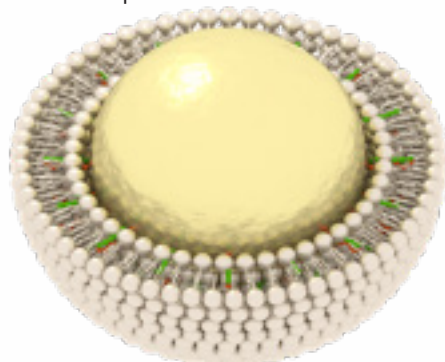


Figure 2: A patented hybrid lipid coating for gold nanoparticle

safety profile of the nanoparticles. While simple in principle, visualization of labeled cells in vivo will require a series of carefully executed studies that determine the number of nanoparticles per cell required to detect a signal, the minimum number of cells per transplant/per visualized area, impacts of other sources of light scatter or absorption such as in vivo pigmentation (use albino or pigmented animal models), optimization of optical properties of nanoparticles in vivo (which may be different from in vitro), among a plethora of other critical components. Perhaps the most critical component of understanding this technology is understanding what happens to the nanoparticles, and the signal they provide, if the transplanted cells die or are rejected by the immune system, which is another focus of our future efforts. Once developed, these preclinical tools will allow researchers to study the safety, efficacy, and mode of action of RMTs (regenerative medicinal therapy), with enormous potential for incurable diseases such as neurodegeneration, cancer, glaucoma, and age-related macular degeneration.

The potential of hybrid lipid-coated nanomaterials also extends to other technologies we are developing in the lab such as research tools to study axonal transport in the eye of experimental glaucoma models and X-ray imaging agents for triple-negative breast cancer. Stay tuned for future work from us.

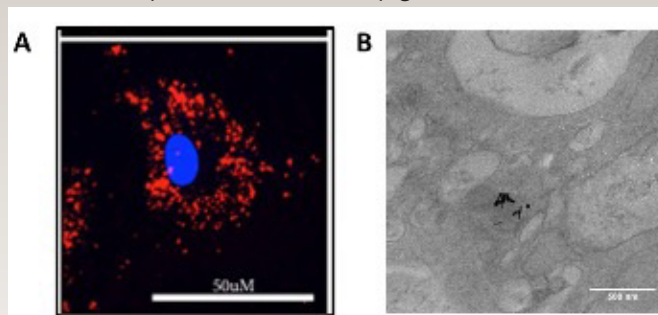


Figure 3: A) Confocal microscopy image of fluorescently-labeled gold nanorods in retinal pigment cells and B) transmission micrograph of nanorods in the cytoplasm of the cells

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2. Engstrom, A. M. W., H.; Mackiewicz, M. R.; Harper, S. L., Controlling Silver Ion Release of Silver Nanoparticles with Hybrid Lipid Membranes with Long-Chain Hydrophobic Thiol Anchors Decreases in vivo Toxicity. International Journal of Engineering Research and Applications 2020, 10, 12-28.
3. Miesen, T. J.; Engstrom, A. M.; Frost, D. C.; Ajjarapu, R.; Ajjarapu, R.; Lira, C. N.; Mackiewicz, M. R., A hybrid lipid membrane coating "shape-locks" silver nanoparticles to prevent surface oxidation and silver ion dissolution. RSC Advances 2020, 10 (27), 15677-15693.
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5. Engstrom, A. M.; Faase, R. A.; Marquart, G. W.; Baio, J. E.; Mackiewicz, M. R.; Harper, S. L., Size-Dependent Interactions of Lipid-Coated Gold Nanoparticles: Developing a Better Mechanistic Understanding Through Model Cell Membranes and in vivo Toxicity. International journal of nanomedicine 2020, 15, 4091-4104.

DAVID JI, ET AL. Receives grant from Basic Energy Sciences, DOE

Project title: "Understanding the Interfaces for High-Energy Batteries Using Anions as Charge Carriers"
PI: Xiulei "David" Ji, Co-PIs: De-en Jiang (Vanderbilt), Chunsheng Wang (Univ. Maryland), Quinton Williams (Howard).

The team works on an alternative Li-ion battery technology. If successful, the new battery technology will provide a safer option for a longer driving range of electric vehicles. The new batteries do not rely on the depleting cobalt and nickel for the cathode materials, which will be more sustainable and of lower cost. The primary difference is that this new battery will use light anions as charge carriers for the operation of its high-capacity cathode materials. The three-million-dollar project from 2022 to 2025 is funded by the program of Basic Energy Sciences of the Department of Energy, and OSU's portion will be \$840,000.

Want to keep up with everything happening in the department? Check out our **social media!**





NEW FACES: 2021-2022



Dr. **Addison Desnoyer** joined our Department in July 2022 at the rank of Assistant Professor. The Department is thrilled to have a new colleague and can't wait to see how his research grows. Addison was born and raised in beautiful Kelowna, a city about the size of Eugene, in the Okanagan Valley in Central British Columbia, Canada. About 560 miles northeast of Corvallis (or 900 km, if you are Canadian).

He's been lucky enough to have been joined on his career odyssey by his wife, **Caroline Hedge**. "We met during our undergraduate studies when I made her a liquid nitrogen Freezie at her freshman orientation." They recently had their first child, **Stanley**, who is currently just over six months old and has been teething for most of that time. They also have a 9-year old cat named Kitty, a 7-year old Shetland Sheepdog named Whiskey, and a 4-month old kitten named Sam, "so our house is

pretty hectic lately!"

When Addison entered the academic job market last year, OSU was at the top of his list for a huge number of reasons. For starters, the resources, and facilities that OSU offers for researchers are excellent. OSU is the kind of place that gives students all the tools they need to be really successful in their research endeavors. Another important reason why he joined OSU is that the values of the Department of Chemistry align very well with his own. The Department is authentically striving to improve regarding Equity, Diversity and Inclusion (EDI) initiatives, as well as delivering an exceptional undergraduate program with significant research opportunities.

He attributes his pursuing Chemistry to a long list of amazing advisors and mentors and says they've each played a part in his desire to pursue a career in chemistry. Addison said he didn't take a single chemistry class his last two years of high school, and started university as a Biology major, and it wasn't until he took a few second-year classes taught by some really dynamic and exciting chemistry professors that he became interested in the area of study. He remembers fondly his first postdoctoral advisor, Prof. **Ian Tonks** at the University of Minnesota, who showed him the positive impact that someone can have in this job as an excellent researcher, a supportive advisor, and compassionate person.

Addison feels the most meaningful experiences he's had in his career so far, have been watching the growth of his mentees. "My first real taste of it was when, as a young

graduate student, the undergraduates I had been supervising started to be able to perform complex manipulations in lab without any help from me. Then, they started to suggest new and original experiments to do all on their own! I'm old enough now that I've been able to watch many of my former students go off to grad school, earn advanced degrees, publish exciting papers, and land good jobs in both academia and industry."

Personally, Addison feels that science should always be working towards making the world a better place than it was before. Especially as researchers at a public university, most of the money that pays for salaries and buys reagents and instruments comes from taxpayers and donors. "Thus, I think it is very important to show the general public the kinds of problems we are trying to solve and how the methods we develop in the lab will have tangible effects on everyday life." This belief coincides well with his teaching philosophy, in believing that everyone, regardless of their background or experience, deserves an opportunity to learn about science. The scientific method teaches us to think critically and rationally about the world, and how to logically approach complex problems. "These skills are also incredibly valuable outside of the classroom."

When not performing Synthetic Chemistry in his research lab, Addison and his wife love to garden. They especially enjoy growing their own food, which, Addison says, "is another perk of living here in the Willamette Valley."

Continued from page 3 **Claudia Maier**, have participated in the mentor training program initially developed at the University of Wisconsin by the Center for the Improvement of Mentored Experiences in Research (CIMER). Dr. **Amila Liyanage**, Dr. **Cassie Siler**, and Dr. **Jie Zhang** have signed up to be Fellows of Inclusive Excellence. Thanks to the efforts of the committee on Diversity, Justice, and Inclusiveness, the undergraduate study room named "Triple Point" is now open with artful decorations and bright lighting. It has been a busy several months, and thanks to the education and support from members of the Executive Committee, I am slowly learning the ropes, and hopefully will get a few projects accomplished in the next few years. I am open to suggestions, ideas, and, of course, active participants. My hope is that when my term ends, I may be able to say that I have made the department a better place, and with good conscience, to say that I have tried my best.



NEW FACES: 2021-2022



Please help us give a hearty welcome to **MacKenzie Boyd**, the Chemistry Departments new ECampus/Undergraduate Coordinator. They started working remotely in February because they are originally from Cincinnati, Ohio, and needed to move cross country to join us here in the office. MacKenzie

says they spent most of their life in Cincinnati, but also did a brief stint in Germany when they were a child.

MacKenzie describes their family as, “the most awesome and amazing people.” Their parents are living in Ohio and both retired, so are spending all their time having adventures and enjoying life. They have a sister in New York City, that they are tempting to move to the West Coast, and two cats who moved out here with them.

They’ve always wanted to work in an academic setting, and when they interviewed with the department, MacKenzie says everyone was very kind and welcoming. So, they took the position. Their job duties include, helping students with overrides, working with professors on miscellaneous projects, and being the main scheduler for the department. When asked what they liked most about their new position, MacKenzie responded, “The people! I get to work with some very funny, kind, and passionate folks.”

As scary as a cross country move can be, MacKenzie is very happy with their decision to move to the West Coast. “Oregon has been an absolute dream. I love the weather, the towering trees and mountains, the beach, and the outdoorsy culture here.”

Outside of work, MacKenzie is very outdoorsy. In Ohio, they volunteered with birds of prey (hawks, owls, vultures, and even a bald eagle named Eli). Although they haven’t found that outlet here as of yet, MacKenzie has many hobbies that they tend to switch between. Currently, they are learning to crochet. MacKenzie is also fascinated by bears, and bets they could teach you a thing or two about them. For example, did you know bear cubs purr when they’re happy, just like cats? They also said if they could have any superpower, it would be to speak with plants and animals. They’re pretty sure they and the cats would come up with some really funny inside jokes.





WHAT'S AHEAD FOR NEW CHEMISTRY LEADERSHIP?



by **Coban Brooks**

This February, Oregon State University welcomed Dr. **Wei Kong** as the new head of the Department of Chemistry. She brings a wealth of experience to the position: Kong has been active in the field of physical chemistry for over 30 years and has been a professor of chemistry at OSU since 1995.

Her research career has taken her through a wide range of topics in physical chemistry, from gas-phase spectroscopy to macromolecular crystallography. This, together with the fact that she is the longest serving member of the department, gives her the confidence to take the helm as the Department Head. "I know the history of the department and I've taught the whole gamut of classes. I have a broad view of our mission," she says.

With her well-established knowledge of the history of OSU Chemistry, Dr. Kong has a clear goal for the future of the department, too. She wants to create a greater understanding of everyone's roll within the department so that everyone feels appreciated and is acknowledged for their efforts. "I want to bring the whole department together and create a rising tide so that we help each other and make this a better place for everybody." The Department of Chemistry is one of Oregon State's largest departments, with over 200 undergraduate and 100 graduate students in addition to 58 faculty and 16 staff members, all of whom will be impacted by Dr. Kong's enthusiasm about the future of the program.

To facilitate these goals, Dr. Kong has begun instituting some new policies and procedures around the department. She has been meeting with faculty members one-on-one, to really hear their concerns and aspirations. Following through with these listening sessions, she is making small changes that are easy for everyone to manage and will help with communications across the department. A monthly "coffee time" is planned to start the Fall term, when COVID is hopefully under control. This is a time for all voices to be heard from undergraduate, graduate, teaching staff, instructors, and professors: anyone can come and speak with the department head about any subject. Together with a few enthusiastic members of the department, she is also trying to reshape departmental events to be more inclusive for those with less free time outside the University. She's planning on implementing more comradery-based events to grow departmental relationships and is actively seeking new ways to promote the amazing individuals and groups within the department. She has established a teaching equity committee based on anonymous election results, and the committee is actively working to create an equitable teaching load for all members of the department. The executive committee is also in full swing, creating policies related to resource allocation and future hires.

Dr. Kong's appointment as the Department Head is significant in another way: she is the first female and the first Asian Department Head in the history of OSU Chemistry. She dismisses the historical achievement with humble indifference: "To me, personally, it's not a big deal," she says. "It just so happens that I'm a woman and I'm Asian." However, she doesn't downplay the effect she might have on her students. She knows that others may see her achievement and be inspired. "I hope that happens with a lot of the students: the female students, colored students, and underrepresented minority students."

Being a scientist was always the plan for Wei. "I was determined to be a scientist since I was a few years old," she asserts. This lifelong ambition seems to be a shared experience among many great scientists, but she also acknowledges the effect her upbringing had on her scientific endeavor. "I still remember many summer days my dad and I would sit in the yard and talk after dinner. One day he explained the concept of a light-year. I didn't know how fast light traveled, even after that explanation, but this memory and many similar events have been part of my life," she recalls. "My dad wanted to be a scientist, but he couldn't because of the political conditions in China. So, it was his dream for me to be a scientist, and it also just so happens that it was my dream too." It was a happy coincidence, and it was a matter she remembers fondly.

Dr. Kong's knowledge of her field will also help bolster Oregon State's already strong commitment to cutting-edge





research. But as a young student, Wei did not realize that she would enjoy it so much: “I did not expect the pleasure of doing research. When you find something in the lab and write it up, that’s super exciting,” she says, “that happiness of understanding something, you just can’t describe it.” That feeling of discovery has led Dr. Kong through a range of subjects in physical chemistry; today, her research group is interested in developing crystallography technologies for biological macromolecules. This journey started in 2005 when she was looking for opportunities that could take her skills in physical chemistry and apply them to the field of biochemistry and biophysics. She received her first funding for this project in 2008, and after consulting with a few OSU faculty members about her ideas, she began the scientific quest that her group is continuing today.



When she’s not in the lab, the lecture hall, or her office, you may find Wei along one of the many nature trails around Corvallis. “I do a lot of hiking,” she says. “I enjoy going to the woods and walking with my husband.” She also enjoys listening to books, which she does while on the treadmill. “Fictions are captivating. But I like nonfiction books also, on occasion. They’re less motivating, so I like to alternate. And if I need to motivate myself again to get onto the treadmill, I’ll find another fiction book.” Whether exercising or reading, it seems that Wei is keen on keeping her body and her mind in shape.

Oregon State Chemistry has a strong history. But it has a bright future, too. Dr. Kong is enthusiastic to work with students, faculty, and staff alike to garner success across the entire department.

THE TRIPLE POINT: A Study Space for All

by **Citlali Nieves Lira**

Earlier this year I had the amazing opportunity to help the Equity Justice and Inclusion (EJI) committee renovate and design the new (and only) undergraduate student space in Gilbert Hall: the “Triple Point.” As part of the EJI committee for the chemistry department, it was important for us to create a space where undergraduate chemistry students feel welcomed. I began my studies as a chemistry major; however, I quickly realized that outside of the classroom there was little sense of community and belonging for students within the department. It was difficult to find a place where I could meet other chemistry majors except for the few classes that are required for us and the Mole Hole. Although it often had many people, especially for PChem office hours, it was not always the right space to get to know or form a bond with other chemistry majors.

Although I love to meet new people and their major is never a factor on whether I interact with them, it is always nice to engage with other people who are taking or have taken the same classes as you, get their advice about classes and share their experiences, or simply meet people who share the same passion as you for chemistry. I, personally was missing this—I was missing the opportunity to make connections and forge friendships with other chemistry majors, to get to know my cohort, and to interact with them outside of class; and I’m sure others were as well.

This new space is a strong statement from the chemistry department; it shows students like me that they care about us, that we belong here, and that there is a space for us within the walls of this building. The Triple Point a space where we can all come together regardless of what phase of our lives we find ourselves in—whether we are in our first or sixth year of our undergrad career or if we are transfer students. We can all come together in that space and share, study, or simply read together.





UNDERGRADUATES OF THE QUARTER:

Winter 2022



Sarah Gernhart has been named one of the Winter 2022 Undergraduates of the Quarter and we couldn't be happier about it.

Sarah grew up in Gresham, OR, where she attended Sam Barlow High School, home of the Bruins.

When asked why she chose Chemistry, Sarah replied, "I was a biochemistry student my first year at OSU in hopes of becoming a pharmacist. I regularly attended Dr. **Neal Sleszynski**'s office hour when I was in general chemistry and he offered to let me take his integrated lab course, CH 324, before I had the prerequisites. I realized in that course that chemistry was definitely the right path for me as I looked forward to it every week! Starting my second year I switched to the advanced track option as a chemistry major."

She chose OSU because she wanted to attend a large university closer to home so that she could experience many things on her own but also have the security of being close to her hometown. By attending a

large university, she has had the opportunity to meet, collaborate, and get to know many different people and it has been a significant, eye-opening experience.

Sarah currently performing research as a part of Dr. **Dipankar Koley**'s lab. She fabricates calcium, potassium, and sodium solid-contact ion-selective electrodes free of the requirement of calibration to expand the applications and usage to other fields, such as complex biological media analysis. She is currently working towards being able to use all three ion selective electrodes at the same time in blood samples!

She got into research because of Dr. Neal Sleszynski! Sarah says she's, "really grateful for all the advice and mentorship he gave my freshman year, I do not know where I would be without his guidance. He got me in contact with Dr. **Chong Fang** at the start of my second year and I started a research project on nitrophenol pollutants." Covid unfortunately prevented Sarah from exploring more of Dr. Fang's research. In the Fall of 2020, she took Dr. Dipankar Koley's analytical chemistry class and was also interested in exploring electrochemical research, so she asked if she could join his lab, and, "here I am!"

Sarah has been a general chemistry teaching assistant throughout her second and third year in the program and says she, "absolutely fell in love with teaching." She knew she wanted to pursue a career in academia but was still unsure which branch of chemistry until she took Dr. Chong Fang's quantum chemistry class. "It definitely was a class that challenged me and kept me on my toes, and it

feels so abstract that it keeps me wanting to learn more." She expanded on this interest by becoming a TA for the physical chemistry series and said, "it has solidified my desire to continue in quantum and in academia."

That being decided, Sarah says her post-graduation plan is to attend graduate school starting Fall 2022 to pursue a PhD in quantum chemistry! She has yet to decide on which school wants to attend, "so that is a decision I need to make within the next month!"

When asked what Sarah liked to do outside school, she said, "this is a funny question to me because this has been a goal of mine for like the last year- find something I like that doesn't involve chemistry. To be honest, I still have not found a hobby I enjoy by myself, but I have been starting to play chess a lot recently."

Her favorite book is "Why do you care what other people think?" By Richard Feynman. She says she's actually reading it right now and it's one of her favorites. She says she tends to like self-help books. Her favorite food is, "definitely, Downward Dog's grilled cheese dipped in ranch... for sure. Or my mom's chicken pasta... also dipped in ranch."

In closing, Sarah would like to express gratitude to all the mentors she has had at OSU, specifically Dr. Neal Sleszynski, Dr. **Kevin Gable**, Dr. Chong Fang, Dr. **Wei Kong**, Dr. Dipankar Koley and Chemistry Graduate Student **Chris Bahro**. "I would not be a confident chemist without the knowledge and guidance these six have given me over the past four years."





UNDERGRADUATES OF THE QUARTER:

Winter 2022



Morgan Frank has been named one of the Winter 2022 Undergraduates of the Quarter and we couldn't be more proud.

Morgan grew up in Loretto, Minnesota, where she attended Delano Senior High School, home of the Tigers.

She chose Chemistry because she was fascinated with the ways molecules interact with

each other and because it offered an option for forensic science. She chose OSU because it appealed to her due to its excellent science program and the available forensic science track. She also really liked the location and campus and the fact that it had the D1 atmosphere but still

felt personal.

Morgan is currently performing research in the Environmental and Molecular Toxicology Lab of Dr. **Staci Simonich**. Their focus is on testing for polycyclic aromatic hydrocarbons (PAHs) and their derivatives in environmental samples and investigating means of remediation. She got involved with research because she wanted to gain hands on, practical laboratory experience.

After graduation, Morgan is planning on attending graduate school for forensic science with the ultimate career goal of working in a forensics crime lab.

Outside of school, Morgan enjoys hiking, traveling, reading, and spending time with friends and family. Her favorite book is *The Court of Thorns and Roses* by Sarah J Maas, and her favorite food is any type of breakfast food.

Congratulations, Morgan. We wish you the best of luck in Graduate School and all your future endeavors.



Darlene Valencia

Forensic Scientist
Washington State Patrol Toxicology Lab

My career in forensics has taken me all across the country. I've worked in forensic laboratories in New York City, Nashville, Portland, and Seattle. I've worked in most areas of toxicology including clinical and workplace drug testing, sports doping and steroid analysis for professional sports, and aided in thousands of criminal and death investigations. I was hired by the Washington State Patrol Toxicology Division in 2018 as a forensic scientist where I work primarily with blood, testing for the presence of alcohol and drugs for DUI and Death investigations.

My favorite time at OSU was working on experiments in the lab. It's where I learned I was meant to be working in a laboratory. The smell of the compound we created in CH 362 seemed to follow me for years!



**Oregon State
University**





UNDERGRADUATES OF THE QUARTER:

Spring 2022



Sullivan Bailey-Darland has been named one of our Spring 2022, Undergraduates of the Quarter, and we

couldn't be more pleased. Sullivan attended Tigard High School in the town where he grew up, Tigard, OR.

He had a good chemistry teacher in high school, so he already liked chemistry and when he had the opportunity to take organic chemistry as an OSU freshman, he figured he may as well take the version for chemistry majors, just in case he liked it. He ended up adding a chemistry major.

When asked why he chose Oregon State, Sullivan replied that it was because it was in-state, and he knew that OSU had lots of opportunities for undergraduate research.

He is currently performing research in Dr. **Chong Fang**'s ultrafast spectroscopy

lab. He's working on a project studying the dynamics of various nitrophenol molecules. Sullivan initially got into research through the URSA program. It was at that point, he learned about Dr. Fang's research while taking physical chemistry. "I asked him if I could work in his lab and have been there since."

Post-graduation, Sullivan plans on attending graduate school to study either physics or chemistry.

Outside of school, Sullivan plays oboe in the Corvallis-OSU symphony, and enjoys running and biking. His favorite book is *Roadside Picnic* by Arkady and Boris Strugatsky and his favorite food is bagels.

GRAD OPEN HOUSE

May 3, 2022

by **Coban Brooks**

In March, the Oregon State University Department of Chemistry hosted an open house dinner for prospective incoming graduate students. Talking over pizza, snacks, and refreshments, the new students were able to meet the current graduate students as well as several faculty in the department. "We're in a great location," one graduate student said, "there's nice weather, you get to explore the Pacific Northwest, and be in a department with lots of funding and cool research." One incoming student made her decision to attend OSU after falling in love with chemistry as an undergraduate and finding herself enjoying being in the heart of the Willamette.

Speaking in front of the evening

crowd, Dr. **Chong Fang** echoes the same sentiments: "there are so many things I love about this town," he shares. Summarizing research life and speaking on the state of chemistry at OSU, he says, "this department will really allow you to flourish."

For many, clearly, Corvallis offers a unique combination of natural beauty and cutting-edge research. Between the towering trees, rolling hills, open fields, and the mass spectrometers, electron microscopes, and X-ray diffractometers, many students

find their home in the unique research environment here. No doubt, this year's cohort of incoming graduate students will continue to excel and make a difference in their respective fields.





UNDERGRADUATES OF THE QUARTER:

Spring 2022



We are proud to announce that **Carlo Schettini Mejia** has been named one of our Spring 2022 Undergraduates of the Quarter.

Carlo was born and grew up in Panama City, Panama, where he attended the Sun Yat.

He said he liked science in general, especially materials science, but he chose chemistry as

his area of focus because he wanted to get into materials chemistry since it integrates many contributions from other fields and applies them in a practical way to understand and improve the world.

When asked why he chose OSU, he replied, “Panama does not present the best quality of education for chemistry students, so I had to look for foreign universities to pursue

higher education.” He ultimately chose OSU because he was interested in the research being done here.

Carlo is currently performing research in inorganic pigments in Dr. **Mas Subramanian**’s Lab, searching for new pigments based on mineral structures. He got into research Fall term of my sophomore year. Dr. **Chris Knutson** (whom he took general chemistry with) and Dr. **Neal Sleszynski** helped him get acquainted with undergraduate research, and to get in touch with Dr. Subramanian to join his lab.

After graduation, Carlo has accepted a position at Los Alamos National Laboratory for a year as a synthetic chemist post-bac intern. He will be researching optical nanomaterials. After that, he plans to go to graduate school, but has not fully decided where yet.

Outside school, he likes playing volleyball, reading books, cooking for his friends, and attending the Tridentine Latin Mass. His favorite book is The Silmarillion by J.R.R. Tolkien, and his favorite food is cheesecake. He says, “I enjoy making them although I do not have a particularly sweet tooth.”

WALT LOVELAND:

Receives grant from SSAA



by **Coben Brooks**

The Stewardship Science Academic Alliances (SSAA) program is a grant program under the National Nuclear Security Administration (NNSA) that aims to safely and effectively manage the United States’ nuclear weapons stockpile and fund research relating to the nuclear sciences. These funding opportunities help maintain national security and contribute to long-term nonproliferation goals.

Dr. **Walter Loveland**, Emeritus professor in the Department of Chemistry at Oregon State University, is the recent awardee of a 3 year SSAA contract for \$441,000. Dr. Loveland is well known in the field of nuclear chemistry, and much of his research focuses on fusion reactions used to synthesize superheavy elements and the neutron induced fission processes of radioactive elements.

This SSAA contract will help provide actinide samples to measure the total kinetic energy release in the fast neutron induced fission of several selected nuclei, such as Americium-241, Americium-243, and Curium-248. The total kinetic energy release is an important metric as it constitutes most of the energy produced during fission, and so this work will give us insight into the energetics and interactions inside certain fission reactions.

The department is indebted to Dr. Loveland’s sustained contribution over the years, and congratulates him for his continued success in research and service. Walt, you make us proud!





HONOR ROLL

2021-2022

Fall 2021

Sam Bednorz
Carley Beeman
Madeleine Bouchard
Katrina Brown
Owen Caleen
Nathaniel Cannon
Noelle Chandler
Madeline Coe
Thuy Duyen Doan
Seamus Fitzgerald
Christopher Frownfelter
Sarah Gernhart
Lindsey Hagglund
Mary Harrington
Lucy Hoang
Kye Hunter
Mitchell Kenny
Skylar Kim
Seiki Koenigsberg
Seohyun Lee
Jessica Li
Taylor Lindsay
Alice Lulich
Sydney Luong
Stormy Macomb
Kerry Madden
Lauren McCauley
Brooke Moser
Isabella Nelson
Mckenna Neubert
Kelly Nguyen
Matthew Nguyen
Vivian Nguyen
Citlali Nieves Lira
Evan Park
Kenzie Parsons
Nam Anh Pham
Nicholas Pogue
Jacob Rauenhorst
Samuel Rose
Anika Roth
Casey Rummelhart
Carlo Schettini Mejia
Isaac Sorrels
Jonathan Tence
Nicolaas VanDerZwan
Samantha Visaya
Timothy Walz
Owen Wasserlein
Kiwi White
Karlise Wiese
Makenzie Williamson
Derek Wong
Maximilian Zadlo

Winter 2022

Trinity Baumgartner
Carley Beeman
Nora Bissonnette
Katrina Brown
Madeline Coe
Thuy Duyen Doan
Seamus Fitzgerald
Lindsey Hagglund
Mary Harrington
Rachel Jenck
Jesse Johnson
Mitchell Kenny
Skylar Kim
Seiji Koenigsberg
Seohyun Lee
Taylor Lindsay
Isabella Nelson
Mckenna Neubert
Kelly Nguyen
Matthew Nguyen
Vivian Nguyen
Citlali Nieves Lira
Meredith Noakes
Damara Ortiz Ojeda
Evan Park
Nicholas Pogue
Gabriel Ramos
Anika Roth
Casey Rummelhart
Carlo Schettini Mejia
Ehman Tannenholz
Jonathan Tence
Keenan Tenoyo
Nicolaas VanDerZwan
Samantha Visaya
Jing Wang
Owen Wasserlein
Hannah Wold
Derek Wong
Bingquing Xue

Spring 2022

Trinity Baumgartner
Carley Beeman
Katrina Brown
Madeline Coe
Seamus Fitzgerald
Madison Flanders
Morgan Frank
Christina-Ann Groening
Takoda Hagberg
Reagan Hansen
Devon Hoskins
Kye Hunter
Jesse Johnson
Mitchell Kenny
Skylar Kim
Seiji Koenigsberg
Abigail Lawrence
Seohyun Lee
Jacob Lassard
Preston Lewis
Jessica Li
Taylor Lindsay
Sydney Luong
Eric Ly
Molly Murphy
Isabella Nelson
Mckenna Neubert
Vivian Nguyen
Damara Ortiz Ojeda
Evan Park
Emma Pham
Nicholas Pogue
Jacob Rauenhorst
Casey Rummelhart
Sophia Switzer
Jonathan Tence
Keenan Tenoyo
Samantha Visaya
Owen Wasserlein
Karlise Wiese
Taryn Willman
Hannah Wold
Derek Wong
Maximilian Zadlo

DEPARTMENTAL AWARDS

2021-2022

Undergraduate Recognition in Chemistry Scholarship: **A Dufur, Ariana Capodeici, B Xue, K Binkley**

Careers in Chemistry Award: **D Ortiz Ojeda**

Peter B Culter Memorial Scholarship: **D Reynoso-Canales, J Hardeman, T Walz**

Carrol W & Gerry A DeKock Scholarship: **C Beeman, J Trance**

Linda Mae Oleson Scholarship for Excellence in Chemistry: **K Brown, T Linsday**

Colleen Spurgeon Scholarship: **G Oedell, M Neubert, S Lee**

ACS-Hach Land Grant Undergraduate Scholarship: **K Johnson, M Bouchard, K Parsons, S Macomb**

Keith McKennon Undergraduate Research Scholarship: **N Pogue, N VanDerZwan, T Baumgartner**

James D Ingle Scholarship: **J Etter**

JJ Stephenson Scholarship: **O Caleen, C Godfrey**

Women in Chemistry Scholarship: **O Ziegler**

Jeff Fahey & Margaret Peterson Chemistry Scholarship: **C Groening**

Freshman Chemistry Achievement Award: **I Nelson, A Egan**

PLU Award: **L Lim**

ACS Physical Chemistry Award: **D Hoskins**

ACS Analytical Chemistry Award: **A Lawrence**

ACS Inorganic Chemistry Award: **S Gernhart**

ACS Organic Chemistry Award: **C Ramsperger**

AiChE: **K Gerl**

Merck Award: **D Wong**

WIC Culture of Writing Award in Chemistry: **C Schettini Mejia**

OSU Chemistry Integrated Lab Series Writing Award: **J Lessard, S Gernhart, C Schettini Mejia**

Undergraduates of the Quarter: F21 - **C Ramsperger, E Henderson;** W22 - **M Frank, S Gernhart;** S22 - **C Schettini Mejia, S Bailey-Darland**

TA Lab Awards: F21 - **S Huo, T Hurley, J Hirschi, M Nord, S Sumantakul, E Starchman;** W22 - **E Musa, D Bashirova, B Hopewell, A Kirsch, P Sengupta;** S22 - **C Boelke, A Roseborough, S Sandstrom, T Hamilton, P Prapapongpan**

Chemistry Graduate Fellowship: **T Gallagher, K Tran, S Huo, R Loughran, D Stetler**

NL Tartar Research Project: **AT Nguyen, C Tome, M Khorani, D Bashirova**

Milton Harris Graduate Fellowship: **T Hamilton, G Points, A Clifford, M Nord**

Bruce Graham Memorial Scholarship: **YA Huang**

Dr. Sheng Chung Fang Scholarship: **J Liu**

Benedict Graduate Fellowship: **E Kalbaugh**

Ken & Lise Hedberg Fellowship: **S Tran**

Combined Ingram, Dandeneau, Johnson Fellowships: **L Lancaster**

Nibler Integrated Lab Development Fellowship: **P Sengupta**

David P and Clara B Shoemaker

Memorial Fellowship: **NC Chiu**

Ingram Award: **E Hernandez**

Benedict Award: **K Smith**

Daniel & Janis Kerrigan Internship Fund: **J Bustos**

David T Wong Chemistry Research Internship: **S Stanisheuski**

Milton Harris Faculty Teaching Award: **D Myles**

James H Krueger Faculty Teaching Award: **K Stylianou**

Staff Service Award: **L Nelson**

Resilience Heroes Award: **J Pracktor, K Edwards**

Milton Harris Graduate Teaching Award: **T Krueger**

COS Loyd F Carter Award for Excellence in Undergraduate Teaching: **K Stylianou**

COS SciRIS Stage 1 Award: **W Kong**

COS SciRIS-ii Award: **C Fang**

COS Inclusive Excellence Award: **M Mackiewicz**

Web of Science, Highly Scited Researcher since 2019: **D Ji**

COS Milton Harris Award in Basic Research: **C Fang**

NSF-GRFP: **A Clifford**

Renewable Energy Foundation Scholarship: **S Sandstrom**

Best Poster Award; 37th International Symposium on Microscale Separations and Bioanalysis: **M Tran**

COS Provost Scholarship: **R Loughran**

Yerex Graduate Scholarship: **M Nord**



Oregon State University

Department of Chemistry
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