

Department of Chemistry

# Chemistry Newsletter

Summer 2021



Oregon State  
University

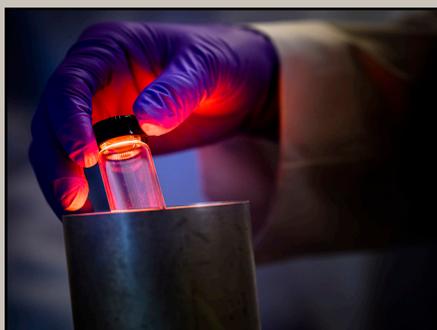
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**On the cover:** MaD Lab Research

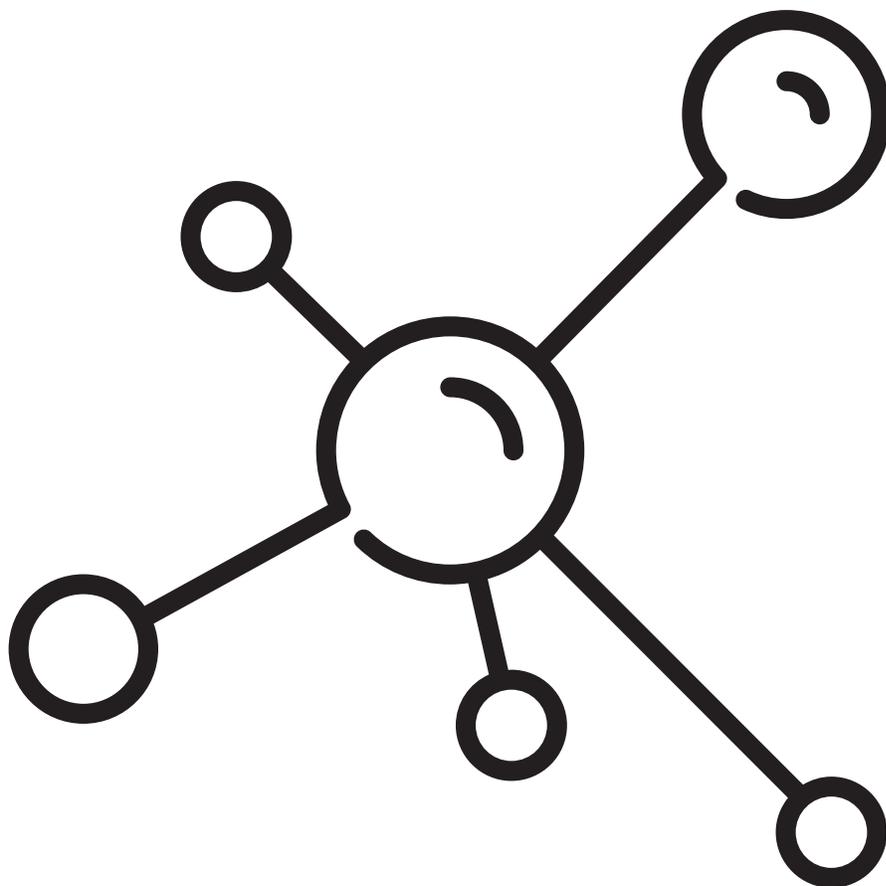


**Photo Credit:** Karl Maasdam

**Expanded stories available online:**  
[blogs.oregonstate.edu/erlenmeyer](https://blogs.oregonstate.edu/erlenmeyer)

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# A MESSAGE: From The Department Head



Hi everyone –

We have reached the end of another academic year, and therefore the start of a new one. It's a good time for a little reflection and a lot of planning.

While we've generally learned to manage and even do very well with the restrictions of Covid-19 in place, we all look forward to these winding down as vaccination rates go up and new cases decline. In our buildings and classes, the Summer 2021 term will continue to resemble our current situation – with only remote classes and reduced building occupancies. The good news is that OSU is currently planning on a full return to campus instruction and occupancy for Fall term.

All of us - faculty, staff, students, and our chemistry community members – have faced challenges this year. Most serious among these were health issues, and I sincerely hope you and your families have stayed safe, or overcome any illnesses, and are currently doing well. Adding to our troubles were greatly increased workloads, sometimes strained finances, and the need to quickly find effective new paths to provide instruction or continue learning. My heartfelt thanks to our department members for their long and hard efforts to help overcome these challenges. I'm sure that we all sometimes feel unappreciated, but our work is

important! Thank you to our donors and supporters for providing the financial assistance that enabled students to keep progressing in their programs this year. Thank you to our students for their patience and hard work learning chemistry at a distance. This community came together and we had as many successful outcomes as in a “normal” year, with undergraduate enrollments down just slightly (about 1%) from the previous year, and our graduate student population increasing by about 5%. Completions in the form of degrees were also similar year over year.

We had a wonderful Spring Awards Zoom event recently to help recognize our students' many achievements and the awards, fellowships and scholarships they received during the year. Those are impressive numbers, we were able to provide over \$300,000 to our students from OSU Foundation department or College funds during the past year, via 38 different award types, and impacting over 100 students! Every year our ceremony gets a bit longer to fit in the growing list of these achievements. We don't mind, I hope it takes even longer next year.

There are many perspectives on the story and lessons from this pandemic, I'll share mine with you – that science is humankind's most powerful invention. Fundamental research matters in the long term, and often in ways that we cannot imagine. From our recent perspective, Covid-19 spread faster and further, and impacted more people than influenzas of the past, however, the potential human health toll was mitigated by applying the scientific advances made over the past decades. This should be a great source of pride for all of us. Not only in managing Covid-like flu or in medicine, but in the critical future of energy, environment, and health, what scientists discover now will matter in the future.

We are sorry to report the passing on June 24, 2020 of **Mario Boschetto**. Mario was Chief Glassblower for the department from 1969 through 1985. After retiring, he and his wife Iris moved to BC Canada.

Mario worked with multiple universities and defense industry companies during a long, active and fascinating career.

**Fred Horne** passed away on April 21, 2021. Fred was Professor in our department and served as the College Dean for 12 years. He is survived by his wife Clara Ann, children and grandchildren.

Fred's research involved non-equilibrium thermodynamics. As Dean, he helped shape the College into its current form, and was always a strong supporter to increase diversity. The Horne's are generous benefactors as well, for example donating funds to create the Fred Horne Award for Excellence in Teaching Science award. Fred received the Lifetime Achievement in Science award in 2018. I know many of maintained a close relationship with Fred, and he will be greatly missed. There is more information about his life and work at OSU here:

<https://science.oregonstate.edu/IMPACT/2018/11/why-things-are-the-way-they-are-a-lifetime-in-thermodynamics>

We also had many good reasons to say “Congratulations!” this year; some of these were our faculty and staff promotions.

**Chris Beaudry**, **Chong Fang**, and **David Ji** have all become Full Professors. **Marita Barth** and **Michael Burand** were both promoted the Senior Instructor II, and **Amila Liyanage** was promoted to Senior Instructor. **Jie Zhang** was promoted to Senior Research Associate. **Rusty Root** was promoted to Manager 1 of Facility/Operations, and **Kristy Edwards** was promoted to Manager 2, OSU Professional Faculty.

There are a couple of other faculty and staff changes to note. **Walt Loveland** retired but remains active in research as an emeritus faculty member. We said farewell with our best wishes to **Chris Knutson** at the end of Spring term.

Wishing everyone a wonderful Summer!

Regards,  
Mike

# ADAPTING LABS For the Covid Era

By: Michael Burand & Jenna Moser

For the past several years, a guided-inquiry approach has been utilized in the OSU general chemistry laboratories. This means that students work in groups to devise and carry out their own specific experimental procedures (with guidance from their TA) to meet the project goals, without a traditional step-by-step list to follow. This leads to a more process-focused

laboratory experience, and students necessarily need to learn, understand, and utilize the underlying chemical concepts to complete the projects. Student groups are encouraged to try different approaches, and if a procedure fails to achieve the desired result it is not considered a negative outcome, but rather a positive way to learn and revise the experiment in an environment that provides ample hands-on experiences with glassware, chemicals, and laboratory equipment, in a way specifically intended to prepare students for success in subsequent laboratory courses.

With the onset of the COVID-19 pandemic in the spring of 2020, however, a serious challenge arose: How can this laboratory experience best be duplicated in a remote setting? Obviously, hands-on manipulation of laboratory equipment and chemicals would not be feasible in most cases. We realized the best option would be to tailor the available technology to maintain our guided-inquiry experience to the greatest extent possible. Fortunately, the learning management system Canvas was already extensively in use in the general chemistry laboratories for providing access to our videos, distributing handouts, administering pre-laboratory quizzes, and paperless assignment submissions. The transition to a fully remote setting was accomplished with the following additional adaptations:

As usual, student groups still submit a plan for their upcoming laboratory project. Students still meet in their two- or three-person groups during the last hour of their laboratory period to create their group's plan, with guidance from their TA. Instead of meeting in person, however, students meet via Zoom breakout rooms.

The following week, students are still responsible for analyzing data from their experiments and working within their groups to write a summary of the results. The difference is that students don't collect their own data; instead, we provide example notebook pages with experimental data along with new videos showing the experimental procedure. (Data, notebooks, and videos were created by **Jenna Moser, Greg Jones**, and the student workers of the LPSC Issue Room.) What if the experimental data we provide don't exactly match a student group's plan? No problem—student plans are graded on completeness and understanding of the experimental concepts, so if the data we provide are slightly different from what a group planned to do, it still works.

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Exp. No.	Experiment/Subject	Date
	Food Dye Lab Day 1	6/24/20
Name	Lab Partner	Locker/ Desk No.
Student		Course & Section No.

Blue Dye Dilution Table (Calculated in Excel)

Sample	Dilution Factor (%)	Dilution Factor decimal	Concentration (M)
Stock	100%	1.0	$1.26 \times 10^{-5}$
Dilution 1	50%	0.5	
Dilution 2			
Dilution 3			
Dilution 4			

Red Dye Dilution Table (Calculated in Excel)

Sample	Dilution Factor (%)	Dilution Factor decimal	Concentration (M)
Stock			
Dilution 1			
Dilution 2			
Dilution 3			
Dilution 4			

Part 2 - continued

1. The cuvette of Gatorade sample was placed in the spectrophotometer and a graph of the Gatorade was made.
2. Each of the blue dilutions was placed into a cuvette and a graph was taken using the spectrophotometer. The final graph included the 4 dilutions and the Gatorade. The Gatorade's absorbance was in between Dilutions 1 and 4, indicating that no more dilutions were necessary.

Signature	Date	Witness/TA	Date
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THE HAYDEN-McNEIL STUDENT LAB NOTEBOOK Note: Insert Divider Under Copy Sheet Before Writing

Figure 1. A page from the laboratory notebook pages provided to students for the Determination of Food Dye Content laboratory project (note that students are still responsible for completing some of the calculations). To ensure student groups were not all using the same raw data, several variants of the notebook pages were provided to students. For this particular project, UV-visible spectrophotometer results were also provided to students via Microsoft Excel.

Figure 2. Crystal growing kits (prepared by LPSC Issue Room staff) await pickup by students in the chemistry majors' and Honors College general chemistry laboratory sections, winter term 2020.



Without the in-person interactions and hands-on experiences students would normally have in the laboratory, it is even more important to provide support and guidance for laboratory students. The Mole Hole (free drop-in chemistry tutoring), TA support, and instructor office hours are all still in place remotely. Students are strongly encouraged to utilize these helpful resources.

Although not feasible for most cases, for one laboratory project, chemistry majors and Honors College students were able to pick up materials at OSU and conduct a crystal growing experiment at home. This provided an avenue to provide students at least some hands-on chemistry experience during the remote term.



Figure 3. Student photo showing results from the crystal growing project carried out at home. Photo by **K. Brown**.

We appreciate the tremendous efforts of LPSC Issue Room staff, TAs, and students to adapt to the remote laboratory environment. As one (anonymous) general chemistry laboratory student wrote after the fall 2020 term, "It was hard to do a lot of things because we weren't there physically but we made it work." We look forward to a return to in-person laboratories at OSU as soon as it is safe to do so.

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



# MATERIALS DISCOVERY LABORATORY (MaD Lab)

By: Kyriakos Stylianou

The discovery of new materials namely metal-organic frameworks (MOFs) for advanced applications is the central focus of my independent research activity. MOFs are crystalline materials prepared by the self-assembly of metal ions (or metal ion clusters) with organic ligands to form two- or three-dimensional porous structures (Figure 1). These materials have some of the highest internal surface areas and lowest crystal densities known to date. The scientific importance of these materials stems from the limitless choice of metal ions and potential ligands available, which provide an ideal platform for a systematic study of materials containing specific functionality for applications in carbon capture and conversion, photocatalysis, sensing and water purification.

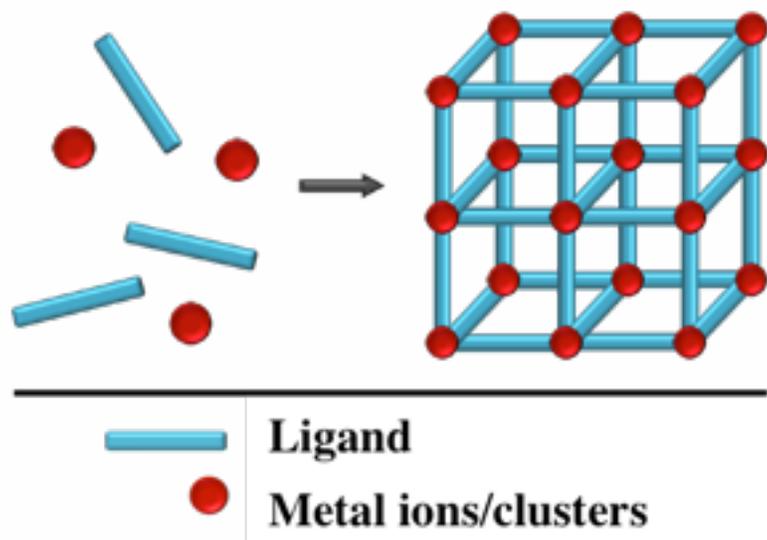


Figure 1. Schematic representation of MOFs; by changing the ligand and metal combination, different materials can be synthesized.

**Carbon capture.** Currently, research on CO<sub>2</sub> capture and storage attracts considerable attention due to the alarming reports that link global warming and climate change and the harmful effects of the steadily increasing concentration of CO<sub>2</sub> in the atmosphere. To tackle this challenge and discover novel materials that can selectively capture CO<sub>2</sub>, we generated a library of 325,000 hypothetical MOFs and screened them with the aim to discover active sites for CO<sub>2</sub> capture in the presence of water, imitating realistic conditions for flue gas separations. Inspired by the performance of few hypothetical MOFs, we synthesized a new family of MOFs, Al-PMOF and Al-PyrMOF, with a hydrophobic active site comprising two benzene (pyrene or porphyrin) rings separated by ~7 Å apart. Through in-situ CO<sub>2</sub> loading powder X-ray diffraction, solid-state <sup>13</sup>C-NMR, DFT-calculations and breakthrough curves, we proved that these hydrophobic active sites are the primary sites for CO<sub>2</sub> molecules to diffuse and sit in and due to the hydrophobicity of this site, CO<sub>2</sub> molecules cannot be displaced by water molecules. Therefore, these materials are considered superior candidates for wet flue gas separations compared to other porous materials such as the activated carbons and zeolite 13X.

**Harnessing sunlight to generate a green fuel from water.** Solar to H<sub>2</sub> energy conversion represents the Holy Grail of energy science and technology. Although numerous semiconducting materials have been developed over the last decades, and used as photocatalysts to split water and generate H<sub>2</sub>, their inadequate visible light absorbance, poor hydrolytic stability and fast charge (holes-electron pairs) recombination have prevented their wide, industrial-scale deployment. As photocatalysts, MOFs are theoretically superior to traditional semiconductors, as they offer high porosity, long-term water stability, and their light absorption properties can be tuned by modifications on the metal ions and the ligands incorporated within their structures, achieving efficient utilization of the solar energy. In our recent studies, we mixed the visible-light active MIL-125-NH<sub>2</sub> (MOF) with abundant metal-oxide, -phosphide and -sulfide co-catalysts, and found that depending on the intrinsic catalytic activity of the co-catalysts as well as the affinity between MOFs and co-catalysts, different H<sub>2</sub> production rates can be achieved. Recently, we also investigated the potential of MOFs towards dual functional photocatalysis, and studied the simultaneous reduction of polluted water and oxidation of a dye (Rhodamine B, RhB). Our proof-of-concept approach envisions a sustainable waste-water remediation process driven by the abundant solar energy while H<sub>2</sub> is produced, captured, and further utilized (Figure 2).

**Water purification and sensing.** Increasing research into the detection and removal of chemical contaminants from drinking water reflects the mounting need to efficiently and reliably test and treat our limited fresh water supplies. MOFs are strong contenders for this task. Recently, we have synthesized a novel Eu-based red-luminescent MOF, which possesses a carefully designed active site to allow the reversible detection of low-level fluoride contaminations in drinking water via a turn-off optical signal. The structure of this MOF is designed such that the active site is sufficiently exposed to a selective, weak interaction with the fluoride ions, while at the same time sufficiently protected to prevent covalent binding, thus making the process both, sensitive and easily reversible, and the material fully regenerable.

These research areas fit well with OSU's Land-Grant mission and the strong research emphasis on the environment. We are active in these research areas and many more and the students working within MaD Lab develop a strong background in these research areas. Our motto is: be a leader and not a follower, and sky is the limit with what we can achieve with these materials! Stay tuned...

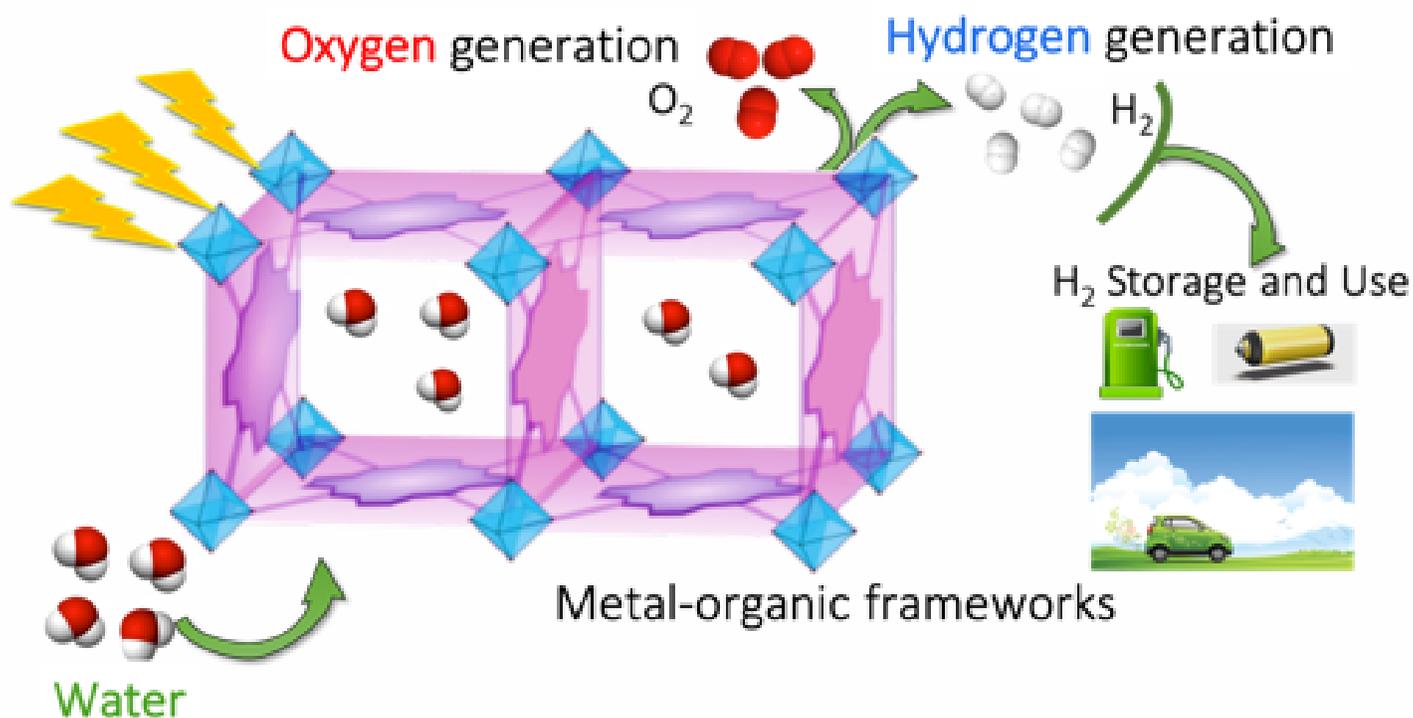


Figure 2. Photoactive MODs can be used to split water into its constituents' elements, oxygen and hydrogen, with the hydrogen being captured and used as a fuel.

## GRADUATES Class of 2021

Al Rahbi, Rahma Hamed Abdallah (ChemEd)

Alghumiz, Nasser (Bus)

Altamira, Juan (For Sci)

Aragon, Samuel (Biochem)

Arteaga, Ana (PhD)

Bloom, Madeline (HBS - ForSci)

Britton, Rachael (Biochem)

Brown, Jessica (HBS - EChem, AdvChem)

Buchheit, Thomas (AdvChem)

Burke, Brenden (ChemEd)

Caspary, Katherine (MS)

Chen, Cheng (PhD)

Cleary, Lauren (AdvChem)

Connolly, Sarah, (ChemEd)

Culbertson, Charles (PhD)

Curtis, Colby (PreMed)

Ding, Ailin (MS)

Dorn, Shelby (MS)

Finstad, Arthur (HBS - ChemEng)

Grove, Markas (PhD)

Hapuraja Pathirannehelage, Vidhara (MS)

Holley, Jillian (BioChem)

Horn, David (MatSci)

Hummingbird, Eshe (AdvBioChem)

Isono, Kirika (Bus)

Jiang, Heng (PhD)

Jiang, Jiana (AdvBioChem)

Justen, Savannah (HBS - AdvBioChem)

Kakoun, Tal (ForSci)

Karslyan, Yana (PhD)

Koga, Kenneth (AdvChem)

Koluda, Rony (ForSci)

Krueger, Taylor (MS)

Lachino-Sonato, Maria (AdvChem)

Lewis, Lauren (AdvChem)

Lim, Younghan (MatSci)

Malmberg, Christopher (PhD)

Mamoori, Sahar (MS)

McKelvey, Andrew (AdvChem)

Muensterman, Derek (AdvChem)

Ngo, Ai (MS)

Nikkel, Jason (PhD)

Oden, Katherine (PreMed)

Perez, Max (ChemEng)

Pica, Ashley (PhD)

Sagal, Samuel (AdvChem)

Sandrea, Mariya (AdvChem)

Schwichtenberg, Trever (MS)

Seevers, Travis (AdvChem)

Sheet, Partha (PhD)

Shin, Woochul (PhD)

Silveira, Matthew (PreMed)

Skala, Leigh (AdvChem)

Souza, Jake (ForSci)

Steinebel, Amanda (AdvBioChem)

Tanpure, Subhash (PhD)

Topham, Duncan (MatSci)

Tsutsui, Mikayla (PreMed)

Unitan, Linus (PreMed)

Wang, Yi-Cuen (MS)

Weeks, Emma (AdvBioChem)

Whelan-Bokusky, Abigail (ForSci)

Wiley, Jackson (AdvChem)

Xu, Wei (PhD)

Yatshon, Mykhaylo (MS & PhD)

Young, Dylan (Bus)

# REIMAGINING A CULTURE OF INCLUSION: Awareness | Active Engagement | Advocacy

By: Marilyn Mackiewicz & Doug Keszler

The global COVID-19 crisis laid bare the long-standing and systemic health, economic, and social inequities borne by people of racial and ethnic minority groups. As the Department reaches more than 3000 students annually, it is incumbent on us to adopt an equity lens across all aspects of our work, so that our actions prepare graduates to be exemplars in fair and just businesses and institutions. As the first elementary step in a series of kinetically driven reactions, we conducted an open conversation among faculty, staff, and students in Fall 2020 to discuss the current state of diversity and inclusivity in the Department. Thereafter, the Department's new Equity, Justice, and Inclusion (EJI) committee met to reflect on that discussion and to begin next steps for reimagining a climate wherein our community members, present and future, feel they belong and are valued and respected.

The Committee is working in three areas: education and building awareness, community engagement and practice, assessment and communication. Over the past year, the Committee improved member awareness of EJI issues, initiated an equity audit of departmental committees and leadership, collected and integrated information on current practices and processes, and selected a new Department slogan as part of our MLK Day celebration. We have already begun to transform our spaces – Gilbert Hall and Linus Pauling Science Center - to promote connections to the Department by better portraying our



history and the values that we embrace as a community of thinkers, innovators, and change-makers. This transformation will be unveiled in Fall 2021 when students return to campus, and we once again actively engage them in the classroom and in research. We look forward to the path ahead and hope that our alumni share our passion for the journey.

“Where Diverse Minds Inspire Endless Innovation”

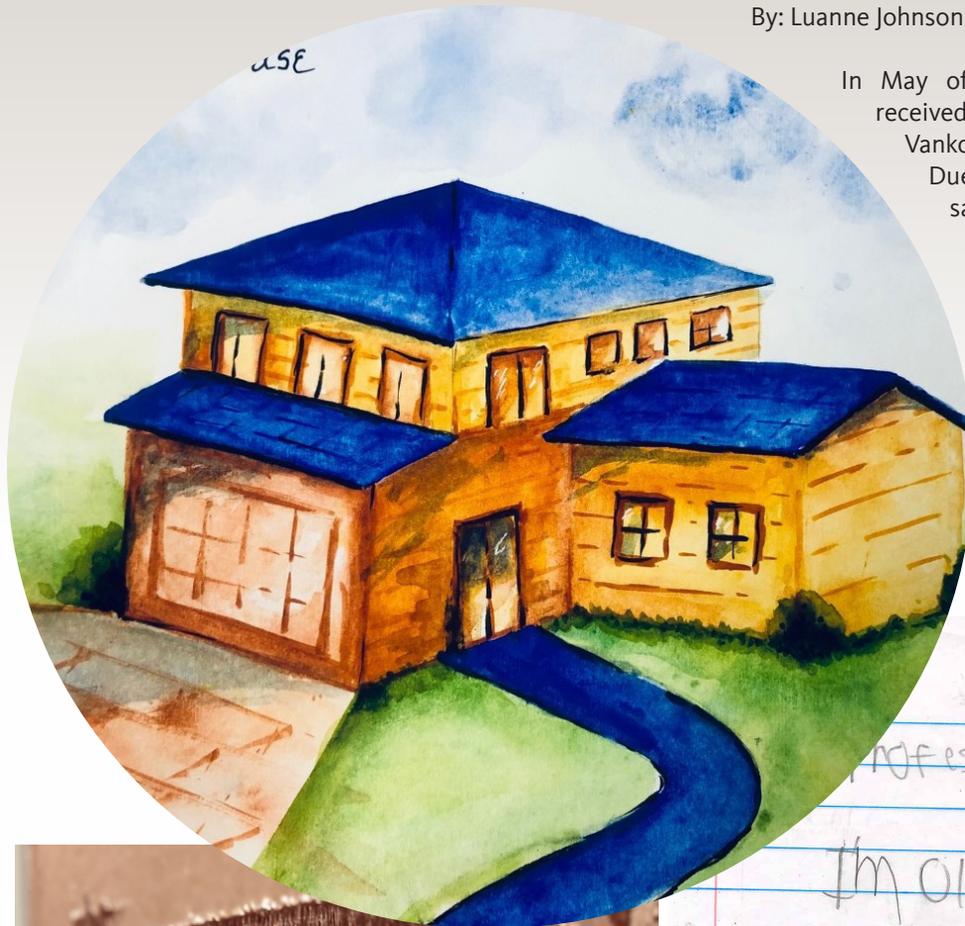
Enhance department climate and culture to be more inclusive

Evaluate current practices and policies, create actionable goals, and communicate successes

Focus on success initiatives to recruit and retain students, staff, and faculty of diverse backgrounds

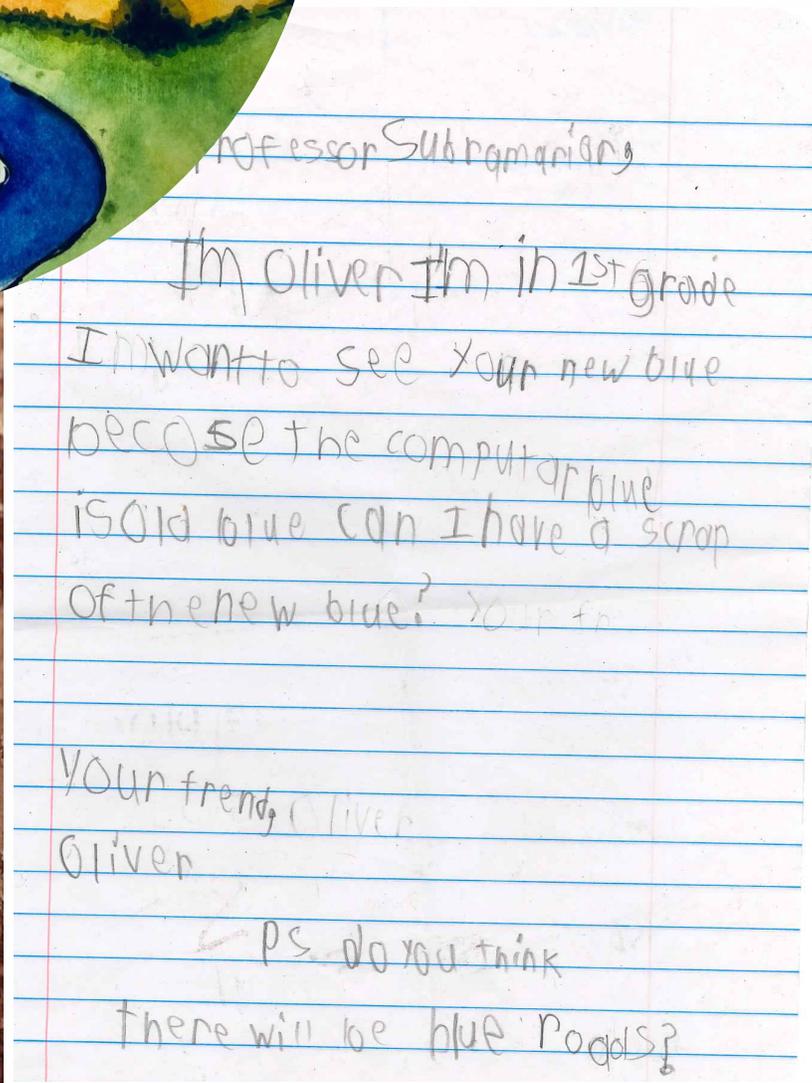
# OLIVER'S HOUSE: First Grader Requests YInMn Blue Sample

By: Luanne Johnson



In May of 2021, Chemistry Prof. **Mas Subramanian** received a letter from San Francisco first grader, Oliver Vankov, requesting a scrape sample of YInMn Blue. Due to YInMn Blue's inorganic nature, sending a sample wasn't an option, so Rajeevi Subramanian painted Oliver a picture of a house with a blue roof and driveway, entitled, "Oliver's House." The return package also included a box of Crayola Crayons featuring the new "Bluetiful" colored crayon. Mas said it was one of the happiest moments of his life reading Oliver's letter.

We in the Chemistry Department love hearing from young scientists in the community. Thanks for reaching out Oliver, keep in touch!



# UNDERGRADUATES OF THE QUARTER

## Fall 2020

**Madeline Bloom** has been named one of our Fall 2020 Undergraduates of the Quarter. We're so proud of her.

Madeline was born in the Bay Area of California, but moved to Medford when she was five. She graduated from South Medford High, home of the Panthers. According to Madeline, she's been interested in forensic science ever since middle school. She chose Oregon State because she saw that our undergraduate program had a forensic sciences option and thought, "Wow, this is perfect." She was enamored with the area; the sheer amount of research being performed in the department and the opportunities she could potentially get involved with. Her decision was made.

After her sophomore year she had an internship at the U.S. Fish & Wildlife Forensic Lab in Ashland, OR. That's where she was first introduced to mass spectrometry as an analytical technique. After that internship, she started researching labs she wanted to be a part of for her Honors Thesis during her junior year. She came across Dr. **Claudia Maier's** Lab in the Mass Spectrometry Center. After talking with her and meeting her lab group and learning about her research she became super interested in working with her. After talking about what projects Madeline was interested in she decided to look at the Oxylipins. Madeline stated that, "even though it isn't

technically related to forensic science, all the skills I am learning are directly applicable."

She is currently continuing her research in Dr. Maier's lab. Madeline works alongside Post-doc researcher Dr. **Manuel Garcia-Jamarillo**, optimizing a method to analyze a group of chemical biomarkers called Oxylipins which are derived from polyunsaturated fatty acids. They're specifically looking at the biomarkers in human plasma that are derived via biological enzymatic reactions. They're able to use them to look at different diseases associated with inflammation such as cardiovascular disease or if they're looking at brain tissues they can look at human diseases associated with the brain. They are currently optimizing a method to quantify these in a triple quad mass spectrometer and then comparing the new method with a standard LC-MS instrument. Madeline is also using this research as a part of her Undergraduate Honors thesis. She says it's been a really fun experience, and she's learned a lot about analytical chemistry and instrumentation and just the scientific method in general.

Madeline graduated in June, and will be attending George Washington University to pursue a Master of Forensic Science in the field of study of Forensic Chemistry in August. After two years in the Master's program, she hopes to gain employment at a crime lab.

Outside school, Madeline worked as a Peer Advisor for the College of Science and the Science Success Center. She did this for three years and said she loved it. She was also a member of the OSU Chamber Choir. She said music has always been very important to her and she knew wanted to do something in addition to science. As a member



of the Chamber Choir, she was able to meet new and interesting people outside the sciences. She also got to travel. In 2018, Madeline went to Washington DC to perform for Holocaust Remembrance Day at the National Cathedral, and last year, they went to Spokane. Madeline says, during the pandemic, the choir has been meeting remotely, and on occasion in a limited in-person capacity at the SEC Plaza because it's outside. She also reported that they have special singing masks that are less restrictive, but still fully enclosed.

Her favorite food is chocolate. She completed a brief study abroad in France during her freshman year and said her favorite part was visiting the chocolate museum. She loved everything about it. Her favorite book is *East of Eden* by John Steinbeck. She used this book as her senior paper in High school. She said her Mom introduced her to the book, and she loves everything it stands for.

We're incredibly proud of students like Madeline, and wish her all the best in her future endeavors.



We're proud to announce that **Samuel Wolff** has been named one of our Fall 2020 Undergraduates of the Quarter.

Samuel grew up all around the Portland Metro area, but graduated from Lake Oswego High School, home of the Lakers. He chose chemistry purely out of

interest. After a brief stint in Chemical Engineering, he realized they didn't focus enough on the fundamentals, so he switched to Chemistry. He chose Oregon State because he didn't want to leave Oregon and was pleased by the opportunities available here.

Shortly after switching to chemistry, Samuel joined Dr. **Kyriakos Stylianou's** lab. Dr. Stylianou works with metal-organic frameworks (MOFs). Samuel's little niche in the lab is photocatalysis. Improving MOFs for photocatalysis is essentially the goal. The big thing about sustainable energy is that hydrogen gas is of course a promising source of sustainable energy. And if you want to improve the way MOFs produce hydrogen sustainably, you have to engineer them in such a way that they absorb solar radiation (instead of using ultraviolet lights or stuff like that). A big parameter they focus on is red-shifting the absorption spectrum, to test improvement.

The chromophores are within the ligands, so they typically use an amino functional group or a hydroxyl. But yes, you can incorporate photo-synthesizers into the MOF. The most common general characterization techniques for these materials are powder X-ray diffraction (PXRD), thermogravimetric analysis (TGA), IR spectroscopy and surface area analysis. But to understand optical and electronic properties we typically employ UV-Vis spectroscopy, photoluminescence spectroscopy, cyclic voltammetry and X-ray photoelectron spectroscopy.

Samuel graduated in June, and his plan was to take a gap year before applying to graduate schools for admission fall term 2023. He wants to focus on materials chemistry with an emphasis in energy, energy storage and/or hydrogen gas.

Outside school, Samuel likes to rock climb, hike, camp, and participate in other outdoor activities. He also enjoys reading when he has time. His favorite food is Sushi, and his favorite book is the Alchemist by Paulo Coelho.

We're very proud of our Undergraduates of the Quarter, and wish Samuel all the best with his future.

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## UNDERGRADUATES OF THE QUARTER

### Winter 2021

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**Citlali Nieves Lira** has been named one of our Winter 2021 Undergraduates of the Quarter and we couldn't be prouder.

Citlali grew up near the Mexican desert, in the middle of Queretaro. When she was 14 or 15, she moved to Tigard with her father. It was a big change for her, going from the desert to the big forest. She graduated from Tigard High School, home of the Tigard Tigers. Citlali has always liked the state of Oregon. She enjoys that there are so many places to go and so many things to see. She knew she wanted to stay in state to go to college. Citlali reported that she's a Ford Scholar, so it's more financially beneficial to stay in Oregon, she also heard Oregon State had a strong STEM program. It was an easy decision at that point.

When Citlali was in high school she wasn't sure what she wanted to do. The plan in Mexico was that she wasn't going to go to college because it's very hard for women, especially, to get into school and find support there. It wasn't until her family got to Oregon that she started thinking maybe she could actually go to college and get a degree. She wasn't sure what that was until she had a chemistry class. She reports having an amazing teacher, who was able to relate

Chemistry to everyday life. "Everything has a reason for happening, and because of chemistry we can explain it." Citlali's teacher told her about an internship program with the ASE. Her teacher helped her apply for it and she interviewed with OSU Professor **Marilyn Rampersand Mackiewicz**, and was awarded the internship. That amazing experience was what made Citlali fall in love with Materials chemistry. "I got to learn a lot about how to actually work in a lab, what a researcher did, what the obligations of a P.I. were, and I just fell in love with the lifestyle. I liked the work you had to put in. I liked the little puzzles chemistry brings every day, although sometimes it was really frustrating because I didn't get the results or I didn't get what I was looking for. But at the end of the day there's always a solution, and there's always a way to find one, and I really liked and enjoyed that. You can always complete the puzzle, it just takes a while to gather and assemble all the pieces. Besides learning so much about chemistry, I also learned so much about managing my time in the lab, working with others, and sharing ideas, I learned a lot from Dr. Mackiewicz."

Citlali continued working with Dr. Mackiewicz when she started at OSU. She works with silver nanoparticles and is tuning the shape and size of them. So, they make different shapes of nanoparticles: triangles, spheres, cubes, rods, and different things that could be used for more applications in chemistry.

After graduation, Citlali wants to attend graduate school for inorganic Chemistry, start working at a university and become a PI of her own lab. Her back-up plan is to work in industry, as long as her chemistry topic is fun.

Outside of school, Citlali plays tennis. She admits she's not that good, but she loves the sport all the same. She also spends a lot of time on the Equity, Justice and Inclusion committee for the chemistry department, working to make the department more inclusive to under-represented students. She also enjoys hanging out with her friends and watching movies. Her favorite book is 100 Years of Solitude by Gabriel Garcia Marquez. Her favorite food is Sushi.

When asked if there was anything else Citlali thought we should know, she said, "I would like to add that OSU is a pretty great community. There are many resources for people to get help and get to the place they want to be. I had a lot of help getting to school, with people advising me and telling me what to do. If you can just reach out to people that would be great, and also creates a community. Especially for all of my girls in STEM, it can be hard, and we all have got to stick together."

We are incredibly proud of our students, and especially of Citlali for being an Undergraduate of the Quarter, and we wish her the best of luck with her future.

# UNDERGRADUATES OF THE QUARTER

## Winter 2021 (cont.)



**Matt Silveira** has been named one of our Winter 2021 Undergraduate of the Quarter, and we're excited to tell you a little more about him.

Matt was raised in the small town of Escalon, California. He is at least the third generation to graduate from Escalon High School, home of the Cougar's. He chose Oregon State because his grandparents would take him and his brother on vacation in the summer through the Willamette Valley to visit extended family in Walla Walla, and he says, "it's just a really nice place. I really enjoyed my time here as a kid."

He had always enjoyed the physical sciences growing up. "You know, when you're in grade school there really isn't a distinction between chemistry, physics, biology and all that stuff, but science always stood out. I really didn't get into chemistry until I was going through General Chemistry at Linn-Benton where I had a professor that was very enthusiastic and she taught in a way that really inspired me to pursue it further, as opposed to a different major I was in at the time. So, when I transferred to Oregon State, I was fully committed to being a chemistry major."

After deciding to go to Oregon State, Matt was browsing the Chemistry Department website and ran across Dr. **Walt Loveland's** website. His research sounded interesting, so he got in touch. They talked for 15-20 minutes and according to Matt, "before I knew it, I was working in his lab."

Matt's job is to manufacture fission targets used for the study of kinetic energy when splitting an atom. The targets are used by graduate students as well as researchers at various National Labs including Livermore and Los Alamos. He got into this research area because when he was in High School there was an interesting section about radioactivity, and it really intrigued him. Dr. Loveland's lab was his opportunity to learn more and expand his knowledge as a scientist. During his time with Dr. Loveland, Matt has had a paper published as first author.

After graduation, Matt wants to take a gap year. He's also interested in Inorganic Chemistry, so wants to apply for a few different nuclear and inorganic chemistry positions wherever he can. He says his summer is going to be really heavy into the applications.

When he is not in the lab, Matt is a big outdoorsman. He says that is another reason why he chose Oregon State is because of its proximity to many good hiking and fishing spots, and will happily spend his time off on a trail in the woods.

His favorite book is a toss-up between For Whom the Bell Tolls and The Old Man and the Sea by Ernest Hemingway. He says his favorite food has to be a classic American Cheeseburger. Block15 is his go-to when in school, and he thinks they have the best fries in town.

We're incredibly proud of our Undergraduates of the Quarter and wish Matt all the luck with his future.

# UNDERGRADUATES OF THE QUARTER

## Spring 2021

**Alice Lulich** has been named one of the Spring 2021 Undergraduates of the Quarter and we couldn't be happier.

Alice grew up in Bend, Oregon. She attended North Medford High School, home of the Black Tornado. She chose OSU due to its emphasis and opportunity for undergraduate research. The other universities she was looking at were missing that, and it was crucial to her. OSU has been a great fit for her, and she is pleased with her decision. As far as research, she has been working in the lab of **May Nyman** for the last two-ish years. She creates metal-organic frameworks (MOFs) using transition metals and then

characterizes them. She can also find applications for the new MOFs she creates, such as capturing carbon dioxide gas or splitting water in a photocatalysis reactor. This utility can be applied to clean energy solutions for climate change. She got into the lab in the first term of freshman year. She wanted to do undergraduate research, and it had a significant impact on her college choice, so she got in as soon as possible!

When asked why Chemistry, she replied, "chemistry makes sense to me. I geek out about reactions and always put things in terms of



chemistry. For example, when I listen to music, I'll think about the gas particles vibrating to get the sound wave to my ears. Or, when I am making food, I think about the denaturing process. Chemistry excites me so much!"

Alice plans research as a career. She is currently interested in options like the national labs, but the thing she loves about chemistry is its applicability; "I don't want to limit myself to thinking I can only do one thing with my degree." She says she will have to go to grad school first, though, so her after-school career is still a ways off. However, she is excited at the prospect of grad school.



**Karlie Wiese** has been named one of the Spring 2021 Undergraduates of the Quarter, and we couldn't be prouder of her.

Karlie grew up in the Rogue Valley in Southern Oregon. She attended Phoenix High School, home of the Pirates. She originally came to OSU with the intent to major in Nutrition with the Dietetics option to become a Dietitian. OSU is the only school in Oregon that has a dietetics program.

Karlie actually really disliked chemistry when she was in high school (long, long ago in 2007, she says) and dropped the class after the first quarter. She procrastinated as long as she could before she started her chemistry courses for Nutrition. She ended up loving chemistry so much that she was always eager to dive into her chemistry reading and homework. Additionally, she was working as a tutor and really enjoyed sharing her chemistry knowledge with other students and helping them better understand the material. She decided it was time to make a big change (her senior year!) and switch from Nutrition to Chemistry with an education focus.

She's not currently performing any research, but may help conduct some research in chemistry education over the next year, and has been toying with the idea of getting into a research lab. She has been working as a TA for the 23x Gen Chem series for the past couple of years now. Karlie reports absolutely love it and says it has really helped to solidify her decision to go into teaching chemistry. Something else that might be mildly interesting to note is that she didn't start college until about 9 years after finishing high school, and she'll be 32 when she finishes her bachelor's degree. After she finishes her bachelor's, she says, she'll



move on to grad school. She's still figuring out if she wants to pursue a Master's in Science Education or go for Chemistry. After grad school, her plan is to teach Chemistry at a high school, or possibly college.

Karlie is a mom to a five-year-old, so free time outside of school has been virtually non-existent; however, she enjoys hiking with her family and just being in nature. She's definitely looking forward to this summer as it's the first summer in 16 years that she won't be working or taking classes. Hopefully they'll be able to make some camping trips and explore the state. They've all definitely been going a little stir-crazy during these pandemic times over the past year, so a bit of fun out of

the house is long overdue!

She says it's hard to pick one favorite book, but her favorite genres are sci-fi and nonfiction. If she has to pick one, she it'd have to be *The Martian*, by Andy Weir.

Karlie wanted to say, "thank you to all of the instructors for being so adaptable over the past year and working hard to ensure students could continue on with their education during these unusual times!"

We're so proud of all our Undergraduates of the Quarter for their many accomplishments and wish Karlie the best of luck with all her future plans.

# DEPARTMENTAL AWARDS

## 2020-2021

Undergraduate Excellence in Chemistry Scholarship: **T Baumgartner, N Cannon, S Connolly, C Cozzocrea, K Franco, M Frank, C Frownfelter, L Hagglund, J Hardeman, D Hoskins, K Johnson, S Kim, J Li, A Lulich, H Martin, K Parsons, S Switzer, K Wiese, T Willman, H Wold, D Wong, O Zeigler**

Careers in Chemistry Scholarship:  
**C Schettini Mejia**

PeterB Culter Memorial Scholarship:  
**S Harvey**

Carrol W & Gerry A DeKock Scholarship:  
**K Brown**

Linda Mae Oleson Scholarship for Excellence in Chemistry: **S Gernhart**

Colleen Spurgeon Scholarship:  
**N VanDerZwan, N Anh Pham**

ACS-Hach Land Grant Undergraduate Scholarship: **S Connolly, K Johnson, K Parsons, K Wiese**

Keith McKennon Undergraduate Research Scholarship: **K Gerl, E Ly**

James D Ingle Scholarship: **J Etter**

JJ Stephenson Scholarship: **O Caleen, J Johnson**

David T Wong Chemistry Research Internship Fund: **M Khorani**

Daniel & Janis Kerrigan Internship Fund:  
**I Colliard**

Freshman Chemistry Achievement Award:  
**S Shah, H McClain, M Sonpatki**

PLU Award: **K Wiese**

ACS Physical Chemistry Award: **S Bailey-Darland**

ACS Analytical Chemistry Award:  
**E Schaffer**

ACS Inorganic Chemistry Award: **J Brown**

ACS Organic Chemistry Award:  
**V Nguyen**

AiChE: **M Bloom**

Merck Award: **Linus Unitan**

WIC Culture of Writing Award in Chemistry: **A McKelvey**

OSU Chemistry Integrated Lab Series Writing Award: **A McKelvey, D Muensterman, C Ramsperger**

TA Lab Awards:

Fall 20 - **R Abdallah Al Rahbi** (CH 261), **S Boulanger** (CH 464), **S Tran** (CH 361), **K Wiese** (CH 262)

Winter 21 - **M Trejo** (CH 262H), **Z Mao** (CH 262), **B Rightnowar** (CH 205), **Y Cao** (CH 362)

Spring 21 - **J Schuder** (CH 26X), **B Dawson** (CH 26X), **B Samel-Garloff** (CH 324), **S Tanpure** (CH 463)

David P Shoemaker Memorial Fellowship:  
**A Johnson** (Subramanian)

Chemistry Graduate Fellowship: **J Hirschi** (Zuehlsdorff), **T Hurley** (Remcho/Stylianou), **A Nguyen** (Koley), **T Rahman** (Nyman), **Y Xu** (Ji)

Max L Deinzer Chemistry Fellowship:  
**S Sumantakul** (Remcho)

NL Tartar Research Project: **D Cao** (Field), **C Bahro** (Koley), **P Dey** (Beaudry), **G Gonzalez-Montiel** (Cheong), **E Kalbaugh** (Remcho)

Milton Harris Graduate Fellowship:  
**S Boulanger** (Fang), **M Nord** (Stylianou), **S Tran** (Kong), **K Kim** (Ji), **T Krueger** (Fang)

Bruce Graham Memorial Scholarship:  
**G Points** (Beaudry)

Dr Sheng Chung Fang Fellowship:  
**T Feoktistova** (Cheong)

Ingram Award: **E Starchman** (Beaudry)

Benedict Graduate Fellowship:  
**D Bashirova** (Zuehlsdorff), **T Rookard** (Stylianou)

Benedict Award: **A Scida** (Ji)

Whiteley Graduate Fellowship: **M Amiri** (Nyman)

Ken and Lise Hedberg Fellowship:  
**M Trejo** (Kong)

Milton Harris Teaching Assistant Award:  
**S Tachibana**

Milton Harris Faculty Teaching Award:  
**V Remcho**

James H Krueger Faculty Teaching Award:  
**M Burand, R Nafshun**

Resilience Heroes Award: **S Hansen, J Moore, R Root, C Siler, P Weiss**

Staff Service Award: **S Hansen**

Oregon Sport Lottery Scholarship: **S Tran**

Oregon Lottery Graduate Scholarship:  
**B Rightnowar**

Wei Family Provate Foundation Scholarship: **J Liu, M Lee Kim-Fu**

GEM Fellowship & DOE SCGSR Award:  
**I Collard**

OSU Diversity Fellowship: **J Bustos**

OSU Provost's Distinguished Graduate Fellowship: **L Allen**

OSU Provost's Distinguished Graduate Scholarship: **R Loughlan, E Hernandez, A Clifford & D Stetler**

2021 COS Milton Harris Award in Basic Research: **C Fang**

American Chemical Society Stanley Israel Award: **M Mackiewicz**

Advisory Editor for Angewandte Chemie & Humboldt Research Award Winner:  
**M Nyman**

**David Ji & Chong Fang** were awarded a \$400K NSF Award

# HONOR ROLL

## 2020-2021

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### Fall 2020

Alghumiz, Nasser  
Alvarez Carmona, Jose  
Aragon, Samuel  
Baumgartner, Trinity  
Bloom, Madeline  
Cannon, Nathaniel  
Chang, Sam  
Chen, Gabrielle  
Deely, Lorelei  
Etter, Jessica  
Frank, Morgan  
Gandy, Benjamin  
Gernhart, Sarah  
Gratton, May  
Hagglund, Lindsey  
Hamilton, Justin  
Hammond, Reno  
Harrington, Mary  
Hioe, Ethan  
Hughes, Haley  
Hummingbird, Eshe  
Hunt, Ginger  
Jenck, Rachel  
Jones, Sophia  
Justen, Savannah  
Kennedy, Madelyn  
Kim, Skylar  
Lawrence, Paige  
Lessard, Jacob  
Li, Jessica  
Lim, Younghan  
Ly, Eric  
Martin, Hailey  
Mathews, Bailey  
McCauley, Lauren  
McDonald, Aliyah  
Parsons, Kenzie  
Pham, Nam Anh  
Rauenhorst, Jacob  
Richardson, Jack  
Rummelhart, Casey  
Sagal, Samuel  
Seibert, Basie  
Skala, Leigh  
Skanes, Benjamin  
Sosnovske, Alden  
Still, Crystal  
Switzer, Sophia  
Tsutsui, Mikayla  
Unitan, Linus  
VanDerZwan, Nicolaas  
Vaz, Katarina  
Virasak, Priscilla  
Walter, Lane  
Wiese, Karlie  
Williams, Thomas  
Williamson, Makenzie  
Willman, Taryn  
Wolff, Samuel

### Winter 2021

Baumgartner, Trinity  
Bobenrieth, Alejandro  
Cannon, Nathaniel  
Chappel, Bo  
Connolly, Sarah  
Curtis, Colby  
Etter, Jessica  
Frank, Morgan  
Gerl, Kathryn  
Hagglund, Lindsey  
Hammond, Reno  
Hughes, Haley  
Hummingbird, Eshe  
Hunter, Kye  
Hyatt, Sarah  
Jiang, Jiani  
Jones, Sophia  
Justen Savannah  
Kim, Skylar  
Lawrence, Abigail  
Li, Jessica  
Liu-May, Benjamin  
Ly, Eric  
Martin, Hailey  
Mathews, Bailey  
McCauley, Lauren  
Nieves Lira, Citlali  
Perez, Max  
Pham, Nam Anh  
Ramsperger, Chloe  
Rauenhorst, Jacob  
Richardson, Jack  
Roth, Anika  
Sagal, Samuel  
Skanes, Benjamin  
Sosnovske, Alden  
Tannenholz, Ehman  
Topham, Duncan  
Unitan, Linus  
VanDerZwan, Nicolaas  
Vaz, Katarina  
Virasak, Priscilla  
White, Kiwi  
Wiese, Karlie  
Williams, Thomas  
Williamson, Makenzie  
Willman, Taryn  
Wong, Derek  
Yu, Hoi Man  
de la Fuente, Phoenix

### Spring 2021

Baumgartner, Trinity  
Brown, Katrina  
Cannon, Nathaniel  
Connolly, Sarah  
Curtis, Colby  
Frank, Morgan  
Frownfelter, Christopher  
Gandy, Benjamin  
Gernhart, Sarah  
Gonzalez Saunders, Izabella  
Gratton, May  
Hagglund, Lindsey  
Hammond, Reno  
Harrington, Mary  
Hunter, Kye  
Justen, Savannah  
Kim, Skylar  
Lawrence, Abigail  
Li, Jessica  
Lindsay, Taylor  
Lulich, Alice  
Ly, Eric  
Martin, Hailey  
Mathews, Bailey  
McCauley, Lauren  
McClain, Hannah  
Parsons, Kenzie  
Pham, Nam Ang  
Pogue, Nicholas  
Ramsperger, Chloe  
Rauenhorst, Jacob  
Roth, Anika  
Rummelhart, Casey  
Skanes, Benjamin  
Spackman, Sachyea  
Switzer, Sophia  
Tannenholz, Ehman  
Tehhoyo, Keenan  
VanDerZwan, Nicolaas  
Vavrosky, Clarissa  
White, Kiwi  
Wiese, Karlie  
Williams, Thomas  
Williamson, Makenzie  
Willman, Taryn





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