

The Oregon Center for Electrochemistry



PHOTOS: CHRIS LARSEN

Researchers in the Oregon Center for Electrochemistry discussing the outcome of a reaction.

Oregon's new Oregon Center for Electrochemistry (*electrochemistry.uoregon.edu*) was founded in 2019 and has gained a remarkable head of steam so far. The center's mission is to educate leaders in electrochemistry; accelerate research and innovation in electrochemistry through a collaborative network of industry, national laboratory, and academic partners; and serve local and state communities and governments in providing science-based input into the energy technology transition. Founding director Professor **Shannon Boettcher** was himself a graduate of the University of Oregon (BS '03), and returned to the Department of Chemistry and Biochemistry in 2010 as a tenure-track faculty member.

Boettcher says his goal in founding the center was to increase the impact of the department's work. "Broadly speaking, I want to elevate the impact of our research, both at

the fundamental level and our applications-based research," he says. "And to do that you want to have a strong network of local and international people you work with."

To increase the impact of their education effort, Boettcher started an electrochemistry master's internship program in 2020 that launches students' careers in industry. Eight students graduated in 2020, and 21 students graduated in 2021. This fall they had 27 new students joining, which Boettcher thinks is the largest internship-based master's program currently on campus. This master's internship follows a model first pioneered by chemistry professor Dave Johnson more than 20 years ago. In this model, students earn a master's degree after an intense six months of integrated course work that blends deep fundamental understanding with technology applications, followed by a nine-month industry internship. "These students are getting exceptional jobs

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The Oregon Center for Electrochemistry

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SHANNON BOETTCHER



“In almost every company in the US that’s doing electrochemistry, we have somebody working there from our program. There is a desire to hire our students and/or collaborators, and make connections with us via research and development.”

*Founding Director
Shannon Boettcher*

and are highly sought after,” Boettcher says. He’s referring to success stories like Cassandra Flores, an alumna from 2021 who is now an electroplating engineer. Or 2021’s Ashley Heldibridle, who is an EV-battery engineer. Or 2022 graduate Alfred Nkhama, who is now researching anion exchange membrane water electrolysis. The average annualized compensation for the students is more than \$82,000 during the internship.

“We have these students creating connections to industry now,” Boettcher says. “In almost every company in the US that’s doing electrochemistry, we have somebody working there from our program. There is a desire to hire our students and/or collaborators, and make connections with us via research and development.”

In addition to Boettcher, associate director **Paul Kempler**, a research assistant professor, is doing technical economic analysis, and growing the workforce development efforts within the state of Oregon. Managing director **Erica Abbe** is working on local- and state-level initiatives for workforce development to support energy transition industries. Another research professor, **Gary Harlow**, an expert in electrochemical surface science and X-ray beamline techniques, recently arrived.

This summer, Boettcher’s research team was awarded phase 1 funding by the NSF CCI program to initiate the Center for Interfacial Ionics (ionics.uoregon.edu), or CI2, to learn more about how ions move across interfaces. CI2 is studying the interfaces between two immiscible liquids, and between solid/liquid systems. In many electrochemical processes, ranging from electrochemical processes in batteries, fuel cells, electrolyzers, etc., it is the ion-transfer processes that control rate and performance, but these are poorly understood.



Oregon Center for Electrochemistry students performing research.

“CI2 is really connected to the other things we’re doing” says Boettcher, “we are building a web, an ecosystem, that addresses current challenges, does really good basic science informed by current challenges, and educates students for jobs that are out there right now and in places where they’re really needed.”

As another example, Kempler recently was awarded a \$1.5 million grant by the Department of Energy. He’ll use that to study decarbonizing metal production using green electricity at low temperature instead of taking metal ores and refining them with natural gas or coal.

Another goal of the center is to lower the price of hydrogen through new water electrolyzer technologies. President Biden’s Energy Earthshot initiative aims to lower the cost of hydrogen to \$1 per kilogram. The

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Department Head's Perspective



Greetings! It is an honor and a pleasure to be writing as the new department head, effective September 2022. I must begin by thanking **Mark Lonergan** for his tremendous service as head over the last two-plus years. Mark calmly guided the department through the continually shifting challenges of COVID, and brought us out strong. This fall we welcome a large incoming class of 26 new graduate students, continuing our standing as the largest graduate program at the University of Oregon. We have faculty searches for new colleagues in the areas of chemical biology and environmental materials, and are discussing future directions to continue research growth. The new **Oregon Center for Electrochemistry**, highlighted in this newsletter, is bringing energetic master's students for novel training leading to jobs across the country. Excitingly, the number of undergraduate students in our general chemistry sequence continues to grow! We have opened additional laboratory sections and are working to increase resources and support for SUPeR Chem (Success Utilizing Peer Resources) and other tutoring groups to scaffold success for undergraduate chemistry students. In future newsletters I hope to highlight the great work being done by department members in these introductory chemistry programs—they support both our

chemistry and biochemistry majors and a huge swath of UO science undergraduates. Chemistry is indeed the central science!

Also highlighted in this newsletter are continuing faculty accolades. It's a pleasure to acknowledge the promotion of **Cathy Wong** to associate professor with tenure. Junior faculty **Julia Widom**, **Chris Hendon**, and **Carl Brozek** all have featured awards. We celebrate **Mike Pluth**'s election as a fellow of the American Association for the Advancement of Science. Appointment as Under Secretary of Science and Innovation places **Geri Richmond** in a federal government position that is critical to the support of science around the country.

Our department has been fortunate to have executive support from highly skilled and committed office staff. After more than 29 years of service since 1993, **Diane Lachenmeier** retired this past June. As department manager, Diane skillfully and gracefully guided department operations through several generations. We miss her and wish her the best in retirement. Also recently retired and well-missed is **Janet Macha Kneller**, who since 2014 has supported myriad activities for the faculty and graduate students in the organic-inorganic-materials division, and been the professional "UO face" to many seminar visitors.

For me, the greatest pleasure is hearing from former students and other department alumni. I am very interested to learn from recent graduates about where their UO degrees are taking them—please keep in touch! It is also a real treat to periodically intersect with alumni of some venerable former UO chemistry research labs. As I write, we look forward to the upcoming Leroy Klemm Lecture by Professor Cathleen Crudden of Queen's University, Ontario. We are also preparing to return to the grand holiday parties in Willamette Atrium, paused since 2019. We are extremely grateful to friends of the department who generously support our student scholarships, building renovations, and student research and learning resources. As the holiday season approaches, we wish you safety and joy.

"For me, the greatest pleasure is hearing from former students and other department alumni. Please keep in touch!"

*Department Head
Vickie DeRose*

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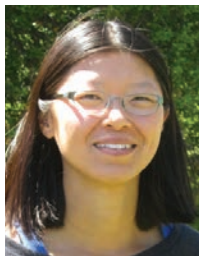
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chemistry.uoregon.edu

Faculty Awards and Honors

CATHY WONG



Cathy Wong Promoted to Associate Professor

Cathy Wong was promoted this fall to associate professor in the Department of Chemistry and Biochemistry. Wong, who joined the UO in 2015, uses lasers to study how material interacts with light and solar cells. Wong, who grew up in Toronto, earned her bachelor's degree in biological chemistry from Toronto's McMaster University and her PhD in 2011 from the University of Toronto. She later completed a postdoctoral degree from the University of California-Berkeley. In 2018 she was honored for her teaching and research with a CAREER Award by the National Science Foundation and in 2021 she was awarded a UO A.J. Ersted Award for Distinguished Teaching.

JULIA WIDOM



Julia Widom Chosen for AHA Career Development Award

The American Heart Association has selected **Julia Widom** as a recipient of the AHA Career Development Award. The award supports the early careers of highly promising healthcare and academic professionals as they explore innovative questions or pilot studies that will provide preliminary data and develop their research skills, fostering their future success as a scientist. The three-year grant will fund Widom's research using single-molecule fluorescence techniques to study the structure and dynamics of heart-specific long noncoding RNAs linked to cardiac stress. Widom earned her PhD in physical chemistry at the University of Oregon in 2013 and joined the UO faculty in 2018 as an assistant professor.

GERI RICHMOND



Geri Richmond New US Energy Under Secretary

In November 2021, **Geri Richmond** was confirmed as the Under Secretary of Science and Energy for the federal Department of Energy following a voice vote by the US Senate. The under secretary for science oversees the Energy Department's Office of Science, and advises the Secretary of Energy on energy and technology issues and research, among other duties. Richmond, at the UO since 1985, holds the Presidential Chair in Science and is a recipient of the National Medal of Science. Her research focuses on air and water interactions at the surface of water. Richmond is a highly regarded scientist with numerous honors, including the Presidential Award received from President Clinton in 1997 and the American Chemical Society's highest honor, the Priestley Medal, in 2018. She is a member of the National Academy of Sciences and is a fellow of the American Academy of Arts and Sciences, the American Chemical Society, the American Physical Society and the Association for Women in Science. Richmond is also the cofounder of COACh, the Committee on the Advancement of Women Chemists.

MIKE PLUTH



Mike Pluth Named AAAS Fellow

Mike Pluth was one of four UO faculty members named as 2021 fellows by the American Association for the Advancement of Science. His research into the delivery, detection, and molecular recognition of reactive sulfur species is expanding our understanding of how living systems interact with this element.

CHRIS HENDON



Chris Hendon Named Dreyfus Teacher-Scholar

Chris Hendon, an assistant professor and computational materials chemist, was one of 18 Camille Dreyfus Teacher-Scholars named for 2022. These faculty are within the first five years of their academic careers, have each created an outstanding independent body of scholarship, and are deeply committed to education. Each Camille Dreyfus Teacher-Scholar receives a research grant of

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News Briefs

DeRose, Pluth, Johnson Receive NSF Training Grant to Support STEM

Professor and Department Head **Vickie DeRose** and her co-PIs **Darren Johnson** and **Michael Pluth** received a five-year, \$3 million grant to support up to 40 PhD students in a range of STEM fields with one-year fellowships for study and experiential learning. Elements of their NSF research training program in Molecular Probes and Sensors (blogs.uoregon.edu/uonrt) will ultimately be shared in models of successful professional development and innovation training that can be applied across research interests. The students will move through the program as a cohort, collaborating on research and innovation activities related to technology, agriculture, and human health. “We want to prepare leaders who can bring great ideas into different areas,” DeRose said about the program. “In addition to technical expertise, common elements that support this goal include working in an inclusive community that supports members from diverse backgrounds, being able to effectively communicate with different stakeholders, being imaginative and agile with projects, and being able to address complex problems.”

The UO Hosts 2022 International Symposium of Macrocyclic and Supramolecular Chemistry

On June 19–24, 2022, the UO hosted the 16th International Symposium of Macrocyclic and Supramolecular Chemistry (ismsc2022.org), which saw 240 participants from 21 countries. The meeting was co-organized by professors **Darren Johnson** and **Mike Haley**, along with Professor Kate Jolliffe from the University of Sydney. There were 60+ invited who contributed talks along with 147 poster presentations. Despite being postponed twice because of COVID, the in-person event was a resounding success based on participant feedback, and importantly, Mother Nature cooperated with excellent weather during the entire week!

Jeffrey Cina Publishes Spectroscopy Textbook

Jeffrey Cina, a professor of theoretical physical chemistry at the UO since 1995, has published a textbook about spectroscopy through Oxford Press (global.oup.com/academic/product/getting-started-on-time-resolved-molecular-spectroscopy-9780199590315). The book is called *Getting Started on Time-Resolved Molecular Spectroscopy*. In the book, Cina explains the basics of time-resolved molecular spectroscopy with chapters designed to be read individually to best fit in with other instructional material. Cina says that this book project gave him a chance to develop what he hopes will be a helpful theoretical perspective on several techniques created by others for measuring chemical and molecular processes with very short pulses of laser light. “I’m grateful for the opportunity the University of Oregon offers to engage with important research topics over prolonged periods of time, to collaborate with other researchers, and to share our findings and our enthusiasm with talented young people,” he says.

Bella Demachkie Honored for Innovative Research

February 11 has been designated the International Day of Women and Girls in Science by the United Nations. In February 2022 the UO honored female students in STEM fields for their innovative research and contributions to their fields. **Bella Demachkie**, a graduate student in the lab of Professor **Mike Haley**, was one of those featured. Her research revolves around designing new organic semiconductors that may eventually be used in more sustainable electronic devices.

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VICKIE DEROSE



MIKE PLUTH



DARREN JOHNSON



MIKE HALEY



JEFFREY CINA

News Briefs

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BELLA DEMACHKIE



Demachkie is an active member of the UO's Women in Graduate Science (blogs.uoregon.edu/uowgs), a group that supports female graduate students on campus. She's also a member of the chemistry and biochemistry department's Division of Equity and Inclusion committee.

Scott Hansen Helps Develop Blueprint For Cancer Enzyme

UO biochemistry assistant professor **Scott Hansen** along with 13 colleagues from other universities have developed a blueprint of the structure for an enzyme known as PI3K. Hansen is coauthor on the paper published in the journal *Science Advances* (science.org/doi/10.1126/sciadv.abj4282). The paper uses higher resolution structural information to measure biologically relevant interactions with other molecules. The researchers used a technique called cryo-electron microscopy, which collects tens of thousands of images in an ultra-thin layer of ice using an electron microscope. The images are compiled and averaged to create a single high-resolution image that reveals the structural features of the enzyme. This detailed image of the structure will allow researchers to determine how other molecules activate the protein.

SCOTT HANSEN



Faculty Awards and Honors

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CARL BROZEK



\$100,000. Hendon's group uses quantum chemical simulations to study mechanisms of electrical charge conduction, defect formation, and chemical kinetics in hybrid organic-inorganic materials. The group is working to understand the emergence and properties of defects in metal-organic frameworks (MOFs), which are a class of solid-state porous materials composed of inorganic clusters spatially separated by organic ligands and other hybrid materials. In 2021 Hendon was named a Cottrell Scholar for his scientific research into the process of coffee brewing.

Carl Brozek Named Cottrell Scholar, Dream Chemistry Award Winner

Assistant Professor **Carl Brozek** was named a 2022 Cottrell Scholar by the Research Corporation for Science Advancement. The Cottrell award recognizes outstanding academics for the quality and innovation of their research programs and academic leadership skills. Brozek was one of 24 early-career scholars selected for the 2022 award based on a two-part proposal on teaching and on research. Brozek will receive \$100,000 over three years for research and will present his proposals at the annual Cottrell Scholar Conference. Brozek's research on water purification methods uses nano-sized porous crystals to filter impurities, such as salt, bacteria, or heavy metals out of water. These nanoparticles exhibited varied behavior at different sizes and at different temperatures. They can be "tuned" so that the same crystals can filter different materials, which would be much more efficient than current water filtration methods.

Later in fall 2022 Brozek was one of five finalists in the Dream Chemistry Award competition in Warsaw, Poland, where he was named the 2022 winner. The Dream Chemistry Award is not about scientific achievements but about vision. This unique international contest promotes young researchers who want to step forward with innovative dreams. Brozek's "dream" is to "capture energy with controllable chaos." He proposed the innovative idea of taking a closer look at the wasted energy lost daily. In his concept, controlling the entropy of molecules will provide a new tool for capturing waste energy released in the environment.

Student Awards

Pai, Stovall Receive NSF Graduate Research Fellowship

Kalika Pai, a third-year chemistry graduate student in the Widom lab, received a National Science Foundation Graduate Research Fellowship (GRF). The NSF-GRF supports outstanding students pursuing STEM-field research-based graduate degrees. Pai's research involves using single-molecule fluorescence methods to determine the kinetics of binding between short oligonucleotides and structured RNA molecules. **Nathan Stovall**, a former undergraduate in the Boettcher lab, also received an NSF-GRF for his study of oxygen evolution catalysts for polymer membrane electrolysis. In 2020, Stovall was a recipient of the UO's Knight Campus Undergraduate Scholar Award. Recipients of the NSF-GRF receive an annual stipend of \$34,000 for three years as well as access to opportunities for professional development. In addition, the fellowship provides UO students with a \$12,000 cost of education allowance for tuition and fees.

Tran and Lindquist Receive Keana Fellowship

Graduate students **Emma Tran** and **Grace Lindquist** have been named as the department's 2021–22 John Keana Fellows. Tran received her PhD in spring 2022 after working in the Richmond lab. Lindquist is a fourth-year doctoral student in the Boettcher lab. The Keana Fellowship was established in 2017 in honor of Professor Emeritus **John Keana**, and provides annual fellowship awards to graduate chemistry and biochemistry students at the University of Oregon. Tran was born in Vietnam, but grew up mainly in Las Vegas, where she completed her BS degree in chemistry with a minor in mathematics. As a graduate student with **Geri Richmond**, she investigated the surface phenomena of oil-in-water nanoemulsions. Lindquist grew up in Minnesota where she was on an accelerated course path through the FoCuS program at the College of Saint Benedict and Saint John's University. As a graduate student at the UO she leads Mad Duck Science, a program that conducts science experiments with students from a local underfunded middle school. She is also an outreach coordinator for Women in Graduate Science. In the Boettcher lab, she researches anion exchange membrane water electrolysis.



KALIKA PAI



NATHAN STOVALL



EMMA TRAN



GRACE LINDQUIST



We're Back!
On December 8 students, faculty, and staff enjoyed the return of the annual holiday party in the Willamette Hall atrium after a three-year absence.

Alumni News From All Over

Keep In Touch

We often do not know about the distinguished careers of our alumni until they share information with the department or for publishing in the newsletter's News From All Over section. Over time, as faculty leave or retire, we lose awareness of previous generations of alumni. You can help us by telling us about your career or of former students that you know. Email us at chem@uoregon.edu.
Thank you!

2010s

Daniel T. Chase, PhD '11 (chemistry), joined the faculty at St. Mary's College of Maryland in 2015, where he teaches courses in organic chemistry. After graduating from the Haley lab at Oregon working on antiaromatic organic semiconductors, he completed a postdoctoral stint at the University of Texas-Austin and then was a visiting professor at Gonzaga until 2015. In 2020, Chase was awarded a three-year, \$70,000 grant from the American Chemical Society Petroleum Research Fund.

Aurora Ginzburg, PhD '19 (chemistry), worked in the Hutchison lab. Ginzburg received a 2019 Student Leadership in Sustainability Award. Now at Oregon State University, she is leading a study she started while at UO on sunscreen. She found that sunscreen containing zinc oxide quickly loses effectiveness and that zinc oxide might also become toxic when mixed with avobenzone, an ingredient common in sunscreen and foundation makeup.

Kristopher Koskela, BS '17 (chemistry), conducted undergrad research in Jim Hutchison's lab, studying metal oxide nanocrystals and their plasmonic properties, and contributed to six papers during his time at the UO. In May 2022 he graduated from Professor Richard Brutchey's lab at USC, where he studied solution processing metal chalcogenides using a dissolve and recover approach using a thiol-amine solvent system. He received the USC Chemistry Department Research Impact Award based on publication of several high-impact papers. Since then he joined the metal oxide atomic layer deposition (MOx ALD) group at Applied Materials at their headquarters in Santa Clara, California, developing state-of-the-art deposition equipment for semiconductor fabs.

Logan Kostur, BS '12 (chemistry), worked as an undergraduate researcher with John

Hardwick (now Senior Research Associate Emeritus). Kostur graduated from the Daniel K. Inouye College of Pharmacy at the University of Hawaii in 2019 and is currently employed as an oncology specialty pharmacist.

Eric Goytia Nummedal, BS '16 (biochemistry), researched in the Niell lab and was mentored by Bruce Branchaud. In 2022 he graduated with an MBA from University of Southern California and will be joining LEK as a life sciences consultant.

Brandon Schabes, PhD '19 (biochemistry), studied physical chemistry and chemistry education with Geri Richmond, Tom Greenbowe, and Elly Vandegriff. He says he landed his "dream job" teaching, coordinating, and improving the 100-level chemistry classes at Union College in Schenectady, New York, where his current position is chemistry lecturer and lab coordinator.

Keenan Woods, MS '15 / PhD '17 (chemistry), returned to Oregon just before the advent of the 2020 COVID pandemic. He had one week in his new position as an applications engineer at Edwards Vacuum before he was sent home to work remotely. Since then, he has been fortunate enough to work on a hybrid remote/onsite schedule. Woods has since been promoted to senior technical program manager for one of the Key Customer Account Teams at Edwards Vacuum. He and his wife, Jackie, have enjoyed the return of global travel, and they recently enjoyed a week spent exploring Southern Germany. Auf Wiedersehen!

Samantha Young, PhD '18 (chemistry), is managing the X-ray diffractometer (XRD) and two X-ray photoelectron spectrometers (XPS) in the University of Washington's Molecular Analysis Facility. She received her BS in chemistry from Truman State University (Kirksville, Missouri). Her PhD research in the Hutchison lab focused on designing

nanoparticle-functionalized electrodes for electrocatalysis. She also managed a small X-ray scattering instrument in CAMCOR as a graduate student.

2000s

Brian Truong, BA '07 (biochemistry), has been working as an anesthesiologist for Oregon Anesthesiology Group at Providence St. Vincent Medical Center in Portland, Oregon. Truong has cared for many COVID-positive patients during the pandemic. Truong started a scholarship foundation at Westview High School (his alma mater) to help disadvantaged students pursuing a career in healthcare. In his free time, he enjoys playing and training his 10-pound Maltese puppy named Matcha.

Benjamin Wiggins, BA '03 (biochemistry), graduated from the honors college in 2003. Wiggins says, "I just took a tenure-track professor of biology at Shoreline College. Thanks for inquiring!"

1990s

Matt Clifton, BS '99 (biochemistry), wrote that during the pandemic he changed positions and joined the pharmaceutical company Novartis. He is now the head of structural and biophysical chemistry at Novartis in Emeryville, California. "My group is involved in a variety of projects, but in regards to COVID, we also recently received a grant for pandemic preparedness from the NIH as the second award recipient," he wrote. "The goal will be to develop a variety of inhibitors for SARS-CoV-2 as well as other viruses

(Dengue, Nipah, etc.)" See the award at this link: www.nih.gov/news-events/news-releases/nih-announces-antiviral-drug-development-awards

Jon Litty, BA '97 (biochemistry), is an attorney at law in Albuquerque, New Mexico, and Army Reserve officer. He is a lieutenant colonel and is the deputy commanding officer of the 97th training brigade, the instructor unit for the US Army Command and General Staff College in Fort Leavenworth, Kansas.

1980s

Ruskin J. Gould, BA '85 (chemistry), now known as Reverend Hugh Gould, has been a Buddhist monk in the Zen tradition for decades and was given the name Hugh at ordination. In mid-June 2021 Rev. Hugh was installed as the new head monk/priest of the Eugene Buddhist Priory. It was a special occasion to step in to this role as it was coming full circle returning to the temple, where he first began his Buddhist practice as a senior at the University of Oregon in 1984.

Klaus Rudolf, PhD '86 (chemistry), studied organic chemistry at the UO from 1982 to 1986, receiving his PhD in physical-organic chemistry with Professor Tom Koenig. "This was a truly wonderful time and great experience," he says. After one year of postdoctoral studies with Professor Ken Houk (UCLA), he joined the pharmaceutical company Boehringer Ingelheim in Germany. He worked with Boehringer Ingelheim for 35 years in various research positions in Germany (and China). Rudolf retired in June 2022 and enjoys his new life to the fullest, he says.

1970s

Pancras Wong, BA '76 (chemistry), earned his PhD in pharmacology from the University of Minnesota-Minneapolis in 1981. Wong has dedicated 39 years to drug discovery research and codiscovered two marketed drugs: Losartan (Cozaar) and Apixaban (Eliquis). He retired from Bristol Myers Squibb Company in 2021. Wong has received a number of research awards including the Sir James Black Award for Contributions to Drug Discovery of Eliquis from the British Pharmacological Society in 2018. He was elected as a Fellow of the American Society for Pharmacological Experimental Therapeutics (FASPET) in 2020. "I am very thankful for my education at the University of Oregon," Wong writes. "My UO training allowed me to successfully pursue a career in the pharmaceutical industry. I am indebted to my professors, Donald Swinehart and Edward Herbert. My success in drug discovery could not have happened without their teaching, guidance, and encouragement."

Brad Wright, BA '79 (chemistry), retired October 1 after working 38 years with 3M Company. Going forward, he plans to spend his time volunteering and composing/performing music. He is a graduate of the University of Oregon Robert D. Clark Honors College and went on to receive his PhD in organic chemistry from The Ohio State University in 1983.

1960s

Gordon Gribble, PhD '67 (chemistry), received his doctorate in organic chemistry with Lloyd Dolby in the area

Alumni News From All Over

of indole chemistry. In early August he vacationed in Gettysburg, Pennsylvania, and participated in refighting the battle that killed his distant uncle, Lt. Horatio F. Lewis of the 145th PA infantry regiment in the Wheatfield on July 2, 1863. As emeritus professor of chemistry at Dartmouth College, Gribble recently finished his 54th year of teaching with a summer undergraduate course on environmental chemistry. He is close to finishing his third monograph on “The Natural Production of Organohalogen Compounds,” the number of which will exceed 8,000. This book will be published next year in the series “Progress in the Chemistry of Organic Natural Products.” Gribble’s “hobby” of collecting nature’s organohalogen compounds began in 1990, when Greenpeace was attempting to have chlorine and bromine banned. They announced that nature doesn’t make organochlorines and organobromines because they are inherently toxic and they don’t biodegrade. Gribble says he knew this wasn’t true because a few natural organohalogens were well

known: vancomycin (the drug of “last resort”), chloramphenicol, aureomycin, Tyrian purple (the ancient Roman dye), thyroid hormone, and more, each of which is natural and contains chlorine, bromine, or iodine. “Then my research began to find as many examples of naturally occurring organohalogens that I could,” he writes. “By 1994 I had found 2,000 in the scientific literature, leading to about 8,000 today. The oceans (algae, sponges, corals, marine fungi and bacteria, cyanobacteria) are the leading source of these chemicals. Some terrestrial sources are termites that generate chloroform to repel termites, ticks that employ 2,6-dichlorophenol as a sex pheromone, the favorite edible seaweed of native Hawaiians that produces 100 organohalogens, and some vegetables produce methyl bromide.”

1950s

Constantine (Costas) Spalaris, MA '50 (chemistry), worked in the lab of Pierre Van Rysselberghe (“Van R” to

the students). In the last newsletter, Costas wrote “I am proud to declare that I have become the curmudgeon I wanted to become!” He remembers that tuition was \$45 per trimester and he had a research assistantship which paid his modest expenses. Van R had five graduate students in his lab located in McClure Hall, which was shared with the Journalism Department. Spalaris’s thesis subject was in electrochemistry which helped him obtain his first job. Eventually he accepted a position with GE at Hanford, Washington, then after obtaining his PhD from Carnegie Tech and Oregon State, he went to San Jose, California, where he developed, designed, and constructed the first privately owned nuclear electric power reactor. “We used basic science and engineering principles,” Spalaris writes. “There were a total of over 100 civilian boiling water reactors constructed, most of which are in use to this day. We were nuclear pioneers. My stay in Eugene was unbelievably happy, especially graduating in only one academic year.”



Honor Roll Chemistry Gifts, July 1, 2021, to June 30, 2022

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The Department of Chemistry and Biochemistry faculty, staff, and students are grateful for your contributions. Private donations, because of their flexibility, are often worth much more than their dollar amount in terms of helping students and programs.

INDIVIDUALS

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Betty and Gordon Moore

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Bridget Huston '13

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Wayne Stalick '64

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Bruce Chasan MA '69

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April Raines

Katherine '66 and Chester Ramey PhD '68

David Rearick '66

Jamie Suter

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- Boekelheide Circle (\$10,000 and more)
- Benefactor (\$1,000–\$9,999)
- Patron (\$500–\$999)
- Sponsor (\$250–\$499)
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- The University of Oregon designates as President's Associates those individuals who give \$2,500 or more annually.

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The Oregon Center for Electrochemistry

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production cost is currently around \$5 per kilogram—for about the same energy as a gallon of gasoline. Boettcher's team is building and studying new water electrolyzers to make hydrogen without using precious metals like iridium oxide and platinum, which are used in the current most-advanced technologies but are expensive and do not allow for the massive scaling needed. For comparison, iridium is about \$5,000 an ounce.

"The Oregon Center for Electrochemistry is already the best place in the world to learn electrochemistry, from fundamentals to applications and technology," says Boettcher, "and we are on a path to also be the best place in the world to do basic and applied research in electrochemistry and translate that

work through innovation and partners to technology that impacts society."

The center brings new tuition resources to the university through the master's internships program—helping to support outstanding new faculty and staff—while addressing a workforce bottleneck that currently slows electrochemical innovation in the US.

"This synergy between education, research, and innovation is allowing us to attack bigger and more important research problems than we have in the past" says Boettcher. "It was a grassroots effort to get this going, but things are starting to come to fruition because now we have connections in industry, and we're much more integrated into the research infrastructure in the US because



Oregon Center for Electrochemistry students performing research.

we have so many people coming out of our program that are really strong and going off and doing good things."