UNIVERSITY OF OREGON

Chemistry News

COLLEGE OF ARTS AND SCIENCES · DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY · 2013

INSIDE

New Organic Chemistry Courses Designed to Better Prepare Chemistry and Biochemistry Majors

Working together in small groups in the PLTL sessions provides a more effective study opportunity for these chemistry majors, Joe Byrne, Julie O'Neil (flowered shirt) and Yiran Ma.

A new series of majors track organic chemistry courses allows chemistry and biochemistry majors to interact with other chemistry majors and to work in small groups conducting hands-on problem-solving. The lecture courses—CH 341, 342, and 343—were introduced last academic year and provide smaller class sizes and small-group discussion sections. Senior Instructor Michael Koscho, who spearheaded creation of the course sequence, says that before this series was developed, chemistry majors were in the same organic chemistry class as nonmajors with 350 to 400 other students. "We wanted to separate our majors from the rest of the crowd to get to know them and let them get to know one another," Koscho explains. "Students here could take two years of chemistry and not know other chemistry majors." Rather than 400 students meeting in 150 Columbia Hall, enrollment in the majors track courses is about seventy students. "Students enjoy the smaller class size," says Koscho, "and it really helps with learning."

The lecture courses implement peer-led team learning (PLTL) in addition to standard lectures. During the PLTL sessions, students must collaborate to answer a series of problems. "Each PLTL session is two hours and students work in groups of five or six," says Koscho. "The students try to explain their answers to one another. You understand the material much better if you can explain it to someone else. At the PLTL sessions, students are with their peers and they learn from each other."

GTF Chris Vonnegut, who headed many of the PLTL sessions last academic year, appreciates leading a class with chemistry and biochemistry majors, not just people who are there to absorb enough material to get a good grade and move on. "Nonmajors want to cover material to get grades, then be done with it," he says, "or perhaps they ask questions that don't relate to what's at hand and slow down

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UO Science Faculty's High-Impact Middle School Outreach Program

Faculty and graduate students excite the next generation of scientists

The stereotype of the science professor as a white-coated loner isolated in his or her lab doesn't hold any water here at the University of Oregon. Our scientists not only do world-renowned research: they also take their knowledge and excitement about science out into the world on a regular basis.

As public school budgets continually shrink and class sizes grow, the need for extracurricular enrichment is greater than ever. To help answer that need, Assistant Professors Shannon Boettcher (chemistry), Eric Corwin (physics), Benjamin McMorran (physics), George Nazin (chemistry), and Michael Pluth (chemistry) teamed up to create "Mad Duck Furlough Friday" science days at the University of Oregon.

In Oregon, budget cuts to primary and secondary schools have resulted in state-mandated furlough days. Oregon already has a shorter school year compared to many other states, and these furlough days mean many less hours of educational time for students. Increased emphasis in recent years has been placed on standardized testing, which has made the experimentation, explanation, and elaboration of the goals of scientific education difficult to achieve. According to some UO researchers, not only do these decreased lab experiences reduce appreciation for the sciences but they also diminish the "I can see myself as a scientist" self-image of many students. Boettcher, Corwin, McMorran, Nazin, and Pluth wanted to do something about this. "Performing lab experiments is an essential part of science education, and we felt that many students were missing out on these experiences due to decreases in funding for education," says Pluth. "I think the tangibility of science is what drew many of us to science, and we wanted to make sure that these students had access to the same experiences."

In summer 2011, these five junior UO faculty members paired with local middle school students and teachers to develop a high-impact program aimed at education in the physical sciences. Three primary concerns came to light from these meetings: (1) in addition to budget cuts significantly eroding classroom time to teach science, simply having labs at all is difficult; (2) it's not only classroom time, it's also finding funding for supplies; and (3) though the teachers (and the students, if the truth be told) realize lab time is a valuable experience, state-mandated testing makes deviating from standard curricula during class time very difficult.

Graduate student Lena Trotochaud working with Hamlin Middle School students

This is where the "furlough days" idea comes in. Now, UO faculty and staff members and graduate students develop and run laboratory-based learning activities at the university on furlough and no-school days. High school mentors help run the laboratory sessions. "The graduate students in the chemistry department have done a great job running the outreach labs and communicating their enthusiasm for science to a younger audience," says Pluth. "Another important aspect of this program is teaching graduate students how to communicate science to a broader audience." A year-end wrap-up event is held in the UO science complex that brings students and their parents to the UO to see all of the labs and tour the science facilities. "Many of the parents are really excited to see what types of labs and experiments their kids were doing here at the UO," says Pluth. "It's also great to get families on campus for educational and not just athletic events."

The researchers initially developed a one-year pilot program consisting of monthly half-day science activities for fifteen middle school students. For the first year, researchers focused on developing individual outreach activities and assessing the interest in the program at all levels, including middle school, high school, and at the UO. Each of the involved UO faculty members donated both time and funding to start the program and to purchase outreach supplies. The program also received seed funding from the chemistry department. Besides the UO participants, Michelle Jensen, the Children's Creative Learning Center afterschool programs coordinator for Springfield Public Schools, as well as Rachael Koller and Paul Griffith, both involved in afterschool planning and administration, have played integral roles in the development and implementation of the overall program. In addition, high school students from Jim Tyser's classes at Springfield High School have acted as near-peer mentors for the middle school students and have also come to the UO to perform selected labs using advanced instrumentation that otherwise could not be performed in a high school class. "We've really benefited from a lot of dedicated individuals," says Pluth, "both from the UO and from the Springfield School District, to make sure that each event comes together and runs smoothly."

Equally important, local businesses and organizations have pitched in their support. "We get discounted lunches from Track Town Pizza, get free bus rides from LTD for students to and from the events, have received support and supplies from Eugene Water and Electric Board, and received a grant from the Camille and Henry Dreyfus Foundation to support the

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Shannon Boettcher Lab Tackles Solar Water Splitting

Modern civilization requires increasing amounts of energy, the vast majority coming from fossil fuels: coal, natural gas, and oil. The sun shines all day, every day, and the energy produced by the sun powers every process on Earth, from photosynthesis to the water cycle to weather. About 1,000 watts per square meter are available to us if we only knew how to harness sunlight effectively. Solar energy provides only one-tenth of 1 percent of our energy today because the materials are expensive to manufacture and it is even more expensive to store the generated electricity.

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New Majors Track Organic Chemistry Courses

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the rest of the class."

In addition to the lecture sequence, the organic chemistry lab sequence has been revised. All students (majors and nonmajors) take CH 337 in fall. In winter and spring terms, majors take the new lab courses, CH 348 and CH 349. CH 339, Organic Analysis, is no longer taught by the department. The replacement course (CH 349) features collaborative lab projects. The course also covers one- and two-dimensional nuclear magnetic resonance spectroscopy techniques. "The lecture and labs have a pretty solid overlap," says Vonnegut, "so the students feel much better prepared."

CH 348 was taught for the first time in winter 2013. April Oleson took the course as a declared Spanish major. She says the course was such an eye-opener that she decided to claim chemistry as a second major. "The winter lab course was a bit overwhelming and made me second-guess my ability to do science; however, because it was challenging, it made me determined to always try my absolute best to understand everything I was doing, which ultimately made me love science even more," she says. "I like that people actually enjoy learning so they don't stress about doing the work. You have to understand what's going on, what you're doing, and why—because if not, you'll fail, because no one is going to tell you what to do."

The revised labs use modern techniques and equipment, such as microwave reactors to accelerate molecule synthesis. Students get to perform a number of modern reactions, such as palladium-catalyzed cross-couplings, which was the topic of the 2010 Nobel Prize in chemistry. The advantage is that, instead of watching "pots boil" in traditional labs, students now spend only a short time on molecule synthesis and considerably more time learning molecule purification and characterization-identification techniques.

Caitlyn Hazlett also felt the winter term was challenging. "The experiments done in the lab required skill in time management and the lab reports outside of class required outside-the-box thinking," Hazlett says. "The challenge was valuable, however, and I felt like I had a better grasp of organic chemistry afterwards." Ben Read is a premed biochemistry major. He appreciated that he was doing lab work that was actually based on groundbreaking chemistry like the Suzuki cross-coupling of an aryl- or vinyl-boronic acid with an aryl- or vinyl-halide catalyzed by a Pd(0) complex. "The lab makes us problem-solve on our own," he says, "so we learn not to fear failure, don't quit halfway."

Of course, making mistakes is going to happen to the best of students. "I was afraid to make mistakes, but I learned by making many," says Oleson. "And because I was so conscious about what I was doing at all times, it helped me gain greater confidence for the next time I encountered a similar situation." The confidence that Oleson gained encouraged her to join the research lab of Professor Jim Remington, using X-ray crystallography to study biological molecules. "I think I never would have tried to enter the Remington lab if I had not built up those confidence levels," she says. "And I love being in that lab, so I am very grateful for the course."

Oleson says the course helped with her self-confidence in general, even outside of science. "I began to pay attention more to how I was cooking, finding similarities in recipes, and using my observations to experiment more, which ultimately leads to having more fun in life because it grants a type of freedom with a lab style of thinking," Oleson says. "It also taught me that there is more than one way to achieve the same results, and I use that daily when managing my time or approaching other homework for nonscience classes. Overall, the course opened up my mind, making learning itself more enjoyable and appealing, while forcing me to face problems in a healthy way that will ultimately help me enjoy the rest of my life."

Caitlyn Hazlett says the critical thinking skills she learned in the course are being put to use in her lab work in Darren Johnson's group using thin films to make devices. "The third term was exceptionally valuable, in that we were taught how to ask real research questions, then we were guided in how to carry out experiments to answer our respective questions," Hazlett recalls. "This culminated in a full eight-week research project and a research paper at the end. This has helped me in the research lab that I work in. I'm able to ask questions about what I'm working on and think of ways to answer those questions. I expect this to be a valuable skill that I'll already have when applying to graduate school."

The courses involve other skills outside of the lab, such as ten-minute presentations on specific subjects to the class. "I love presenting in front of people, but I had never presented anything about chemistry," Hazlett says. "Since an important part of science is communication, it's important to be comfortable explaining a topic that you are the 'expert' in. This taught me how to break down the science and teach it to the class well enough that it wasn't confusing, in only a ten-minute time slot. This helps me immensely when I present about the research that I'm doing."

"This class really prepared me well for both research and gaining a better knowledge of organic chemistry," says Hazlett. "Professor Koscho would be happy to know that it also discouraged me from doing anything last minute!" ◘

Department Head's Perspective

Gracias! Merci! Vielen dank! Domo arigato! Xie xie! Thank you!

Once again, it is time to highlight all of the exciting things that have transpired in the department over the last twelve months. Leading off this year's newsletter is a feature on our new majors track organic lecture and laboratory sequence, which debuted last academic year. Based on student feedback, both are big hits. The peer-led team learning problem-solving sessions, funded in part by the Hedden Instructional Fund, brought needed pedagogical change and a small classroom feel to the lecture sequence. The revised laboratory curriculum introduced a research flavor to the course, better preparing our majors to be successful performing undergraduate research. The Mad Duck Furlough Fridays science outreach program established by Assistant Professors Mike Pluth, Shannon Boettcher, and George Nazin illustrates chemistry's commitment to introduce and recruit the next generation of chemists.

I continued to be amazed by and proud of faculty research accomplishments and awards within the department. Geri Richmond continues to be on a roll, following up her 2011 election to the National Academy of Sciences with being named to the National Science Board last fall and then receiving both the American Chemical Society's Charles Lathrop Parsons Award and American Physical Society's Davisson-Germer Prize this year. It was only fitting that she was named in September as the UO Presidential Chair in Science, making her only the second so honored at the University of Oregon. Pete von Hippel continues his long, distinguished career at UO, winning the 2013 Founders Award of the Biophysical Society. It is great to see the university recognize the significant research, teaching, and service contributions of Darren Johnson and Mark Lonergan with Fund for Faculty Excellence (FFE) Awards. Given the solar water-splitting research highlighted on page 3, it is only a matter of time before Shannon Boettcher joins the list of chemistry FFE recipients. The problem is that there are many more colleagues from the physical, organic-inorganic, and biochemistry divisions that also deserve FFE recognition than the limited number of awards allows.

One of the most important changes is also one that has garnered little attention. Observant readers will have noticed on page 1 that, while this publication is still called *Chemistry News*, we are now the Department of Chemistry and Biochemistry. The faculty voted last spring and the university approved early in the summer the addition of "and Biochemistry" to our name in recognition of the importance biochemistry plays in our graduate and undergraduate programs. Whereas many institutions have a separate biochemistry department, the UO does not. By clearly stating that we are a Department of Chemistry and Biochemistry, we should mitigate any confusion prospective students might have as to whether or not UO actually has a biochemistry program. While many of us still say "chemistry," I guarantee in the coming years you will see the use of "chemistry and biochemistry" much more.

As noted above and described throughout this newsletter, a number of great things have happened at UO chemistry and biochemistry during the past twelve months. Nonetheless, I have struggled with how to wind up this piece—odd since I am usually never at a loss for words. This is now my sixth and very likely last year as department head. Rather than toot my own horn and summarize my accomplishments as head, I refer you to the contents of this and previous newsletters that you have received and can find online for such "grandstanding" information. Instead, I would rather acknowledge the individuals who have made my time as head as fun and fulfilling as a university administrative role can be.

As assistant department heads, one cannot underestimate the importance of Julie Haack and Mike Koscho (for the year Julie was on sabbatical). They were my go-to people when I needed someone to run interference between me and the bureaucrats in Friendly and Johnson Halls. They significantly mitigated the day-to-day, low-level student "noise" and allowed me to focus on important "big-picture" items within the department as well as keep my research program intact. One could not ask for a better staff than we currently have in the department office. Led by Diane Lachenemeier, director of administration, this team is a well-oiled machine, and I have come to understand and respect each member for the important role she or he plays to keep the department moving forward. Instructional laboratory coordinator Roger Leonard and his staff of top-notch chemistry lab preparators are essential to our instructional mission. After all, chemistry is an experimental science and we would be lost if the lab prep staff did not do such a great job setting up and breaking down experiments between the never-ending parade of students in and out of the instructional laboratories. There are many more individuals to thank than space will allow. Just know that the staff parties at my house every summer have been a small way to show my appreciation!

One last thank you needs to be conveyed, and that is to you, the faithful alumni and friends of the UO Department of Chemistry and Biochemistry. Your generous donations over the last five years have been essential in us continuing to move forward, whether it be with funds to renovate space (Barnhard Chemistry Resource Center), purchase new equipment (microwave reactors for the majors lab sequence), or establish scholarships, peer tutors, or endowed professorships. With the upcoming university-wide capital campaign, I hope that many of you continue to support us in whatever way possible in our academic and research missions.

I'll close by saying what I always say: come visit us! Next time you are in the Eugene area, please stop by the department and let me give you a tour. With the addition of the Lewis building to the UO science complex, I know you will be quite impressed with all of the changes.

With best regards,
Mike Haley

P.S. Drop us a line and let us know what you are up to! Send your details in an e-mail to chem@uoregon.edu. Also, follow us on Facebook to stay up-to-date with all the happenings at the University of Oregon Department of Chemistry and Biochemistry.

UO Science Faculty's High-Impact Middle School Outreach Program

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program for three years," says Pluth. "This grant money goes toward buying supplies, developing new labs, providing lunches for the students, and paying for time involved for middle school coordinators. A major goal for us has been to build in sustainability to the program. We have tried to design all of the labs so that they are easy to run and the supply costs are relatively low. We would like to develop this program into a long-standing program at the UO, and are very happy to have the next three years of the program supported by the Dreyfus Foundation."

During the first two years of the program, researchers have developed ten separate middle school labs and successfully organized all of the administrative aspects of bringing students to campus, providing lunch, and handling room reservations. During the first year, there were 142 visits from middle school students, and during the second year there were 153 visits. The program also has developed two high school labs, and had forty-eight visits from advanced Springfield High School students each year. In addition, about fifteen of these students volunteered as near-peer mentors for the middle school activities. The students in the advanced-placement class came to the UO after school to perform the developed labs either in the teaching labs or research labs at the UO. A sizeable benefit of this program is that the students are exposed to state-of-the-art instrumentation, which otherwise would not be accessible to high school laboratories.

In a typical outreach event, middle school students are divided into groups of six to eight with two high school near-peer mentors and one graduate student leader. Midway through the day is a lunch break, short, small-group tours of the UO campus and the science facilities, and then the labs resume. For high school labs, the students are divided into groups with one graduate student mentor per group. After completing the labs, there is a short summary presentation of what students learned during the activities and also time to fill out evaluations so that the program can be refined and tailored to maximize its impact.

To date, students have learned about electrical current, voltage, resistance, and solar power conversion in the Inner Workings of Electronic Devices and Solar Cells Lab. In the Chemistry of Color Lab, students were introduced to incandescence, fluorescence, chemiluminescence, atomic emission, and additive-versus-subtractive color. Students have learned about the theory and principles of using powerful microscopes; key chemical concepts behind phase changes and reactions; and acceleration, forces, and material properties including acceleration, impact, and applied stress. Students have constructed and optimized Zn-, Cu-, and Fe-based galvanic cells using salt water, Gatorade, lemons, pickles, and potatoes as electrolytes. In the Solar Powered Cars Lab, students designed, built, optimized, and raced solar-, battery-, and gravity-powered cars. In the high school labs, students determined the copper content in pennies manufactured in different years using atomic absorption spectroscopy and students extracted curcumin, a fluorescent compound that can be used as a pH indicator, from the spice turmeric. ◘

The UO hosts laboratory-based learning activities on furlough and no-school days.

Shannon Boettcher Lab Tackles Solar Water Splitting

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While there have been tremendous advances in batteries, they remain expensive and not yet practical for large-scale energy storage. Shannon Boettcher, a UO chemist and materials science expert, is searching for a solution to efficient, scalable, and affordable capture and storage of solar energy. "The big picture goal is to develop new materials and systems that absorb sunlight and use it to drive a chemical energy process," he says.

Conventional solar panels use silicon crystals, which absorb sunlight to generate excited electrons that are collected as current and voltage. These work well, but the challenge is storing the solar energy when the sun is not shining. For a power-hungry world like ours, where factories and cities never sleep, twenty-four-hours-a-day, 365-days-a-year power is a necessity.

There is a possible solution. Take a water molecule, split it, and you get hydrogen and oxygen. The hydrogen is a "stable storable chemical fuel that can be used to make liquid gasoline substitutes using simple and efficient known processes," says Boettcher. "It can be burned like natural gas in a turbine, or used on demand in a fuel cell to generate electricity for transportation. The only side product of using hydrogen fuel is water."

The practical implications of hydrogen technology are exciting. "Our research aims to address one of the major challenges that our civilization currently faces," he says, "which is, how do we get the energy we need that is sustainable in the long term? The possibilities are exciting. Yet, there are real fundamental materials chemistry and physics challenges that we need to address."

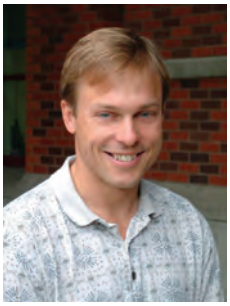
Boettcher's lab has been working on materials that can absorb and store the solar energy, then use that energy to split water molecules. "We've made some significant advances, but there is much work to do," Boettcher says. "We're looking at what the limitations are and how we get around them. We study fundamental rates of various electron transfer steps, and then try to use materials-by-design approaches to improve the processes."

To that end, Boettcher has been studying the catalytic processes that are used to convert water into oxygen, which is half of the water-splitting process. "We've made some neat discoveries about the nature of the active catalyst and how to make it better," he says. "In some of our materials, my students have found that nickel-iron oxyhydroxide species that form in situ have the highest activity measured."

Boettcher is hoping for a solution to this problem within his lifetime, or sooner. "I'm an optimist. Because it is absolutely essential to the prosperity of human civilization, we will find solutions—both social and technological—to the energy problem." ◘

Chemistry News Briefs

Jim Hutchison Gives Keynote Speech at the Green Chemistry and Engineering Conference



Professor James "Jim" Hutchison, the Lokey-Harrington Chair of Chemistry and founding director of the Oregon Nanoscience and Microtechnologies Institute Safer Nanomaterials and Nanomanufacturing Initiative, gave a keynote speech on the final day of the three-day seventeenth annual conference. He spoke on "Greener Nanoscience: Advancing Sustainable Solutions through Molecular-Level Design." The conference program includes world-renowned keynote speakers, poster sessions, and technical sessions on subjects such as catalysis, green chemistry in medicinal science, measurements and metrics, and curriculum innovations.

Professor Hutchison described efforts in his lab to reduce the hazards of and environmental exposure to nanomaterials. His lab incorporates green design and principles in all areas of the synthesis of nanoparticles, and creates nano-enabled products that may help reduce waste in consumer products. He also highlighted the development of methods to identify hazards early in the nanoparticle development process. ◘

Geri Richmond Gives Spring Presidential Research Lecture

On May 7, 2013, in the UO's Lillis Hall, Geraldine "Geri" Richmond gave the inaugural UO Presidential Research Lecture entitled "At the Water's Edge: Understanding Environmentally Important Processes at Aqueous Surfaces." Richmond's group studies the simplest properties of what holds a water surface together. In her forty-five-minute public lecture, Richmond discussed the fundamentals behind the surface chemistry of water, such as how water interacts with membranes in the body and how environmental processes occur at liquid surfaces.

Richmond, recently named as the UO Presidential Chair in Science, was appointed by President Obama to the National Science Board in November 2012 and received the American Physical Society's 2013 Davisson-Germer Prize in Atomic or Surface Physics (see page 8 for our feature on all three of these honors). ◘

Rosaria Haugland Honored for Distinguished Service to UO

On April 10, 2013, Rosaria Haugland was recognized as a recipient of the University of Oregon's 2012 Distinguished Service Award, the university's highest award for service. Presented annually since 1956, the award is given to individuals who have made a significant contribution to the cultural development of Oregon or society as a whole.

Rosaria Haugland, a retired biochemist, was born in Italy, the fifth of six children, and was the first in her family to get a college degree. She went on to cofound Molecular Probes, a Eugene biotechnology company later sold to Invitrogen. She later established the Rosaria P. Haugland Foundation Chair in Pure and Applied Chemistry at the UO, held by Professor David Johnson. Haugland also created our first graduate fellowship in chemistry (see below for more information about Melissa Hale's receipt of the 2013 Haugland Fellowship). The Distinguished Service Award recognized Haugland for these accomplishments and more.

Since retiring, Haugland has focused on philanthropy, with a particular interest in the arts, health care, education, and nonprofits that help women and girls. ◘

Melissa Hale Awarded 2013 Haugland Fellowship

In 2004, Rosaria Haugland established the Rosaria Haugland Graduate Research Fellowship Fund in Chemistry. The fund is a three-year, full salary and tuition award that supports outstanding students in the department from groups that have not traditionally participated in the sciences. It is Haugland's preference that women, when possible, receive strong consideration for the award. All recipients of the fellowship award so far have been women.

This was the first fully funded private fellowship in any of the sciences at the University of Oregon. The intent is to fund the Rosaria Haugland Graduate Research Fellowship Award in Chemistry every three years, with the hope of being able to do so in perpetuity. The first Rosaria Haugland Graduate Research Fellowship was awarded in 2004 to Takiya Ahmed, in David Tyler's Lab. Subsequent fellowships have been awarded in 2007 to Anica Wandler, in Karen Guillemin's lab, and in 2010 to Julia Widom, in Andrew Marcus's lab. This year, molecular biologist Melissa Hale received the award. Melissa works with Professor Andy Berglund studying the molecular mechanisms of myotonic dystrophy, a common form of muscular dystrophy. In this disease, the RNA binding a specific protein, muscleblind-like 1 (MBNL1), is sequestered so that it cannot function properly. This sequestration of MBNL1 leads to many of the symptoms of myotonic dystrophy. "Melissa is designing synthetic MBNL1 proteins with potentially new and different functional abilities to better understand the function of this important protein in cells and its role in myotonic dystrophy," Berglund says. "Melissa's fundamental biochemical and cellular studies will help inform current therapeutic strategies for myotonic dystrophy and could lead to new approaches in the future." ◘

UO Chemistry Alum Dr. Robert M. Wah Named President-Elect of the American Medical Association

On June 18, 2013, Robert M. Wah, M.D., was elected president-elect of the American Medical Association, the nation's largest physician organization. He will serve as president-elect for one year and be sworn in as AMA president in June 2014. Dr. Wah is a reproductive endocrinologist and ob-gyn in the Washington, D.C., area, and is also a native Oregonian and graduate of the University of Oregon's chemistry department.

After receivlng his bachelor's degree from the UO, Wah received his medical degree from Oregon Health and Science University and completed his ob-gyn residency at the National Naval Medical Center in Bethesda, and a reproductive endocrinology fellowship at Harvard in the Brigham and Women's

A Puzzle from the Past

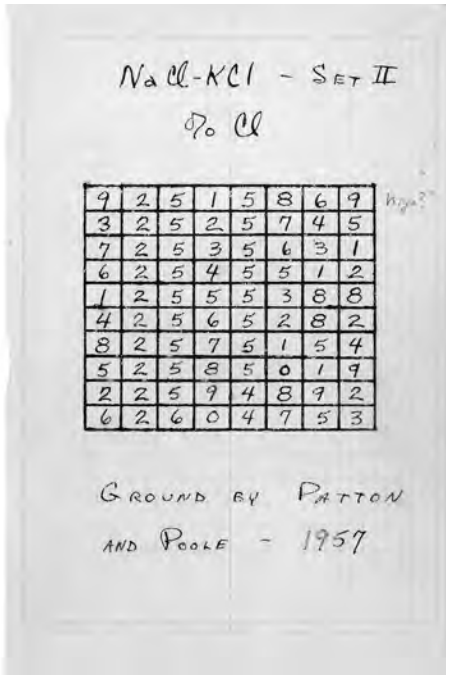
Hospital in Boston. Dr. Wah served more than twenty-three years on active duty as a captain in the U.S. Navy Medical Corps. He now practices and teaches at the Walter Reed National Military Center in Bethesda, Maryland, and the National Institutes of Health (NIH). ◘

Chemistry Student Named NSF Graduate Research Fellow

Five University of Oregon graduate students have been awarded 2013 National Science Foundation Graduate Research Fellowships. Chemistry graduate student Ann Greenaway was named a fellow along with Emily Hommerding (physics), Lauren Kahn (psychology), Jordan Livingston (psychology), and Hannah Pruse (computer and information sciences).

The University of Oregon currently has fifteen such fellows, each of whom will receive three years of support over a five-year period. This includes a $32,000 annual stipend, a waiver of full-time tuition and mandatory fees during fall, winter, and spring, subsidized access to the GTF insurance plan, a $1,000 annual travel award, $1,000 annual supplies award (courtesy of the Office of Research, Innovation, and Graduate Education) and NSF-sponsored international research and professional development opportunities.

Ann Greenaway joined Shannon Boettcher's research group at the end of May 2013. "Boettcher's overall work focuses on solar energy production," says Greenaway, "and I am working on the growth of GaAs microstructures using close-spaced vapor transport, an atmospheric pressure deposition system for high-quality semiconductor materials." ◘



Can you solve this puzzle? See page 14 for another puzzle.

The above diagram is a page from an old Freshman Honors Chemistry Analytical Chemistry Laboratory key showing unknowns given to students to analyze. Each page has the analytical results for a set of unknowns. The matrix-grid for each type of unknown was arranged to ensure that students looking at it casually, say over the instructor's shoulder, would have difficulty in making sense of it. This format was used for half a century, beginning when the chemistry department was in McClure Hall. The grid was always eight columns by ten rows, which never changed. The unknowns did, of course, change as batches ran out, and were replaced, or different compounds were analyzed. The department has three books of these records in the historical collection. Many pages are undated. The earliest dated entry is 1947 and several entries are by Herschel Frye in the 1950s. (For more about Herschel, a colorful PhD student of Donald Swinehart's, and Herschel's poem "The Gaunt and Dour McClure," see *Chemistry News* 2005, pp. 12–13). Donald Swinehart inherited this system from an unnamed predecessor and used it from the 1950s to 1983. Jim Long then took over the Honors Lab and continued to use this same key format for the next twelve years. This key was abandoned after the 1995–96 school year when the laboratory was reorganized, with a decreased emphasis on qualitative and quantitative analysis. The staff made most of the unknowns themselves. Solid samples were made using a ball mill: the mixture was milled for several days, mixed again, making sure that no cake had formed in the mill, then milled several more days. The cycle went on for a week or two. That explains why the NaCl-KCl set has the notation "Ground by Patton and Poole"—1957. After grinding, the unknown was sampled randomly throughout the lot and analyzed. The lot was discarded if the samples did not agree within the precision of the analytical method, but this rarely if ever happened. The average value was then recorded in the grid.

Question: What is the code used for these unknowns? Hint: there is one unknown ID and its composition on each horizontal line. Answers are given on page 9 of this newsletter.
—Contributed by Jim Long and Hayes Griffith

Spring 2013 Department Graduation Statistics

University Honors

summa cum laude

magna cum laude

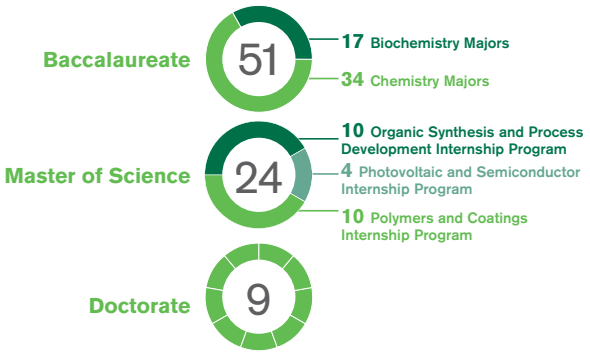
cum laude

Phi Beta Kappa

Undergraduate Awards in Chemistry

- Biochemistry Achievement Award
- Chemical Biology Achievement Award
- Inorganic Chemistry Achievement Award
- Materials Chemistry Achievement Award
- Organic Chemistry Achievement Award
- American Chemical Society Analytical Chemistry Award
- American Chemical Society Inorganic Division Award
- Richard M. Noyes Physical Chemistry Achievement Award
- Warner Peticolas Award for Excellence in Undergraduate Chemical Research in Physical Chemistry
- Leroy H. Klemm Award for Excellence in Undergraduate Chemical Research in Inorganic or Organic Chemistry
- American Institute of Chemists Foundation Award

2013 Graduates



Faculty Awards and Honors

Geri Richmond Honored with Three High-Profile Accolades

Shortly after the publication of last year's *Chemistry News*, in which we announced that she was named the 2013 recipient of the American Chemical Society's Charles Lathrop Parsons Award, the University of Oregon community learned that Geraldine "Geri" Richmond had been appointed to the National Science Board. The announcement was made by the White House on November 16, 2012.

Richmond was appointed by President Obama to the twenty-five-member board, which is the governing board for the National Science Foundation. The board establishes the policies of the NSF, approves new programs and awards, and serves as an independent body of advisors to the president and Congress on policy and education matters related to science and engineering. Recommendations are made by the board, and nominations are made by the president. Richmond will serve a six-year-term.

Shortly thereafter Richmond was announced as the recipient of the American Physical Society's 2013 Davisson-Germer Prize in Atomic or Surface Physics. "The Davisson-Germer Prize is a wonderful honor because it recognizes the physics side of our science," said Richmond. "Our group was the first in the surface physics field to be recognized by this award for studies of liquid surfaces." All previous winners of this competitive award have been for processes at solid surfaces. The award citation reads "For elegant elucidation of molecular structure and organization at liquid-liquid and liquid-air interfaces using nonlinear optical spectroscopies."

To top off the past twelve months, in September Richmond was named the UO Presidential Chair in Science, making her only the second faculty member so celebrated at the university. "I'm delighted and honored to have been selected for this prestigious presidential chair," Richmond said. "It's a phenomenal tribute to the students who inspire me everyday, and the many students and researchers who I have had the privilege to work with in my laboratory over these many years."

In 2005, a $5 million gift from an anonymous donor established a fund to support at least two presidential chairs at the UO. The presidential chairs honor distinguished faculty members who excel in research, attract and teach top students, and create an expectation of achievement that can elevate an entire academic department. Richmond will hold the presidential chair alongside Yong Zhao, a Chinese-born educator, who was chosen in January 2011 to be the UO's first presidential chair. Zhao, who had been a faculty member at Michigan State University, was appointed to serve as the UO's presidential chair for global academic extension. He is a professor of educational methodology, policy, and leadership in the College of Education.

Geraldine Richmond

Richmond's research focuses on the chemical and physical processes at water surfaces of environmental importance. Throughout her twenty-eight years at Oregon, Richmond has made significant contributions to science and is also known as an advocate for women in science. Richmond cofounded the Committee on the Advancement of Women Chemists, an organization that provides mentoring and support to women scientists around the globe. With financial support from the U.S. Department of State, she is currently working on several projects with women scientists in developing countries. In addition to all of the awards mentioned above, she was inducted into the National Academy of Sciences in 2011.

"Geri has had an exemplary career at the UO and has been the recipient of many awards and accolades," says department head Mike Haley. "It is completely fitting that she be honored with the UO's top chaired professorship." ◘

Pete von Hippel Receives 2013 Founders Award from the Biophysical Society

Late last year, the Awards Committee of the Biophysical Society selected Peter "Pete" von Hippel as the recipient of the 2013 Founders Award, which is given "to recognize outstanding achievement in any area of biophysics." Von Hippel received the award in February at the 2013 annual meeting in Philadelphia, Pennsylvania, in honor of his work "in establishing the principles which underlie the quantitative study of all protein-nucleic acid interactions." Von Hippel stated that this award, and this particular recognition of the work of his laboratory over many years in this area, is particularly meaningful to him because it indicates a recognition by the wider community of biophysicists and molecular biologists that the regulation of DNA function is a quantitative rather than a qualitative matter. Previously most biochemical scientists had tended to consider that the control of replication and transcription is a "yes or no" matter—i.e., either a particular regulatory cofactor affects the reaction or it doesn't—while now researchers are beginning to understand that this is not the case, and that regulation depends, like any other chemical reaction, on concentrations of factors, rates of interactions, and all the other quantitative parameters that determine whether a molecular reaction will go or not, how far and how fast, and so forth. These are the issues that regulate all protein-nucleic acid regulations that control the macromolecular interactions of genome expression, and this is the area in which von Hippel and his colleagues have been using such approaches to understand biological problems for many years.

Although von Hippel has retired from teaching, he remains active in research. He says that the present research of his NIH-funded laboratory, which is focused on the physical biochemistry of proteins and nucleic acids as well as the mechanisms of the "macromolecular machines" that drive and regulate gene expression in the cell, is now in a very (at least to him) exciting phase. This is because, in collaboration with the research laboratory of his chemistry department colleague Professor Andy Marcus, their combined groups are now beginning to be able to use advanced spectroscopic and single-molecule approaches to ask fundamental questions

Peter von Hippel

about the molecular details of regulatory control in these systems at a level that had previously seemed unreachable. Von Hippel stated, "I am really looking forward to seeing what Andy's group and mine can do together in the next few years, because I think that the approaches we are developing will let us ask biological questions at a level of molecular detail that may put all sorts of interesting questions that we could never approach before within our reach. I can hardly wait to see what we will learn next!"

Darren Johnson and Mark Lonergan Receive Fund For Faculty Excellence Awards

The University of Oregon Fund for Faculty Excellence provides one-time awards of $20,000 to tenured or tenure-related faculty members who have distinguished themselves in research, teaching, and leadership. They are nominated for the award by the academic deans or department heads. Two from the chemistry department received recent awards: Darren Johnson (2012–13) and Mark Lonergan (2013–14).

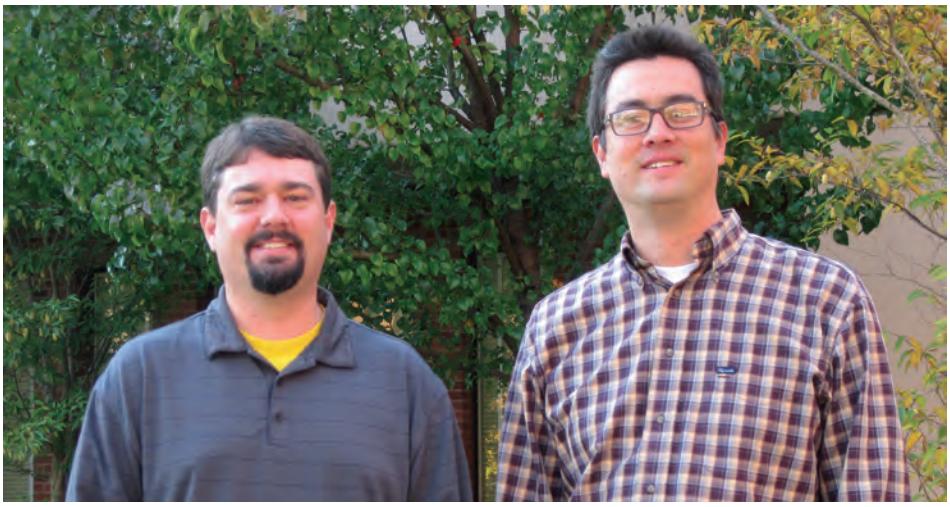
Johnson is an associate professor with interests in inorganic, organic, supramolecular, and materials chemistry. He has been at Oregon since 2003. "The award was a total surprise," Johnson says. "I had no idea that the department had put me forward for that and I was really honored to receive the recognition from my peers at the UO."

Lonergan is professor of physical and materials chemistry. He has been at Oregon since 1996. "It's wonderful to be recognized by your colleagues," Lonergan says. "I'm very appreciative. It's certainly an honor when the people you work with value your contributions to the university."

The fund provides a one-time stipend to encourage distinguished faculty members to stay in the university community. It is a way in which the university can correct salary compression and compensation imbalances compared to peer universities, which could threaten the University of Oregon's long-term success and ability to recruit and retain outstanding faculty members. Neither Lonergan nor Johnson were looking for "greener pastures" elsewhere; they both say the awards were a nice surprise to support their teaching efforts.

Darren Johnson's lab spans research in organic and inorganic materials, specifically areas where synthetic chemists are working on chemicals and molecules for specific applications, such as removing and sensing toxic metal ions like arsenic in the environment. "Through the Center for Sustainable Materials Chemistry, we work on synthesizing new nonorganic cluster compounds that can be used as inks or precursors for thin film electronic devices that can be fabricated at much lower temperature and energy costs than current methods using vapor deposition," he explains. Through a collaboration with Mike Haley's lab, the groups are working on fluorescent organic molecules that can be used to sense anions (usually toxic anions), such as a molecular probe that can sense chloride in an aqueous environment. "We've developed a material that can sense nitrate in the soil and have started a company called SupraSensor Technologies to develop wireless sensors for fertilizer management in precision agriculture."

Mark Lonergan's research is in the area of what is called organic or plastic electronics. "Most people think of plastics like a Tupperware container," he explains. "You don't think of applications where you have electronics involved. But there has been a lot of interest in developing plastic materials that can be used in solar cells or computer chips—these would be made completely of plastic rather than silicon. Recently we have been trying to understand how solar cells work and more particularly how plastic solar cells work." ◘



Darren Johnson and Mark Lonergan

Answer to a Puzzle from the Past FROM PAGE 7

The first column is filled with random numbers. The next three digits in each row identify the unknown. The remaining four digits give the composition. For example, the first line of the NaCl-KCl page reads "Unknown No. 251, 58.69% Cl." For analytical methods with lower accuracy, such as the colorimetric determination of Fe in solution, the first two columns were filled with random numbers, and only the final three columns were used to describe the composition.

New Faculty

Mike Harms

Mike Harms Joins as Assistant Professor of Chemistry and Biochemistry

Mike Harms joined the University of Oregon faculty over the summer of 2013. A self-described "platypus," Harms grew up near Portland, and attended Oregon State University for his undergraduate education. He then moved to Johns Hopkins for his PhD in molecular biophysics. He rounded out his education with postdoctoral work at the Institute for Ecology and Evolution at the University of Oregon.

"It was not really intentional, but I ended up doing my postdoc 100 miles from where I grew up," he says. "I'm excited to stay at the UO because I love the university and love the Northwest, and it's good to be close to family."

While at Johns Hopkins, Harms became interested in protein evolution and started looking for a postdoc mentor at a laboratory where he could apply his biophysical skills to tackle evolutionary problems. He found that mentor in Joe Thornton, and in Thornton's lab from 2009 to 2013 Harms explored how the biophysical properties of proteins affect the evolutionary processes, which can, in turn, help explain why proteins have the properties they do.

"I'm interested in the intersection of protein biophysics and protein evolution," Harms explains. "Over evolutionary time, proteins somehow acquire new functions by winding their way through the vast 'space' of possible amino acid sequences. How does this occur? Specifically, I'm trying to understand how proteins acquire complex properties like binding sites or allosteric regulation. It's a rich area of study that transcends—and reciprocally illuminates—classic questions in both biophysics and evolutionary biology."

We welcome Mike Harms to the department and look forward to his contributions! ◘

Alumni Achievements

Victor Snieckus Wins Global Lithuanian Award

Victor Snieckus received his PhD from the University of Oregon in 1965, a time which he remembers fondly as "the greatest period" of his life. He is currently a professor in the Department of Chemistry at Queen's University in Kingston, Ontario, where he leads a research group studying directed metalation reactions. Snieckus has held the Bader Chair in Organic Chemistry at Queen's University since 1998.

Snieckus received the 2012 Global Lithuanian Award from the president of the Republic of Lithuania, Dalia Grybauskaite. The winners were announced on December 27, 2012. The awards ceremony was held in Vilnius, Lithuania, and celebrated outstanding contributions of the more than one million members of the Lithuanian diaspora to the prosperity and global standing of the country. Snieckus provided a video in absentia in which he emphasized his continuing dedication to his organized Balticum conferences for bringing international attention to Baltic state scientists.

Victor Snieckus

"More significant than the individual honor is the possibility to help chemistry and chemists in Lithuania and, for that matter, in the other Baltic states of Latvia and Estonia to achieve excellence in their research activities," comments Snieckus. "The suppression, no, the elimination, of independence for half a century by the communist regime was a blow from which recovery is understandably slow. The award I hope highlights this aim, which is in my heart. For this reason, my expatriate colleagues (Jaan Pesti, Jonas Duncia), Eugenijus Butkus from Vilnius University, and I have initiated a biannual conference, Balticum Organicum Syntheticum, which is now in its second decade and whose purpose is exactly that."

According to the website of the Global Lithuanian Leaders, the awards "strive to build a culture that fosters these globally oriented achievements among Lithuanians and Lithuanian businesses. It supports new ideas, development of modern technologies, products and services oriented to compete in the global market along with other activities intended to growing a stronger, more competitive Lithuania and building a more open and forward-thinking society."

See page 11 for his biographical sketch in Alumni News. ◘

Alumni News from All Over

1960s

Dennis Beetham, MS '67, writes that he is "alive and working at seventy-two years old." Beetham is CEO of D. B. Western, Inc., in North Bend, Oregon, where the company designs, builds, owns, and operates chemical plants. He is still doing research and engineering. Beetham left UO graduate school in 1967, where he worked under Professor Kenna. His wife, Janet, and his children are all scientists and work for him. "I am working on my grandsons," Beetham jokes. D. B. Western has built plants all over the world, including seven in China within the last two years.

George Bettoney, PhD '69, retired from Dow Chemical Company and is living in Clute, Texas. His work with Dow Chemical was in analytical services. This involved various techniques such as x-ray diffraction and electron spectroscopy. Bettoney writes that he also did computer programming and laboratory robotics.

William D. Brewer '65 was an undergraduate at the UO in 1961–65 and finished with a chemistry major and mathematics minor in what he believes was the second graduating class of the Clark Honors College. Brewer did undergraduate research with Tom Koenig, studying the pyrolysis of organic peroxides and, in particular, deuterium isotope effects. While at Oregon he had a William W. Stout Scholarship (1961–65), a Crown Zellerbach Scholarship (1963), and an NSF Summer Student Grant (1964).

After graduation, Brewer was a summer student at Los Alamos (chemistry-metallurgy) and then went to UC Berkeley for graduate school. He did his PhD work in the group of D. A. Shirley (College of Chemistry) at the "Rad Lab" (now the Lawrence Berkeley National Laboratory) with an NSF graduate fellowship, and finished in late 1969. His thesis was on studying weak interactions by low-temperature nuclear orientation. He then went to Berlin on an NSF postdoctoral fellowship for one year and helped set up a low-temperature lab at the Free University of Berlin (FU). At the end of his postdoc year, Brewer took an assistant professorship at the FU, and completed his habilitation (an advanced degree usually needed in Germany to get a tenured university position) in 1975. In 1977, he obtained a professorship in the physics department at the FU and continued working on nuclear solid-state physics there. Over the years, Brewer writes, he has worked in France (Paris, Grenoble), Belgium (KU Leuven), Berkeley and Stanford, at IBM Thomas J. Watson Research Center in Yorktown Heights, New York, and in Brazil (University of São Paulo and Centro Brasileiro de Pesquisas Físicas, Rio de Janeiro), while maintaining a base in Berlin. He was dean of physics at the FU in 1995–97 and 2003–5.

Since 2008, Brewer has been retired, but maintains an office at the institute and continues doing translations (he has translated more than a dozen textbooks and monographs from German to English on a variety of topics ranging from astronomy to quantum chemistry to sustainable energy). He is pursuing interests in philosophy and the history of science, and has attended several UO European alumni events in Geneva and Berlin. Around 1998, Brewer helped host Dave Frohnmeyer, who was visiting Berlin as president of the UO.

Brewer takes note of an interesting parallel with the career of Stephen Southworth '77, who was featured in the 2012 newsletter. "We both worked with Tom Koenig at the UO, and both went to graduate school in Berkeley, both doing PhDs in the Dave Shirley group," he writes. "In fact, I worked with Steve in 1979–80 while on sabbatical in Berkeley, when he was doing his PhD work, on analysis of the angular distributions of photoelectrons from gas-phase molecules."

Victor Snieckus, PhD '65, writes that most articles by alumni begin with "That was the greatest period of my life!" to which he can only respond, "Yes" or "Right on!" (depending on one's vintage). He wrote to us: "My memories are excellent faculty, closely-knit chemistry department, steady interaction among organic-molecular biology students (and appreciation that we should understand each other), and an inkling that exciting research will happen in our labs. Let me test my memory: freshly arrived were Lloyd Dolby, who taught us innovative synthetic strategy; Tom Koening (mechanism, radicals, and 'don't play football against me'), John Bush ('I can do Huckel calculations on any molecule'), Leroy Klemm (not newly arrived, but forgotten is the fact that he published one of the first intramolecular Diels-Alder reactions), and Virgil Boekelheide, under whose mentorship I discovered the passion for organic synthesis. In the adjoining labs through which we wandered to chat, coffee cup in hand and, in some cases, pipe or cigarette in the other, we recognized that we each had a different problem and that we could learn enormous amounts of chemistry by such discussion. The other time for such learning was, of course, the weekly organic seminars: 'Put a problem on the board,' would say Lloyd Dolby; 'So please now present your literature review of the current hot area of the Woodward-Hoffman rules,' boomed the resonant voice of VB, and his finale, 'Let's now go to the bar, where I will teach you an interesting game that involves memory, focus, and, by the way, beer.' Among the lab mates who were on the same wavelength in the passion for chemistry, many of whom became lifelong friends, or at least regular contacts, were Dave Booth, Manny Debono, Andy Fedoruk, Gord Gribble, Frank Meneghini, Clay Smith, Maury Schwarz, and Charlie Wilkins (*see next page for Wilkins' update*).

"The imprint of all these activities was immense: we loved chemistry even more from what we learned, we wished to contribute usefully to our field, we set paths for our future. My mind was made up: I wanted to make molecules, simple and complex, to make them in inventive ways, to see if I can instill love of learning into youth by modeling myself after VB. With time, the awards, prizes, and lectureship received have simply indicated that our research has some merit; among these, the Arthur C. Cope Scholar Award (one of four Canadians), the Arfvedson-Schlenk Prize, the Givaudan-Karrer Medal, and the Alfred Bader Chair on moving from the University of Waterloo to Queen's University stand out for reasons which are recognized by the respective names of the awards. Two others, the Order of the Lithuanian Grand Duke Gediminas from the president of Lithuania and the *Honoris causa* from the Tallinn University of Technology were also very happy occasions, since they reflect the contribution of four Baltic state emigrants to bringing knowledge of chemistry and chemists to these countries formerly oppressed by Communism.

"What has been achieved in our labs that had its beginnings in the late 1970s? In somewhat technical terms, we have contributed to discoveries in the area of the directed

ortho metalation reaction (DoM) and used it as a conceptual platform for development of new efficient methods for the regioselective synthesis of polysubstituted aromatics and heteroaromatics. The directed remote metalation (DreM) reaction and DoM-linked transition-metal-catalyzed cross-coupling (especially Suzuki-Miyaura) were first uncovered in our group. And where is this chemistry useful? The reactions have found broad application in agrochemical and pharmaceutical industry—e.g., fungicide Take-All (Monsanto), anti-AIDS Sustiva, antiinflammatory Losartan (Bristol-Myers Squibb), among others. These are commercial products with key reactions which had their fundamental origin in our labs. We continue in these directions with the entry of an additional component: with deep appreciation to Alfred Bader, Snieckus Innovations, an academic unit that undertakes synthesis of small molecules for the pharmaceutical and agrochemical industries, has been established. Hopefully, it will provide permanent jobs for a small band of synthetic chemists.

Outside of the lab, I still run a bit, bike more, and play hockey (there is only one type in Canada), but I wish I had not given up the clarinet. My passion for organic chemistry actually all began with the iconoclastic teacher Rube Sandin at the University of Alberta, but it reached maturity and direction in the chemistry department at Oregon with VB.

Charles Wilkins, PhD '66, worked on research under the mentorship of Professor Lloyd Dolby. Following his PhD in organic chemistry, Wilkins accepted a postdoctoral appointment in the laboratory of Professor Andrew Streitwieser at the University of California at Berkeley (1966–67). Wilkins began his academic career at the University of Nebraska at Lincoln, joining the faculty as an assistant professor in 1967 and rising through the ranks to full professor during the fourteen years he spent there. Although he was originally hired as an organic chemistry faculty member, he changed his emphasis to analytical chemistry relatively soon after his initial appointment.

While at Nebraska, Wilkins participated in the formation of one of the first National Science Foundation mass spectrometry facilities as a cofounder with Michael Gross and Gerry Meisels of the Midwest Center for Mass Spectrometry. In 1981, Wilkins moved to the Department of Chemistry at the University of California at Riverside, where he was hired as a senior analytical chemist. From 1982 to 1989, he served the department as chairman, founding the Analytical Chemistry Instrumentation Facility that is still successfully housed in the chemistry department. In 1997, he was promoted to distinguished professor of chemistry. After seventeen years at UC Riverside, in 1998 Wilkins accepted an appointment as distinguished professor of chemistry and biochemistry at the University of Arkansas, joining his wife, Ingrid Fritsch, who is currently a professor of chemistry in the same department. They have two children, Connor, thirteen, and Eric, seven. Wilkins is presently active in both research and teaching, and was recognized this year with the 2013 American Chemical Society Division of Analytical Chemistry Award in Chemical Instrumentation.

1970s

Neil Jacobsen '77 writes that he was recently promoted to staff scientist at the University of Arizona Department of Chemistry and Biochemistry. "The academic professional positions have an assistant, associate, and full staff scientist levels just like faculty, except we don't get tenure," he writes. "So my promotion is to full staff scientist."

Jacobsen has been Nuclear Magnetic Resonance Facility manager at the University of Arizona for eighteen years as of September 2013. He is writing his second textbook, *NMR Data Interpretation Explained* (John Wiley and Sons), to be completed in summer 2014. His first was *NMR Spectroscopy Explained* (John Wiley and Sons, 2007). "That pretty much occupies every waking minute after my regular duties as NMR Facility manager," he says. He was able to visit Eugene at the end of June 2013.

1980s

Paul Faringer '83 is chief of plastic surgery for the Hawaii Permanente Medical Group (Kaiser) and lives with his family on Oahu. He graduated from UCLA Medical School in 1987 and completed his residencies in general surgery and plastic surgery at OHSU in Portland prior to moving to Hawaii in 1995. Faringer's daughter will be a freshman at the University of Oregon in September 2013 and his son is a junior in high school who is also interested in becoming a Duck. "Go, Ducks!" says Faringer.

1990s

Matthew Fry '93 has been living and working with his wife and daughters in the Boston area for nearly twelve years. Fry writes that he has been working for the same growing biotechnology company all this time and is now director of products at Cell Signaling Technology. "I continue to use my research experience and biochemistry skills," he writes. "My daughters keep me young and active as well. Alyssa is twenty-four, Kayla is four, and Maria is two years old."

Sergio Gurrieri, MS '92, PhD '94 (biophysical chemistry), is now an investor and business adviser with Tech Coast Angels (TCA), the most active network of angel investors in the U.S. with more than 350 members. TCA supports early-stage entrepreneurs to turn game-changing ideas with high growth potential into successful, sustainable, and scalable businesses.

Along with financial support, TCA provides coaching, industry expertise, and valuable contacts. TCA typically screens several hundreds of companies a year in a wide range of industries (medical devices, molecular diagnostics, biotech and drug development, social media, digital marketing, high-tech, software) and funds fifteen to thirty companies a year.

Gurrieri led due diligence and fundraising for two of the most successful deals. Savara Pharmaceuticals was the largest raise in TCA history—$3.2 million TCA funds in a $16 million second round of financing with 100 percent angel money. In Avaxia Biologics, TCA invested alongside with AbbVie Biotech Ventures in an $11.4 million second round. Other investments include Anabios, Groundmetrics, Virtualmetrix, Culture Jam, Gemmus Pharma, Deal Current, Infobionic, Yapert, and Mogl.

Gurrieri is also a very active member of the biotech-biomed screening committee, driving company evaluations and acting as business adviser in multiple areas, including drug discovery and development, medical devices, molecular diagnostics, and more. Gurrieri also represents TCA as a judge in business plan competitions and speaks at relevant conferences and workshops.

Michael Lindenmaier '91 was an undergraduate student in chemistry with a biochemistry option. He wrote to Pete von Hippel, Mike Haley, and Hayes Griffith that their classes were not easy but that he wanted to extend thanks for the efforts that his instructors took to make the subjects clear to him. "Despite the fact that I was never a very good theoretical chemist, your

teachings helped me a lot to understand the physics behind chemistry and biochemistry," Lindenmaier says.

After graduation, he worked as an analytical chemist using spectrophotometric and mass spectrometric methods combined with RP-HPLC seperations. He says that his education from the UO helped him tremendously to fully comprehend the theories behind chromatography and the various detection methods. He was only able to fully understand LC-MS techniques because of the comprehensive teachings he received from his instructors, he writes.

Lindenmaier is currently enrolled in the master's program at the University of Zurich, where he is studying biochemistry and biophysics in the hope of expanding his expertise to newer biophysical methods such as biosensors and molecular medicine.

He is also an avid contributor and critical editor to science and medical topics on Wikipedia. "I enjoy this work to supply the public with statements and conclusions that I always back up with good, peer-reviewed journals," he writes. Lindenmaier hopes to become a teacher of biochemistry at the technical or junior college level, or to apply his knowledge in bioanalysis for leadership positions in medical and diagnostic laboratories or in pharmaceutical research.

Donald "Pat" Marshall '90 started Sunrise Analytical, LLC, in January 2011. Sunrise is an analytical laboratory that tests medical marijuana for pesticides, mold, and mildew. Using GC/MS and EPA 8270 methodology with strict quality control, Sunrise is able to determine the potency of and detect any pesticides in the medical marijuana it tests. Marshall is determined to help medical marijuana users obtain safe medical marijuana and be able to regulate their dosage so they can lead healthier, productive lives, he writes. Sunrise is located in Wilsonville, Oregon. Marshall and his wife, Julie, have three grown children, still attend all home football games, and love to visit Eugene.

Margaret "Peggy" Rice, PhD '90, earned a PhD in molecular biology. She is a professor in the Department of Chemistry and Biochemistry at Cal Poly, San Luis Obispo. Rice writes that she enjoys backpacking and walked the Pacific Crest Trail across Oregon last year. On the day of our e-mail communication, she was off to hike across Washington.

Ken Usher, PhD '96, earned his chemistry PhD under Jim Remington's advising. He has been a professor at the Oregon Institute of Technology since 2000. In 2011, Usher was promoted to full professor and became chair of the natural sciences department at Oregon Tech, where he teaches biochemistry and medical genetics to undergraduates.

2000s

Christoph Balzarek, MS '96, PhD '00, is global marketing manager of amines, higher aldehydes, and specialty derivatives at Oxea. After finishing his PhD with David Tyler and spending two years as postdoc at Cal Tech, Balzarek accepted a position as R&D chemist with Celanese at their production site in Oberhausen, Germany, not far from where he was born. In parallel to working on process development topics around hydroformylation, he continued his university education and earned an MBA degree from the University of Texas at Dallas.

After some time as project manager for new business development topics, he moved into a marketing role when Celanese sold its oxo business, to be renamed Oxea, to a financial investor in 2007. Initially Balzarek was responsible for the product groups carboxylic acids and polyols for the European and Asian markets. In 2011, he took on the responsibility of global marketing manager for the portfolio of amines, higher aldehydes, and some more unique special products for the global market.

With his wife, Véronique, and their two children, Charlotte, three, and Victor, one, Balzarek is living in Krefeld, very close to Düsseldorf. He writes that he and Véronique cannot wait to take their children on a trip to the beautiful Pacific Northwest, where the two of them traveled together in 2008 and of which they have very fond memories.

Buck Hanson '03 (biochemistry), MS '04 (chemistry), defended his PhD thesis in spring 2013 at Cornell University's Department of Microbiology. The title of his thesis was "Molecular Microbial Ecology of Sediments and Subsurface Groundwater at a Coal Tar-Contaminated Waste Site".

In January 2013, Hanson began applying for postdoctoral positions (ideally back in the Pacific Northwest, he writes), but ended up getting a position at the University of Vienna. This September, Hanson will be working with Alexander Loy and David Berry (www.microbial-ecology.net). Here he will use the skills he developed as a graduate student in microbial ecology, microscopy (fluorescence and secondary ion mass spectrometry), and molecular methods (genomics, metagenomics, transcriptomics, metatranscriptomics, proteomics, and metaproteomics) to investigate microbial community composition and population structure of bacteria inhabiting the colon under different irritable bowel disease–related conditions.

"I truly feel that my training from the UO biochemistry and chemistry MS programs significantly contributed to my marketability in the graduate and postdoc arena," Hanson writes. "The foundation that my experiences at the UO provided have been immensely valuable in my career development."

Christopher Sweeney, MS '01, is now a patent attorney in the Seattle office of Knobbe Martens, the third largest patent law firm in the country. Since the publication of the 2012 newsletter, Sweeney was elected vice president of the Washington State Patent Law Association, and continues to expand his work in biotech, pharmaceutical, and medical device patents.

Ryan Wiser '08 is now pursuing a doctorate in physical therapy at George Fox University in Newberg, Oregon. ◘

New Ways to Connect
with UO Chemistry and Biochemistry!

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Like our University of Oregon Department of Chemistry and Biochemistry Facebook page and keep tabs on current events and activities such as PhD defenses, seminars, conferences, department news, and outreach events.

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Join the University of Oregon Department of Chemistry and Biochemistry Group on LinkedIn. Join other alumni, students, faculty and department members of the UO Chemistry and Biochemistry Department for the purpose of sharing expertise, networking, and communication.

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www.linkedin.com/groups/University-Oregon-Department-Chemistry-4826434/about

In Memoriam—Paul Delahay

Paul Delahay, the first PhD graduate of the UO chemistry department and a pioneer in electrochemistry, dies at ninety-one

Paul Delahay was an internationally known scientist. His research in electrochemistry spanned diffusion processes, electrode kinetics, photoionization in solution, the solvated electron, adsorption and double layer phenomena, and electroanalytical methods. He is coinventor of cyclic voltammetry.

Delahay was well known to generations of chemistry graduate students and faculty members in the 1950s and '60s through his seminal books, *New Instrumental Methods in Electrochemistry* (1954,1965), *Instrumental Analysis* (1957), and *Double Layer and Electrode Kinetics* (1965).

Paul Delahay's early years were spent in Brussels and Liege, Belgium, where he worked hard to gain an education under nearly impossible conditions during the build up and start of World War II, described in his first-person account in *Chemistry News* (2007, page 6).

Paul Delahay was a junior faculty member at the University of Brussels when Pierre Van Rysselberghe of the UO chemistry department invited him to come to Eugene. Delahay arrived in Eugene in 1946 and received his PhD in 1948. There were three other students awarded PhD degrees at the same time. All four were physical chemistry students of Pierre Van Rysselberghe. Delahay outlived all others in this group. Paul Delahay wrote about those early years at the UO in the special historical edition of *Chemistry News* (2003, page 4).

After leaving Eugene, Delahay took a faculty position at Louisiana State University, and rose through the ranks to become the Boyd Professor in 1956. In 1965, he moved to New York University, where he was the Frank J. Gould Professor of Sciences until his retirement in 1987.

Delahay received the American Chemical Society Award in Pure Chemistry in 1955, the Southwest Regional Award of the American Chemical Society in 1959, the University Medal from the University of Brussels in 1963, the Heyrovsky Medal from the Czechoslovak Academy of Sciences in 1965, and the Palladium Award from the Electrochemical Society in 1967. Delahay was awarded the UO Department of Chemistry Distinguished Alumni Award in 2001 for his lifetime achievements in the advancement of chemistry. Details of his career were reported in *Chemistry News* (2002, page 6).

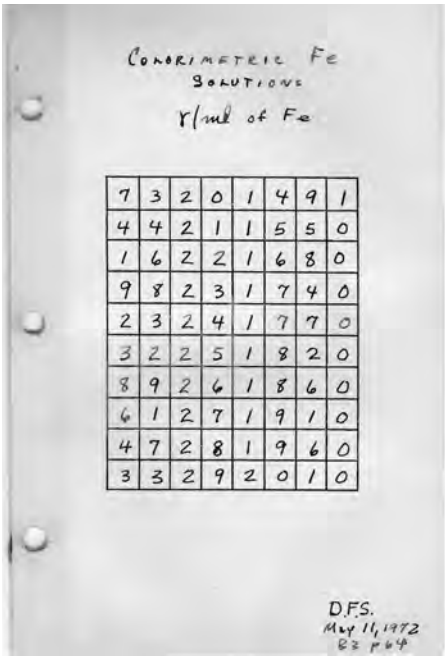
Paul Delahay was a kind and gentle man. After his retirement, he and his wife, Yvonne, moved to Paris, France. Yvonne was afflicted with rheumatoid arthritis and Paul personally cared for her until her death in 2002. He died in his Paris apartment on June 21, 2012. He shall be missed. —*O. Hayes Griffith*

In Memoriam—Mordecai Rubin

Mordecai Rubin, Technion–Israel Institute of Technology, Haifa, Israel, passed away on December 9, 2012. Professor Rubin was a world leader in the field of organic photochemistry, and beginning in 1986, he was a frequent collaborator with researchers at the University of Oregon, including Richard Noyes and Ralph Barnhard.

In an article for our 2009 newsletter, "My Love Affair with the UO," Professor Rubin looked back fondly at his time spent in the University of Oregon chemistry department. Find it online at **pages.uoregon.edu/chem/pdf/news/news09.pdf**.

He is also remembered in an article in *ChemViews Magazine*: **www.chemistryviews.org/details/ezine/3820331/Mordecai_Rubin_1926__2012.html**.



Another puzzle from the past

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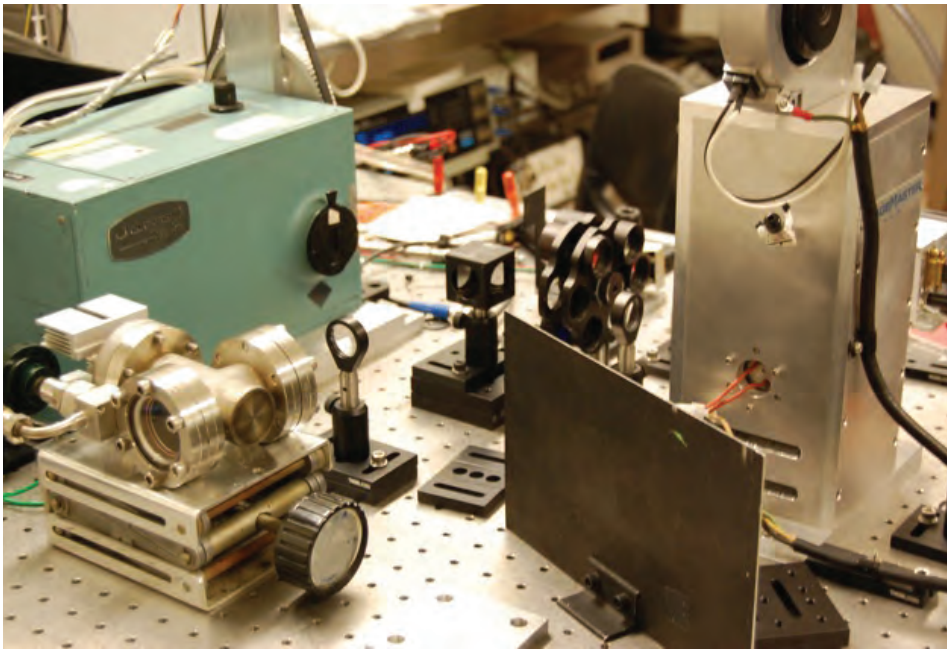

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