



UNIVERSITY
OF OREGON

Chemistry News

COLLEGE OF ARTS AND SCIENCES · DEPARTMENT OF CHEMISTRY · 2012

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Lewis Integrative Science Building Opens

The building promises to cement the UO's status in materials research.



Exterior of the recently opened Robert and Beverly Lewis Integrative Science Building.

What is “integrative science”? How do studies of the human brain, molecular biology, nanotechnology, and solar energy relate to each other?

These are questions that are common among people who are discussing the University of Oregon's new Robert and Beverly Lewis Integrative Science Building (LISB). Construction on the 100,000-square-foot building began in August 2010, and is now nearing completion.

With its grand opening on October 26, 2012, the building will be home to strategic research clusters that will foster collaborative opportunities among scientists studying cognitive development, molecular biologists studying cancer and stem cells, and materials sci-

entists working in green nanotechnology and solar energy. One-third of the building will be devoted to laboratory space. The remaining two-thirds will be offices, an atrium, and “dry” labs.

Shannon Boettcher, assistant professor in inorganic and materials chemistry and an Oregon Nanoscience and Microtechnologies Institute (ONAMI) Signature Researcher, is one of the researchers that will benefit from the new lab space.

“The new laboratories in the Lewis Integrative Science Building will be state-of-the-art and will provide ideal space for my research group,” says Boettcher. “For example, the lab we currently occupy is designed for organic chemistry—many fume hoods but no space for solid-state materials synthesis (i.e. furnaces, vacuum chambers)

and analysis equipment. The new labs have been designed for inorganic materials research, and the architects have been fantastic about working with us to design a really usable space.”

The UO is a leader in the concept of collaborative science, and the Lewis building will further cement the UO's reputation as a leading research university. The shared instrument facilities within the Lorry I. Lokey Laboratories, home to Oregon's high-tech extension services—the Center for Advanced Materials Characterization in Oregon (CAMCOR), the Support Network for Research and Innovation in Solar Energy (SuNRISE), and Partnership Laboratories (camcor.uoregon.edu)—will expand into the

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Integrated Green Product Design Course Debuts

Course brings together students in several disciplines to improve product design.

It would be nice to believe that bringing new products to the global marketplace is the result of a series of well-informed decisions. But this is not always the case. We can look at electric vehicles and their charging stations as an example of the well-intentioned but often flawed manner in which products are designed.

For normal charging of a car connected to the electrical network using 230 volt AC current, the charging time is six to eight hours, and a car must be charged every couple of days, on average. But the rate of charging is a variable that could have been taken into consideration during the design phase. For

instance, if people were going to a charging station and leaving their car plugged in, it would be nice to have the car charge much more quickly, perhaps in the time it takes to get a meal or shop for groceries.

"If chemists had more information during the design phase it could drive innovation to meet those usage specifications," says Julie Haack, instructor for the new Green Product Design course. "But now here we are with a mismatch of systems. What the consumer wants is not met by what the manufacturers created. If chemists had had more information at the point of invention they would have designed the batteries very differently. Really

differently. And this could also lead to more rapid adoption by the market."

Haack's new course brings together chemists, marketing majors, designers, journalists, and business majors to look at how to solve these types of problems early on in the design and development phase. The chemists in the laboratory likely didn't know what the final result of their battery research would be. If they had, they would have been able to ask questions such as, "What are the charging stations going to look like? How will they be accessed? How long will the car

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Lewis Integrative Science Building Opens

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basement space of LISB. These facilities, which were featured in the 2009 newsletter (chemistry.uoregon.edu/pdf/news/news09.pdf), foster interdisciplinary partnerships between academia and industry. A large portion of the fourth floor of the Lewis building will be the home of the Center for Sustainable Materials Chemistry, an NSF-funded \$20 million Center for Chemical Innovation.

"The labs will host students who are supervised by several center faculty members working on high-impact collaborative research projects," Boettcher says. "The LISB basement will house large, shared materials

opportunities the new building will provide.

"The Lewis building provides the Center for Sustainable Materials Chemistry the opportunity to pioneer a more collaborative research experience for both undergraduate and graduate students," he explains. "The ability to shift from individual faculty-centered labs to a 'collaboratorium' provides a fantastic opportunity to evolve graduate education, providing students the ability to, for example, prepare a new inorganic cluster, make ultrathin films of the cluster via prompt inorganic condensation, characterize the films using the equipment in CAMCOR, and measure properties while working with national leaders Darren Johnson, Douglas Keszler [director, Center for Green Materials Chemistry at Oregon State University], and Mark Lonergan. It's a unique opportunity."

In addition to the leading-edge collaborative nature of the labs and offices, the Lewis Integrative Science Building is one of only a handful of Leadership in Energy and Environmental Design (LEED) platinum certified science facilities in the country. Science buildings present unique energy-usage challenges, because health and safety regulations and the need for superior ventilation and waste systems prevent some of the typical energy-reduction strategies, such as recycling air in large buildings.

The plan did not initially include LEED certification, but as the project continued, the design teams at Portland's THA Architecture and builders Lease Crutcher Lewis of Eugene



Main entrance to the new Lewis Integrative Science Building.



Beverly Lewis surveys the construction site of the Lewis Integrative Science Building in October of 2011.

analysis equipment, such as x-ray diffractometers, thin-film deposition equipment, and optical laser tables. The open layout of the building will encourage collaboration."

Dave Johnson, a UO professor of solid-state chemistry, electrochemistry, and materials science, also praises the collaborative

developed some cutting-edge techniques to create an energy performance 58 percent better than building code regulations. One of those strategies involved cutting into a utility tunnel system under the university campus. Using a series of coils, excess heat from the tunnel system will be used to preheat the science building, a strategy that could potentially be used in the future with other buildings on campus. In addition, LISB will be outfitted with exterior solar shading and interior light shelves, advanced lighting

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Department Heads' Perspective

UO Chemistry: Past, Present, and Future

This is a first—a perspective from two department heads! While I (MH) am spending the fall term on a “study leave” catching up on proposal and paper writing, Vickie DeRose is filling in as interim department head. I return winter 2013 to finish out the remaining eighteen months of my term as head. More from Vickie below.

Looking back over the past year, it can be summed up in one word—BUSY! On the educational front, the new General Chemistry Laboratories as well as the renovated Barnhard Chemistry Resource Center, featured in last year’s newsletter, are great successes as both spaces have proven to be very popular with students and staff members alike. Not wanting to stop there, we completely renovated the 171 Onyx Bridge classroom this past summer and have added a number of new course offerings.

In addition to the new Science Literacy and Green Product Design classes featured in this newsletter, we are debuting a new “majors track” organic lecture and laboratory sequence this academic year. The latter

Science Building Opens

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controls and daylight sensors, and a chilled beam system, which is a type of ventilation that passes water through beams suspended from the ceiling.

The building will be the most expensive science building ever built at the University of Oregon. The project received a \$30 million bond to help with design and construction costs; the remaining \$35 million came from a combination of grants, fundraising, and generous donations from Robert and Beverly Lewis as well as Lorry Lokey. ■



Robert and Beverly Lewis at a Ducks game in 2000.

will extensively utilize microwave reactors purchased in part with monies from the Chemistry Instructional Space Improvement Fund. Students will be able to synthesize in minutes what used to take hours, allowing precious lab time to be utilized for learning important purification and characterization techniques as opposed to watching a pot boil. Only a very small number of schools use microwave reactors as part of the undergraduate curriculum, so this will be something that will really set Oregon chemistry students apart. More on this in the next newsletter!

On the research side, things are equally exciting. Faculty members and students alike continue to garner well-deserved national and international accolades, many of which are described on pages 9–12. By the time you read this, the new Lewis Integrative Science Building will have opened, providing top-notch research space for Shannon Boettcher’s lab and for the Center for Sustainable Materials Chemistry. This will free up considerable space in Klamath Hall that we hope to completely renovate in the near future.

The NSF I-Corps article illustrates just one of the many efforts within the department to take basic research to the marketplace. With help from ONAMI and local industrial partners, be on the lookout for good things to come from chemistry start-ups such as Dune Sciences, QE Chemicals, and SupraSensor Technologies.

We continue to work to ensure that the chemical sciences are accessible and welcoming to all individuals by supporting groups such as the newly established NOBCCChE chapter and the well-established Women in Graduate Sciences group.

Finally, despite shrinking grant dollars from Washington, DC, we have managed to hold our own and actually increase the number of graduate students and teaching assistantships. Overall, I feel that the department has retained its solid foundation during the rocky financial times of the past decade. Now, onto Vickie for ideas on how to build and expand upon that foundation.

Mike has addressed the recent past and present, and I would like to focus on the future. Last spring the department underwent its first comprehensive review by an external

panel since 1995. This overdue “decennial review” provided an opportunity to describe the strengths of the department in research and education, many of which Mike has high-



Vickie DeRose and Mike Haley

lighted above and in previous newsletters. The review also gives us an opportunity to focus on strategic planning in order to build on our current strengths and envision new horizons. Even in early stages, it is clear that we have an ambitious faculty that wishes to create exciting opportunities for our graduate and undergraduate students!

As we move forward, there will be ways in which our community can help. We wish to build on endowed graduate and undergraduate student fellowships, in particular assisting undergraduate students to gain early research opportunities. A large focus will be on full renovations of research laboratory space. As we make concrete plans, please watch for opportunities to contribute to these projects and to be recognized for that effort. We welcome input on ideas that are particularly exciting to our broad community of support.

In conclusion, we hope you enjoy the newsletter. Next time you are in the Eugene area, please stop by campus for a visit. We would love to give you a tour and a chance to see all the changes for yourself. You will be quite impressed!

With best regards,

Mike Haley and Vickie DeRose

PS: Let us know what you are up to! Send your details in the enclosed envelope, fire off an e-mail at chem@uoregon.edu, or use the online form at chemistry.uoregon.edu/alumni.html?update. ■

An Understanding of Science for Everyone

UO Science Literacy Program offers general courses for nonscience majors.

Nonscience majors don't have to feel like they are stuck with a watered-down understanding of science. The University of Oregon Science Literacy Program (UO SciLit Program) offers general education courses for nonscience majors designed to improve scientific awareness and general science literacy for anyone who wants to learn more.

The SciLit Program was funded in 2010 by a \$1.5 million grant to create an understanding of how science can help solve societal problems. The program will also train faculty members in teaching strategies that are known to be effective, and will encourage them to share that knowledge with their colleagues on campus. It also helps graduate students in the sciences to effectively communicate ideas to audiences of nonscientists. The grant to the UO was among \$79 million in grants announced by the Howard Hughes Medical Institute to help universities strengthen undergraduate and precollege science education nationwide.

Many people are interested in scientific concepts, but don't actively work in science. These classes help elucidate the scientific concepts in varied fields, such as the 4-credit Physics 155 course, Physics Behind the Internet, which examines how discoveries in twentieth-century physics mesh to drive modern telecommunications. Other classes include Scientific Revolutions, Physics of Life, Earthquakes, Reporting Science, and Physics of Energy and the Environment.

Chemistry faculty members Andy Berglund and Marina Guenza are both active participants in the SciLit Program.

"The program has been a wonderful experience because I am learning how to better engage all students by using approaches that engage the students in the learning process," said Berglund. His course, Science, Policy, and Biology, which is cotaught with Judith Eisen from biology, explores the biology and biochemistry behind important topical issues such as stem cells, cloning, genetically modified organisms, genetic testing, and gene therapy. They also explore how policy decisions affect research in these areas. "In the course, we are working with our students so that they understand how science is performed. They can then use this understanding to make their own decisions about the science in the news."

Guenza's course, cotaught with Michael Raymer from physics, focuses on Information, Quantum Mechanics, and DNA. Before they are done, students learn the answers to such questions as: What is information and how is it measured? How is information stored in and transferred between biological molecules? What do these questions have to do with compressing music files onto a compact disk or into an mp3 format? The course develops students' scientific reasoning abilities and introduces basic methods of data visualization and mathematics. ■

For more information about the Science Literacy Program, see scilit.uoregon.edu.

Green Chemistry News Briefs

Governor's Green Chemistry Initiative Draws Praise

On April 27, 2012, Oregon Governor John Kitzhaber signed the Green Chemistry Innovation Initiative. The initiative will not only increase awareness around the state (government agencies and the Oregon business community) about the benefits of green chemistry, but it will also encourage new incentives through legislative proposals, implement a preference for green chemistry-based products in state purchasing and procurement guidelines, and refine the state's strategies to use safer alternatives to toxic chemicals.

"Ultimately, successful innovation will create good jobs that are safer for workers and offer a high quality of life for our communities, enhancing opportunities and resources for future generations," the newly signed executive order states. ■



Two participants collaborate on the "Liquid CO₂ Extraction of D-Limonene from Orange Rind" lab in the 2012 Green Chemistry in Education Workshop.



Jim Hutchison, center, is one of the instructors for the workshop, which provides hands-on lab opportunities to chemistry educators around the country.

Twelfth Green Chemistry in Education Workshop Held

For the twelfth year, the UO hosted a weeklong, hands-on workshop for university educators who wish to adopt a greener organic laboratory curriculum. The goal of the workshop is to establish a network of chemical educators around the country who are incorporating green chemistry experiments and concepts into their teaching.

The workshops, led by chemistry Professors Jim Hutchison and Ken Doxsee and senior instructor Julie Haack, are a combination of lectures, discussion, and hands-on laboratory time with the chief goal

of helping the participants implement green chemistry into the curriculum at their institutions. Participants "test drive" more than thirty different labs to see which of them they will adopt when they return home, and business and industry leaders address the group to show how green chemistry is having widespread impact. Networking among the participants is emphasized, to help them establish a supporting group of educators who can help them implement the curriculum once they return to their home institutions.

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UO Chemistry Team Wins NSF I-Corps Top Prize

A University of Oregon research team led by chemistry professors Darren Johnson and Michael Haley recently won the top prize at the National Science Foundation's Innovation Corps (I-Corps) program final presentations held at Stanford University on May 23, 2012. Calling themselves the SupraSensor team, they delivered the winning pitch on nitrate sensors for precision agriculture.

"To have venture capitalists and entrepreneurs with billions of dollars in their pockets tell you that your idea is bankable gives us a huge push," said Calden Carroll, a postdoctoral researcher who also received his UO Ph.D. in 2011 working on the Johnson-Haley collaboration. "We're seeing firsthand that the scientific method can be applied to entrepreneurship."

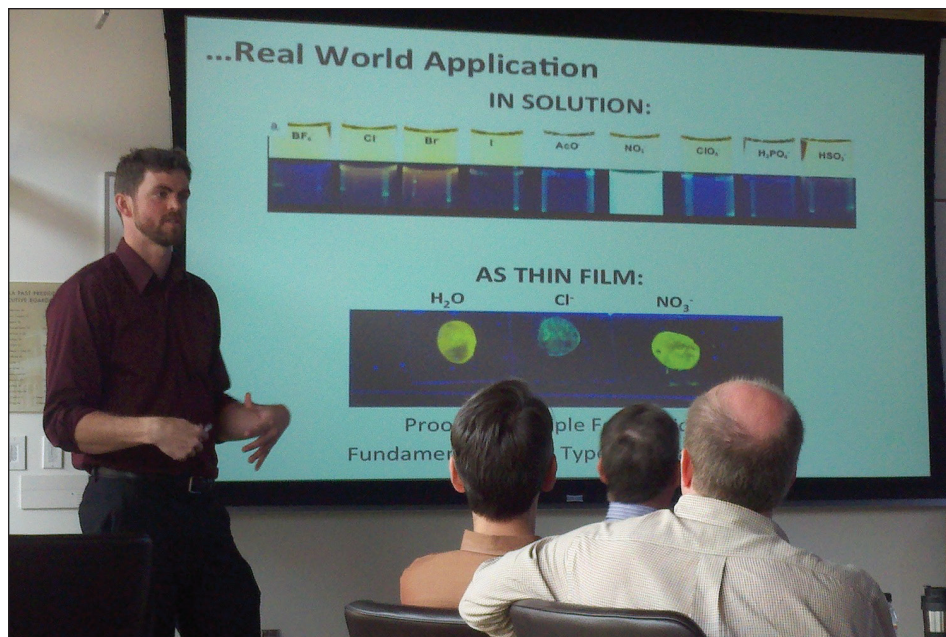
The I-Corps program was first announced in 2011, and the UO team was among twenty-five selected for first-quarter 2012 awards. This unique NSF program is designed to broaden the impact of select, NSF-funded, basic-research projects by preparing scientists and engineers to focus beyond the laboratory.

The I-Corps program consists of teams made up of academic researchers, student entrepreneurs, and business mentors. By working together and with established entrepreneurs, I-Corps teams learn to identify valuable product opportunities that can emerge from NSF-supported academic research. Over a period of six months, each I-Corps team learns what it will take to achieve an economic impact with their particular innovation.

Workshop

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Participation (including registration and housing) is free, and meal costs are reimbursed. Faculty members at U.S. institutions are welcome to apply, as are postdocs and graduate students who plan to teach at the college level. Applications for the workshop are accepted through the Center for Workshops in Chemical Sciences and can be found at the website chemistry.gsu.edu/CWCS. ■



Calden Carroll presenting his I-Corps work.

I-Corps teams are composed of three main members: the principal investigator (PI), the entrepreneurial lead, and the mentor. As the PIs, Johnson and Haley serve as the technical lead and project manager.

The entrepreneurial lead (EL) is typically a postdoctoral researcher or graduate student with the relevant technical knowledge and real interest in achieving commercial success with the innovation. As the EL, Carroll also provides support to transition the innovation out of the university, should that level of readiness be reached.

The I-Corps mentor brings entrepreneurial experience and serves as the principal guide in determining the technology disposition. Bruce Branchaud, professor emeritus of chemistry at the UO, serves in this role. August "Augie" Sick, an "entrepreneur-in-residence" from the Oregon Nanoscience and Microtechnologies Institute (ONAMI), also assists in this role.

"Calden deserves 95 percent of the credit as he did the lion's share of the work," said Johnson. Added Haley, "It was amazing to watch his transformation from scientist to entrepreneur."

On July 18, the team took part in a showcase session featuring some of the most successful I-Corps teams at NSF headquarters in Arlington, Virginia. Over the six months of the project, the UO team had worked with a private company on a proof-of-concept effort to determine the feasibility of a nitrate-sensing probe designed to maximize agricultural productivity, optimize fertilizer usage, and minimize environmental impacts. The team studied whether proprietary compounds can be incor-

porated into a solid matrix, such as polymer thin films, to provide an optical readout that is sensitive for nitrate in the presence of other common interfering anions and natural organic matter. But beyond the focus on the technology, the SupraSensor team learned key business concepts such as scalability and how to appeal to customers.

"This particular technology may not even be what goes to market in the end," Carroll said. "Rather than being an exercise in trying to fund our technology, we started to think about how best to develop a product around a customer need."

The team received additional support from ONAMI and has been working with the UO's Technology Transfer Services. The group has patented its technology and established the company SupraSensor Technologies. The team is applying for additional grants and developing a prototype of the nitrate sensor, which promises to fulfill a need for real-time monitoring of fertilizer application in environmentally sustainable precision agriculture. Members of the team stressed that they are committed to keeping the company in Oregon.

"This award validates the SupraSensor team's hard work and offers a glimpse of the successes that lie ahead for this Oregon start-up," said Kimberly Andrews Espy, vice president for research and innovation and dean of the Graduate School. "This entrepreneurial technology will help secure a sustainable future by limiting the wasteful over-application of nitrate fertilizers. The team is part of a proud tradition of UO research that couples cutting edge fundamental work with translational application to develop the tools for tomorrow." ■

Integrated Green Product Design Course Debuts

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be plugged in? Are the charging stations at home, at the grocery store, at work?" These kinds of questions could only be answered by an architect, a marketing professional, and a visual designer, none of whom typically visit the white-coated chemists in the R&D lab.

Haack also points out that we have an infrastructure for providing power to homes and business, but we don't have an infrastructure for charging stations.

"They're not built yet. Who owns them? Who is going to take the risk? How do you assess that?" she remarks. "We need business strategies to create incentives for this kind of development."

Ninety students enrolled when the course debuted in winter of 2012. Thirty percent were from the School of Architecture and Allied Arts, thirty percent were from the journalism school, and thirty percent were business majors.

"That was done on purpose," Haack says. "And that's the first time I've had that mix of students in a science course." The term project required the identification and analysis of the use of polyvinyl chloride (PVC) in a specific consumer product of each student's choice, followed by creation of a greener product solution.

The students studied polymers because it's a mature industry, students are familiar with products made from polymers, and a lot of data is available about hazards and toxicity. The course contrasted that with nanotechnology, which is an emerging industry and less familiar.

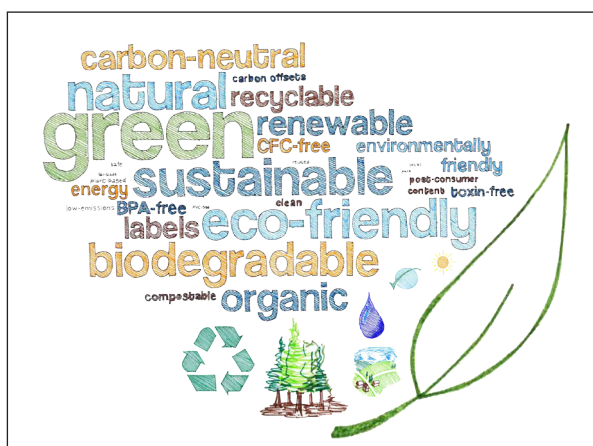
"In terms of design, you can imagine using nanotechnology to meet a variety of consumer needs and it's all new, it's all possible," says Haack, "but the hazards are still being investigated so we asked the students to design in a dynamic context where you don't always have all the information you need to solve these problems."

Another example that illustrates the importance of informed decision-making in the design process was that of a toy made of biodegradable plastic. Prototypes of toy trucks were made, but when they were shipped to a toy store, they couldn't withstand the heat inside the delivery trucks.

"They all melted," says Haack. "There was no feedback loop." A chemist could have de-

signed a plastic with the desired properties had someone in that design meeting raised their hand to ask about the melting point. "You can design properties in and design properties out," Haack notes. "In the design of pharmaceuticals, chemists routinely design out the structures that contribute to side effects—we demand that. But people don't demand that chemists design out the hazards in consumer products. It's exactly the same."

Sara Tepfer, a teaching assistant for the course, designed materials to teach students how to think about solving these big-picture problems. She's now in the architecture program at the University of California at Berkeley, but while at the UO, she worked in the lab of Dave Johnson studying the crystal structures and thermo-electric properties of new materials. Tepfer designed a "word cloud" and a material profile for polyvinyl chloride.



Sara Tepfer designed this word cloud showing words that are commonly used in product descriptions, but that have little meaning to product designers.

"We found that these words in the word cloud—green, sustainable, ecofriendly, biodegradable, recyclable—are often used in product descriptions but they are not very helpful for design," says Haack. "If this is the current state of affairs, how do we move beyond this?" The students were asked to take a photograph of their new product and describe how to avoid those clichés when talking about the sustainability of their product.

Tepfer's material profile took a very complex subject, including the toxicity of the plastic, the impacts on society, how PVC is made, where the raw materials come from, and how it degrades, and presented it in a visual for-

mat that makes it easy to see "nodes" or "hot spots" where the process could be improved. It also reveals the impact of changes in the process, such as what happens to waste or preliminary products if the process changes.

"She created a visual with her art and communications and product design perspective that will help nonscience students understand the life cycle assessment," says Haack. "It helps students see that connectivity between the parts of the life cycle and not get confused by the chemistry." If a material like PVC is considered "bad" but has good attributes and is also in numerous common products, this basic information about its properties is essential in approaching a redesign. Haack says that university instructors around the country are now using Tepfer's visualization because they have had a hard time getting students to understand this connectivity.

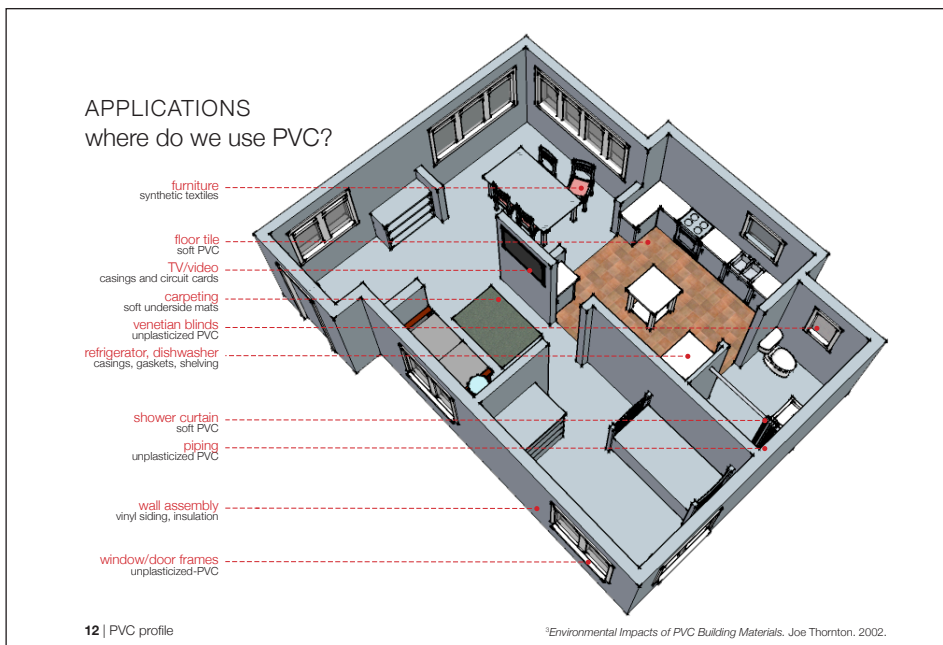
"I think it's important to understand how non-scientists think and how scientists think and how designers think," says Tepfer. "You can speak different languages and become sort of a translator." This interdisciplinary approach will follow her through her architecture career, she says, because architecture itself requires thinking about the "product," or building, from several angles: human interaction with the building, environmental impact, and aesthetic impact.

"I was attracted to science because you get to explore your curiosities really rigorously and that's something I really appreciate," she says. "But I also wanted a really concrete understanding of materials and why they perform the way they do, and this experience will help me in choosing the ones that will achieve the affect I want perhaps in more sustainable ways than what we currently do."

Simon Sanchez is an undergraduate studying digital arts and business. He is preparing a visualization of the "chemical ecosystem" of PVC for the course. The chemical ecosystem is a digital simulation portraying all chemicals as nodes of a global chemical "food" web, displaying the web of materials that are used by or related to the end products.

"What I'm doing specifically is trying to visualize nodes, and each node is a feed-

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PVC usage in the household.

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stock or an intermediary or a final consumer plastic,” explains Sanchez. “By being able to visualize it we can identify hot spots and make a better design.” Companies do this for individual products all the time, Sanchez points out, but his project is more lofty: “I want to create a chemical ecosystem for all chemical companies all over the world.”

Sanchez feels that the interdisciplinary thinking that this course engenders is “drastically important,” because chemistry is everything—everything we wear, containers for our food, components in our electrical devices, and on and on.

“The holistic approach to problem solv-

ing is the most effective,” he says. “It’s a breath of fresh air for me. My goal is to be a mediator between the specialists and the nonspecialists, the laymen and experts, and to give everyone a common understanding of where we need to go and what we need to do to have a more sustainable planet for everyone. Designers aren’t going to know as much as a chemist or another scientist, but they can make conscious decisions about the best materials to use and which ones are red flags that they shouldn’t use.”

As the course instructor, Haack encouraged the students to present their information using the formats most common in their discipline—drawings, videos, and standard reporting.

“The media students weren’t used to the reports and the business students weren’t used to using the videos,” she says. “The art students started partnering with the journalism students because they saw a synergy there. They were all stunned at how differently people from these different disciplines think, and also how valuable it was to understand that.”

Haack says her “dream” would be to have chemistry, or that “molecular perspective,” as she says, be integrated across the university curriculum. And with students like Sanchez and Tepfer taking their molecular perspective into their non-science fields, we just might see that in the future.

The students who came to Tepfer’s office hours expressed how cool it was to be sitting at a table next to people that they otherwise wouldn’t interact with, and learn what common interests people can bring to a concept.

“It was eye-opening for everyone and really changed the way they thought about group work and process,” says Tepfer. “In my experience, people really want to know that what they are using may not be the healthiest option. I think people are starting to change. It’s not just about what material looks good in a space, it’s also what comes from it and what happens to it when it starts to degrade. People said, ‘the class was so amazing, I never thought I would be into this, I really want to keep exploring this.’”

These are the kind of students who *will* raise their hand at that future design meeting, and ask the question: Is there a better way we can do this? ■



Every year the UO Department of Chemistry hosts Septemberfest in Alton Baker Park. The get-together is a chance to meet other students and faculty members in the department, eat lots of barbecue, drink some beers, and have fun in the sun.

NOBCChE Chapter Supports Minorities in Science

New chapter is now incorporated statewide.

Maisha Kamunde-Devonish and Milton Jackson Jr. came from very different backgrounds, but both are now studying chemistry at the University of Oregon and both are united in a common goal—to create a more welcoming environment for people of color and to give a face to groups underrepresented in the sciences.

Maisha grew up in southern California and earned her bachelor's degree in northern California. "Where I'm from it looks exactly like here," she says. "I was the only black student in my department there, so when I came here I was like, 'I don't see the big deal, this is how my life has always been.'"



From left to right: Maisha Kamunde, Milton Jackson, and Matti Alemayehu.

She had attended a conference of the National Organization of Black Chemists and Chemical Engineers (NOBCChE) in Atlanta in 2009, and enjoyed it. As it turns out, one of the ladies she stayed with at the conference had been a previous UO graduate student working in David Tyler's lab. She had been trying to urge creation of a NOBCChE chapter or similar group, but it hadn't gone anywhere.

About a year ago, Farrell Ford, director of corporate relations and diversity in the Graduate Internship Program, mentioned that she wanted to start a chapter here. "I thought it was a fantastic idea," Maisha says. "I never put two and two together because I thought there weren't enough people who were

interested, and it seemed that it wouldn't coalesce into anything."

But it did. Last year, Farrell, Maisha, Milton, Matti Alemayehu, and a small group of students found an advisor, Darren Johnson, filled positions for the officers (Matti is president and Maisha is vice president), and acquired the minimum number of interested students necessary to form the chapter. The group was aiming for ten members, but has far exceeded that.

In April of 2012, the president of NOBCChE, Victor McCrary, and Western Regional Chapter Director Isom Harrison visited campus to certify the chapter. Now, the NOBCChE chapter is incorporated throughout the Oregon University System, with student groups at Portland State, Southern Oregon University, Eastern Oregon University, and several other colleges throughout the state.

Milton, who is in his third year of graduate studies in Darren Johnson's research group, grew up in Mississippi and Louisiana, and later attended a historically black university, Prairie View A&M University, in Texas. "We had a NOBCChE chapter," Milton recalls, "so when they first mentioned it I didn't see what was so special about having an organization here."

He had a change of heart, and is now the chapter's secretary. "I started to think, 'What if I hadn't had that?'" he says. "Where I came from was 90 percent black, and here it is 90 percent white, a complete reversal. Then I started to realize that having a chapter here would be a great opportunity."

The organization, though it has "chemists and chemical engineers" in its name, is not limited to only those fields of study. The group is open to any science field, including physics, biology, and physiology, and it is not just for people of color.

"Anyone who supports the cause is welcome to join," says Maisha. Milton would like to strengthen ties between other African American student groups, such as the Black Student Union, the African Student Association, and Black Women of Achievement. "We want students to know, hey, we have this organization here that can help support you on your way," says Milton.

Matti attended the 2012 NOBCChE leadership retreat where she was provided with the constitution of NOBCChE, which is

being implemented in the local chapter.

"We have monthly chapter-wide meetings with all participating schools where we are also currently working to create a NOBCChE professionals chapter in collaboration with chemical professionals in Oregon," says Matti. "We attended the national NOBCChE conference in Washington, D.C., in September to present the variety of research that current NOBCChE members are involved in at their respective schools." Students from PSU as well as the UO participated in this conference.

Matti is quick to point out that though it hasn't always been easy to get this organization off the ground, "the chemistry department, Center for Sustainable Materials Chemistry, Materials Science Institute graduate internship program, and COACH have been generous supporters of the new NOBCChE chapter." (COACH stands for Committee on the Advancement of Women Chemists.) "The Office of Institutional Equity and Diversity (OEID) has supported the organization tremendously," says Maisha, "as has Carla Gary, assistant vice president of OEID."

Both Maisha and Milton acknowledge how hard it is to start an organization like this on top of being a graduate student in a rigorous field, but both also admit that the UO faculty has been outstandingly supportive of their goals.

"Without Darren a lot of things would not have happened," Milton says. Maisha concurs. "You may feel as though what you're doing is crazy but you know he's going to support you, you know he's got your back," she says. "If I talk to him he'll go out to bat for us. It's really nice to know that we have a boss that really supports us and stands behind us 100 percent."

Darren Johnson says that Farrell has been instrumental in getting this "vibrant" chapter started and motivating the students. Farrell's efforts have also led to the Western Regional Meeting of NOBCChE being scheduled on the UO campus in March of 2013. Johnson accompanied the students to the NOBCChE conference in Washington, D.C., in September, which gave the group new momentum.

"Now we can really start pushing the message of increasing the numbers of mi-

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Faculty Awards and Honors

Marina Guenza Named Fellow by the American Physical Society

Chemistry Professor Marina Guenza was among 238 scientists selected as 2011 fellows by the American Physical Society.

The American Physical Society was founded on May 20, 1899, when thirty-six physicists gathered at Columbia University. Since that day, the society's mission has been "to advance and diffuse the knowledge of physics." Guenza was nominated by the Division of Polymer Physics for "significant contributions to the field of polymer physics through the development of theoretical methods to study macromolecular structure and dynamics."

Guenza has distinguished herself in her research using theoretical and computational methods applied to modeling and understanding the physics that affect the dynamics of polymeric systems. Specifically, she



Marina Guenza

has been a leader in developing statistical theories of polymer structure and dynamics in the liquid state. Original theories for macromolecules with different geometries and semiflexibility, including the effect on the dynamics of the local chemical structure, in solutions and in melts, have been presented. Her approaches are microscopic, predictive, and as much as possible, free of adjustable parameters, providing a direct correlation between the chemical structure of a polymeric chain and experimental observations. This fundamental research has relevant implications in the study of polymeric materials and biological processes.

Recently, Guenza has developed coarse-graining and multiscale modeling approaches starting from liquid state theory, which extend the range of time and length scales that can be investigated in simulations of macromolecular liquids. Because they are analytical, these approaches overcome the problems of transferability and thermodynamic consistency between different coarse-grained descriptions.

Guenza received her PhD in physical chemistry from the University of Genova, Italy, in 1989 and in 2002, Guenza was hired at the University of Oregon as an assistant professor. Before coming to the UO she was

a tenured researcher at the Italian National Council of Research, the CNR, and a visiting scientist at the University of Chicago (1994) and at the University of Illinois at Urbana-Champaign (1995–98). Since 2010, she has been on the editorial advisory board of *Macromolecules*, a journal of the American Chemical Society. In addition to her faculty position in the UO Department of Chemistry, she is a member of the Institute of Theoretical Science and the Materials Science Institute, and an associate member of the Institute of Molecular Biology.

Shih-Yuan Liu Receives Dreyfus Teacher-Scholar Award and Journal of Physical Organic Chemistry Award

Shih-Yuan Liu has been honored with a 2012 Camille Dreyfus Teacher-Scholar Award, which supports the research and teaching careers of talented young faculty members in the chemical sciences. He will receive a \$75,000 unrestricted research grant, which will further his work into biomedical research. Liu was selected for this award based upon his significant achievements in advancing important knowledge of azaborine

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NOBCCChE

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nority students in the sciences," says Maisha, "and also showing ourselves as a recognized

group of students that are underrepresented that are starting to be part of the influx of

students that are pursuing higher level degrees." The group hopes to not only get more students of color interested in attending the UO, but also show that the Northwest itself is trying to make this a diversity-friendly area.

Maisha is quick to point out that this *is* a diversity-friendly area, but she says it is hard to see that based on the population. "There's no reason that students of color wouldn't want to be here, but sometimes it doesn't seem like a place where they would want to be. If they don't see people here that look like them, they might think that they wouldn't want to come here. But if you keep thinking that way then nothing is going to change, so hopefully we're that little needle point that will start spreading now." ■

See www.nobcche.org for more information about NOBCCChE.



From left to right: Carla Gary, Sarah Newton, Ron Lewis, Matti Alemayehu, Victor McCrary (NOBCCChE president), and Isom Harrison (West Regional chair) at a West Regional NOBCCChE event in La Jolla, California.

Faculty Awards and Honors

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Shih-Yuan Liu

heterocycles. Furthermore, his dedication and contributions to education in the chemical sciences, particularly with respect to undergraduates, was also noted.

Liu was also named the winner of the 2012 Journal of Physical Organic Chemistry Award for Early Excellence. Liu will receive the \$5,000 award check at the fortieth Ontario-Quebec Physical Organic Minisymposia in Kingston, Ontario, Canada, in November 2012, and will also present a plenary lecture at this meeting. The JPOC award is given annually to recognize the accomplishments of an individual working in the field of physical organic chemistry or applying the principles of this field to other areas.

"It is really a great honor to be recognized by the Dreyfus and JPOC awards," says Liu. "I would like to thank the Department of Chemistry for support throughout the years. I am also greatly indebted to my coworkers in the research group whose contributions really made this possible."

Liu is currently an associate professor of organic, organometallic, and inorganic chemistry. Prior to joining the UO faculty in 2006, Liu was both a graduate student (PhD 2003) and a postdoctoral researcher (2003–6) at the Massachusetts Institute of Technology. Liu's research group is engaged in synthetic organic-organometallic chemistry with a focus on azaborines, boron (B)–nitrogen (N)-containing heterocycles that have potential as hydrogen storage materials and as arene structural mimics in biomedical research.

Last November, Liu published his work on the creation of hydrogen storage materials for use in fuel cells. Soon after that publication in the *Journal of the American Chemical Society*, the U.S. Department of Energy awarded \$2 million to be shared among

three organizations for developing and testing hydrogen storage materials. Liu, a member of the UO's Material Science Institute, is principal investigator of that project.

Geraldine Richmond Named 2013 Recipient of the Charles Lathrop Parsons Award

The Charles Lathrop Parsons Award, which is considered as one of the two most prestigious awards given by the American Chemical Society (ACS), recognizes outstanding public service by a member of the society and is named after the executive secretary who helped create today's ACS. The ACS Board of Directors chooses the recipient of the award. Geri Richmond is being honored for her advocacy on behalf of higher education, science policy, and women scientists.



Geri Richmond

A long-time advocate of women in science, Richmond is well known for her role as cofounder and leader of the Committee on the Advancement of Women Chemists (COACH, coach.uoregon.edu/). Since 1997, COACH has worked to support women scientists and engineers through leadership, career development, and mentoring opportunities. Richmond is currently working to broaden COACH's reach internationally.

Richmond was quoted in *Chemical & Engineering News* in July 2012 as saying, "All of us as scientists have a responsibility to give back, and I learned that very early on from my mentor, George Pimentel," Richmond says. "Ever since I was in graduate school, that message has been there, and I've had incredible opportunities to be able to give back to the community through service. And it's been enormously rewarding but also a real learning experience for me on how we can be even more impactful with our actions."

Richmond is no stranger to awards—she first was honored in 1977 with an Outstanding Undergraduate Teaching Award at the University of California at Berkeley. She received a Guggenheim Fellowship in 2007, the Bomem-Michelson Award in 2008, and was elected to membership in the National Academy of Sciences in 2011. Since 2001 she has been the Richard M. and Patricia H. Noyes Professor of Chemistry at the University of Oregon.

Nor is this Richmond's first ACS national award. In 1996, she received the Francis P. Garvan-John M. Olin Medal. In 2005, she was honored with the ACS Award for Encouraging Women into Careers in the Chemical Sciences, and in 2011, she received the ACS Joel Henry Hildebrand Award in the Theoretical and Experimental Chemistry of Liquids.

Michael Haley Named AAAS Fellow

Last fall University of Oregon chemist and department head Michael Haley was named as one of 539 newly elected 2011 fellows of the American Association for the Advancement of Science, an honor bestowed upon AAAS members by their peers. He became part of this select group that already includes chemistry faculty members



Mike Haley

Vickie DeRose, David Tyler, Geri Richmond, Pete von Hippel, and Bruce Branchaud, among others.

Haley joined the UO faculty in 1993 as a professor of organic, organometallic, and materials chemistry. He also is a member of the UO Materials Science Institute. His research group explores nonnatural molecules, utilizing modern synthetic methods for the prepara-

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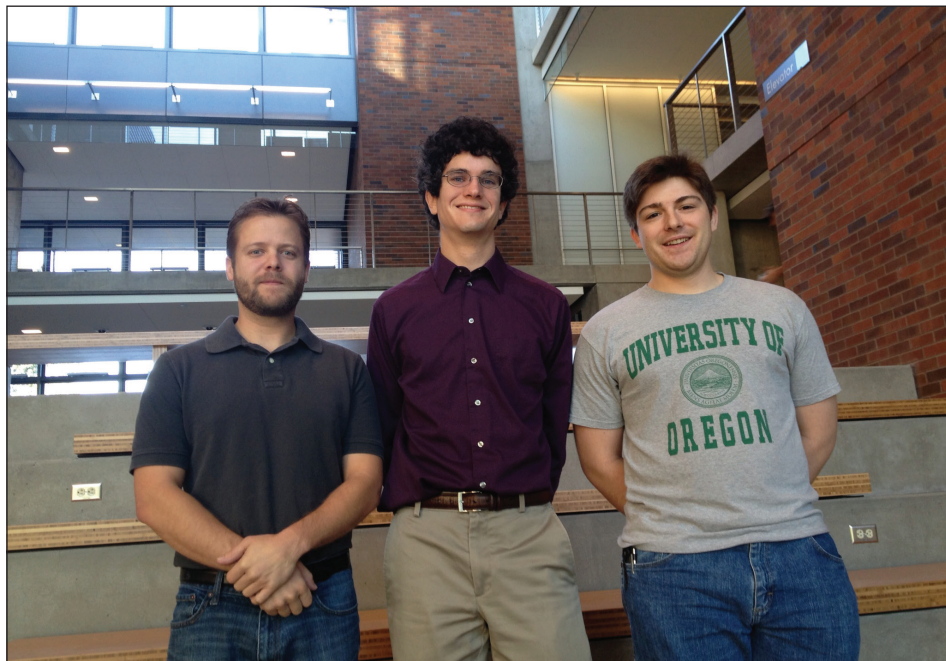
Graduate Student Awards

Alex Kendall Receives NSF Graduate Fellowship

Alex Kendall, who is in his third year of the PhD program in David Tyler's laboratory, was recently awarded a prestigious National Science Foundation Graduate Fellowship for 2012–15. In November 2011, Alex submitted a proposal entitled “Novel Iron-Tetraphosphine Metallaboratrane Complexes for Catalytic Nitrogen Fixation,” which was approved in early March.

Alex's proposal was inspired by the inefficiencies of the Haber-Bosch process used to create ammonia-derived fertilizers. The production of ammonia (NH_3) for fertilizers accounts for 1–2 percent of the world's energy consumption and an estimated 2–7 percent of global greenhouse gas emissions. The Haber-Bosch process to synthesize NH_3 requires high temperatures of 350–500 degrees Celsius and high pressures of 150–300 atmospheres. Even a small improvement in the production process would result in much less waste and energy needed.

“Most of what is in our air is plain nitrogen, and it's very difficult for plants and animals to utilize it because it's an extremely



Left to right: Chris Weber, Brad Rose, and Alex Kendall, recipients of this year's graduate student awards, standing in the atrium of the new Lewis Integrative Science Building.

inert gas,” explains Alex. “Iron is known to mediate the Haber-Bosch process, so if you can design around iron a molecule that can get the work done at room temperature and pressure, then you end up saving a lot of money and time and pollution. Ten percent of CO_2 comes from this process. We're trying to redesign something that's extremely inefficient but we believe we can do it because we understand the chemistry a lot better now than they did when they invented this process in the 1920s.”

This project is very similar to a nitrogen fixation project Alex worked on as an undergraduate at Western Washington University. While there, Alex worked with John Gilbertson, who also earned his PhD with David Tyler on small molecule activation and heterogeneous catalysis.

Alex was aware of a new class of boron compounds called metallaboratranes that have been investigated, but not specifically with the goal of activating N_2 . “I thought incorporating that into an iron scaffold would be a really nice way to explore this kind of chemistry and see if we can't activate N_2 better than it's been done before,” explains Alex. “The idea was to take everything we know about iron and how it interacts with a molecular scaffold to effectively design the most activating environment so that N_2 can coordinate and be easily reduced to ammonia.”

It wasn't just the strength of his proposal that earned him this coveted award—Alex is a well-rounded student who is also actively involved in outreach programs and community service to encourage an interest in science among middle school students. “Shannon Boettcher, Mike Pluth, and other junior professors here have outreach programs where they bring middle-schoolers to the university,” says Alex. “The idea is to expose them to science, get them to a college setting. These kids are from schools with huge dropout rates and that are underfunded. We want to get them excited about science so that they can excel.”

Chris Weber Receives UO Doctoral Research Fellowship

Graduate student Chris Weber has been selected to receive one of two UO Doctoral Research Fellowships for 2012–13. The fellowship includes a salary stipend and a university tuition waiver and is designed to support outstanding advanced doctoral degree candidates as they complete their research and write their dissertations.

Weber is studying the process of photochemical oxidation of conjugated polymers—in other words, the degradation of electrically conductive plastics by air in the presence of light. Weber is part of the research group of

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Faculty Awards

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tion of organic semiconductors and optical materials, many of which are also compounds of theoretical interest.

Among his other awards are an NSF CAREER Award (1995), a Camille Dreyfus Teacher-Scholar Award (1998), a UO Herman Faculty Achievement Award for Distinguished Teaching (2002), and a UO Fund for Faculty Member Excellence Award (2007).

“I was stunned when I got the e-mail notifying me that I had been elected,” said Haley. “Needless to say, I am very honored and pleased as punch to be named an AAAS fellow. Of course, I have to give credit to my students, past and present, whose hard work in the lab generated the research results that made my election possible.”

The AAAS is publisher of the journal *Science*. AAAS was founded in 1848 and includes some 262 affiliated societies and academies of science, serving 10 million individuals. ■

Graduate Student Awards

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the lab of Mark Lonergan, which is focused on the electrical and electrochemical properties of solid-state materials.

Degradable plastics have important implications, particularly with regard to solar photovoltaics, or solid-state lighting. Currently, photovoltaic cells are made of silicon-based materials. Lonergan's research is proposing an alternative to this in the form of organic photovoltaic cells (OPVs) composed of organic molecules and polymers. However, if OPVs are ever to become commercially viable, scientists must first find a way to increase their stability in air. Weber's work is aimed at overcoming this fundamental chemical problem.

"In terms of the specifics of my research, while there have been significant advances in the efficiency and processability of organic photovoltaics, the long-term stability of these devices remains largely unexplored and poorly understood," Weber says. "In this respect the work conducted in the Lonergan lab has contributed to the understanding of the fundamental chemistry associated with the degradation mechanisms in one of the constituent components of these devices, namely conjugated polymers." Weber's research is making important strides toward achieving the goal of cheaper and more versatile solar energy technologies.

As a graduate student at the University of Oregon, Weber has twice been recognized for Research Achievement (2011, 2010) by the National Science Foundation's Integrative Graduate Education and Research Traineeship program (IGERT), and his work

has been published in the peer-reviewed journal *Macromolecules*. Also committed to community outreach and secondary science education, Weber has initiated and conducted workshops for local high school students.

"While the receipt of this award is certainly gratifying in terms of the work I have accomplished, I feel it is more a testament to the importance of the area of sustainable energy research in general," Weber says. "The recognition of the selection committee of the need to provide support for research in this area verifies the larger consensus that future sources of energy require sustainable and cost-effective alternatives to fossil fuels. The receipt of this award will allow me to focus my efforts on continuing this research while also exploring new approaches to controlling or mitigating the degradation of these materials in functioning photovoltaic devices."

Brad Rose wins ACS Division of Organic Chemistry Fellowship

Brad Rose, currently a fourth-year PhD candidate working in the lab of Mike Haley, has received the Troyansky Fellowship from the ACS Division of Organic Chemistry for 2012–13. The fellowship consists of salary support and benefits for graduate study. Typically only eight to ten ACS-DOC graduate fellowships are awarded annually and are meant to recognize outstanding graduate students in their third or fourth year of study.

Rose's research has focused on new conjugated pi systems that are based on the indeno[1,2-b]fluorene scaffold. The goal, Rose says, is to develop new organic materi-

als that could be used in organic electronics such as organic light-emitting diodes, organic field effect transistors, and organic photovoltaics. These electron-accepting cores could allow for the inexpensive printing of electronic devices. In addition to synthesizing a number of new indenofluorene derivatives, Rose has explored these types of compounds computationally and completed some basic materials characterization. To date Rose's research work has earned him coauthorship on seven papers from the UO, with him as lead author on three. Prior to coming to the UO, Rose earned his BS from Illinois State University in 2009.

"I am very grateful to have been awarded this endowed fellowship in memory of the late Dr. Troyansky," says Rose. "It will allow me to continue my passion of creating and exploring new conjugated organic materials as well as present some of these discoveries at the forty-third National Organic Chemistry Symposium in Seattle next summer."

Established in 2003, the funds come from an endowment made by the family of Emmanuil Troyansky in his memory. Troyansky (1951–2002) received a PhD in 1976 and a DSc in 1988—both in organic chemistry—from the Institute of Organic Chemistry, Russian Academy of Sciences, Moscow. He spent the early part of his career in Russia, followed by several professorships and research positions in the United States and England. Troyansky was known for his research in radical chemistry and heterocyclic chemistry and was the author or coauthor of more than 100 papers and seven patents. ■



Opher Kornfeld

Undergraduate Student Awards

Barry M. Goldwater Scholarship to Biochemist Opher Kornfeld

Three UO Clark Honors College students received 2012 Barry M. Goldwater Scholarships. Biochemistry student Opher Kornfeld was honored, along with Amy Atwater (geological sciences and biology double major), and Brianna McHorse (biology). Kornfeld entered the CHC during the 2009–10 academic year. He plans a career in academia but also loves to write poetry

and short stories. He is an Israeli citizen who is deeply committed to finding peaceful solutions to the political problems in his homeland.

This isn't Kornfeld's first award—he has received the Shephard Family Scholarship for International Students. On May 21, 2011, he also received the Centurion Award, which is given to 100 undergraduate students from all classes for dedication

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Undergraduate Student Awards

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and outstanding service as student leaders in the last year. On a campus of 25,000 students, being recognized in this group of 100 selected leaders is very significant. Kornfeld received the Centurion Award again this year, in addition to the Robert and Opal Clark Scholarship. That award is presented to a student for outstanding scholarship and leadership in honor of President Emeritus Robert D. Clark's wife, Opal, in recognition of her lifetime commitment to the University of Oregon.

Established by Congress in 1986 to honor Senator Barry M. Goldwater, the scholarships recognize highly qualified students majoring in science, mathematics, and engineering who intend to pursue careers in these fields. About forty of the Goldwater scholars are biochemistry majors.

"I am looking forward to the research aspect of my career as well as the teaching aspect, as I have done throughout my time here at the UO as a FIG [Freshmen Interest Group] assistant and a TA for multiple biology courses," he says. Kornfeld particularly wants to acknowledge his mentor, Diane Hawley, a professor of biochemistry and a member of the Institute of Molecular Biology, for his recent achievements. "Her contribution to my undergraduate experience and the scholarship was very significant," says Kornfeld. Congratulations Opher!

New UO Beckman Scholars Program Supports Undergraduate Research

Shannon Boettcher, assistant professor of chemistry and ONAMI Signature Researcher, along with other chemistry colleagues, received funding in spring 2012 to establish a prestigious Beckman Scholars Program on campus. The first UO student recipients of Beckman Scholar Awards are Greg Harlow, who is working with synthetic organic chemist Shih-Yuan Liu, and Richard Cramer, who is working in the lab of Boettcher on solar cell materials.

"Last September, the University of Oregon, because of its already strong record in undergraduate research and mentoring, was invited to apply for the highly competitive Beckman Scholars Program," says Boettcher. "With the help of my chemistry colleagues, I wrote a proposal to establish a Beckman Scholars Program at the University

of Oregon for the first time. The proposal was highly rated by the Beckman Foundation and awarded funding."

To be considered for this award, students must be exceptionally talented, full-time undergraduates who are pursuing a career in chemistry, biochemistry, or the biological and medical sciences at accredited four-year colleges and universities in the United States. Students are named as Beckman Scholars in the spring of their sophomore or junior years.

Qualifying undergraduate research students receive a \$19,300 scholarship in the form of \$6,000 earned each summer, \$4,000 for the academic year plus \$850 in summer travel and supplies funding and \$1,600 in academic year travel and supplies funding. Students are expected to attend and present their research at the annual Beckman Scholars meeting in Irvine, California.

"The students are selected based on academic performance, and independent research proposal, and an interview by committee," Boettcher explained. "The goal—indeed expectation—for each of these students is that they publish their work in a peer-reviewed international journal, present at a major international conference, and apply for (and win) prestigious fellowships for graduate study at other top universities. We expect the Beckman support to really accelerate the careers of our top students."

Established in 1997, the program is named after physical chemist Arnold Beckman, who was an outstanding inventor of scientific instruments. Beckman's devices include a "rock smasher" for a Mars robot mission and an electronic shark repellent, but most of his work centered around "the chemistry of life." Beckman invented the pH meter in 1935.

Learn more about the Beckman Foundation at www.beckman-foundation.com.

Warner Peticolas Undergraduate Prize for Research in Physical Chemistry

The Department of Chemistry and the Physical Chemistry Division establish a new fund.

UO Professor Warner Leland Peticolas was seventy-nine years old when he died in 2009 (see chemistry.uoregon.edu/pdf/news/news09.pdf). While at the UO, Warner headed a research group in bio-

physical chemistry and taught chemistry for nearly thirty years. Warner attained worldwide status as a leading expert in the field of Raman spectroscopy, which he pushed into many new directions in his study of biological systems.

Now, a new undergraduate prize for research in physical chemistry has been established in his honor. The award was officially endowed in February 2012 by contributions from physical chemistry faculty members. Additional contributions are sought for the fund, which will provide an annual prize to a UO undergraduate who has excelled in research in physical chemistry.

The prize consists of a certificate and a cash award of \$100. Chemistry majors or other undergraduate students engaged in research with physical chemistry faculty members are eligible for the prize. As the endowment grows to a sufficient level, a second award named after Warner Peticolas will be given to support a physical chemistry graduate student.

"I was very impressed how the whole physical chemistry group got together and donated to support this award," says Marina Guenza. "Every single faculty member in physical chemistry participated quite generously to the making of this award."

"We are also grateful to the department head and the chemistry department who matched one-to-one our donations," she adds. "It is important for the physical chemistry group to have a way to remember and celebrate our colleague, Warner, by encouraging and supporting the best of our undergraduate students performing research in physical chemistry. It will be exciting in the future to be able to recognize among our graduate students those who have the capabilities and the enthusiasm to follow Warner's steps, and to be able to reward their excellence in research."

The hope is that in the future the fund will grow enough to provide additional resources, multiple awards, or other types of awards in support of student research in physical chemistry.

Warner Peticolas' wife, Virginia, expressed her pleasure at her husband being remembered in this manner. "I thought it was a very good thing to honor chemistry or physics students in this way," she says. "I think Warner would be very happy with it." ■

Alumni Achievement Award

Carol Gross Receives 2012 Award

This past spring Carol Gross was the recipient of the 2012 Alumni Achievement Award, which was awarded for the first time jointly by the chemistry and biology departments. Carol graduated from the UO in 1968 with her PhD in molecular biology, working under Professor Aaron Novick. She stayed on as a postdoctoral associate in physical biochemistry with Professor Pete von Hippel from 1969 to 1971. When she remembers that time, Carol, now seventy-one, has no hesitation about how formative it was. "I owe everything to the University of Oregon," she says. "They totally changed my life."

Carol repeats versions of this sentiment several times throughout the hour we spent on the phone talking about her receipt of the award. She has achieved considerable success in her scientific career, which she says was founded on the academic integrity of the advisors she worked with.

Biophysicist Aaron Novick (1919–2000) founded the Institute of Molecular Biology at the UO in 1959, just six years after James Watson and Francis Crick published their paper on the structure of DNA, and Carol recalls that it was "an amazing place" when she arrived here in 1965.

"The institute was a unique blend of biology, chemistry, and physics, and this nucleus of people working together in a new field that combined all three previously separate areas raised the level of everyone else at the university. This was the cutting edge of science done by a small group of people in this sort of, outpost. It was an unbelievable learning environment."

The researchers and graduate students in the institute became a close-knit group that would socialize together. Before institute members gave outside seminars, they would often try out the seminars on the institute first. Moreover, both faculty members and students would often meet for lunch.

Novick and von Hippel entertained often, so Carol had a chance to get to know the professors and their families. She recalls that George Streisinger, who pioneered the genetic work with zebra fish and has Streisinger Hall named in his honor, gave Carol her first gin and tonic. Biochemist Charlotte Schellman, wife of Professor Emeritus John Schellman, taught Carol how to make lamb in yogurt sauce.



Carol Gross

"Charlotte was a role model for me of a woman in science," says Carol. "Each person was doing amazing things and each one of them was an incredible scientist. It was a bunch of incredibly brilliant yet modest people who were really setting new directions."

When Carol first joined the institute, George Streisinger was working on trying to break the genetic code by making various mutations, and Francis Crick was also very involved in this field and often visited. "There were several times while I was a grad student that George would be discussing it with Crick," Carol says. "You can imagine what it was like to be a grad student in this intellectual ferment."

With Aaron Novick, Carol worked on in vivo applications of repression of the lactose gene. During her postdoc with Pete von Hippel, she worked on the same problem, but from a physical biochemistry perspective. After that postdoc she did a second postdoc at the University of Wisconsin with Dick Burgess, where she honed her biochemistry skills. Carol became a faculty member in the bacteriology department at Wisconsin from 1981 to 1993. During that time she studied regulatory circuits in the bacteria *E. coli*.

"I used a combination of in vivo and in vitro studies, drawn from the combined perspective of Aaron's quantitative in vivo studies and Pete's rigorous biophysical analysis, complemented with new biochemical approaches I had learned from Burgess, a savvy biochemist," she explains.

During Carol's twelve years at Wisconsin she went from assistant professor to full professor and was elected to the National Academy of Sciences and the American Academy of Arts and Sciences, along with having received many other recognitions.

After moving to the University of California at San Francisco in 1993, Carol still studied *E. coli* but with the new focus of looking at multiple outputs simultaneously.

"If you use high throughput approaches to monitor how removal of each gene in the organism alters response to stress, you can sometimes infer novel pathways that we didn't know existed, and you can study them molecularly," she explains. "We're heavily involved in that, we're at the forefront of this movement; it's a new phase. It's really exciting because it's uncovering novel connections that we never knew existed. It's a very integrated approach where it's highly computational and once the computation shows you something you have to figure out what biology to do."

"One of the things that I'm passionate about and one of those things which was promoted by my time in Eugene because of everyone involved in the political process, is access to science for all people," Carol remarks. "I'm very involved with promoting diversity in science." Carol has received an AAAS Mentor Award, and a Martin Luther King Award from UCSF for her efforts at promoting diversity.

Both of Carol's children were born in Eugene, and in fact she was pregnant when she arrived here for grad school. Her son, Steven, is now a biophysics professor at the University of California at Irvine, studying molecular motors. Her daughter, Miriam, is now a professor of modern Chinese history at the University of Oklahoma, studying rural public health. Carol also has a stepfamily that she is very close to.

Carol has no plans to retire anytime soon; she just received a new round of grants, she has new students, new postdocs, and remains excited about her research. She wrapped up the conversation by saying again how lucky she feels to have been a part of the Institute of Molecular Biology during its early years.

"The University of Oregon, the institute, and the convergence between all approaches that they have promoted ever since I've been there was really foundational to me and I would be no place without them," she says. "I was really happy to get the Alumni Award, and particularly happy that it was a joint biology-chemistry award, because that's what I learned from the University of Oregon. Integrating all of these approaches and reaching for big problems is what makes your science great." ■

Alumni News from All Over

1960s

Gordon Gribble, PhD '67, a regular contributor to our Alumni News section, received his doctorate in organic chemistry with Lloyd Dolby in the area of indole chemistry. Following a National Cancer Institute Postdoctoral Fellowship at UCLA with Frank Anet, Gribble started his career at Dartmouth College, where since 2005 he has held the endowed chair, The Dartmouth Professor of Chemistry. In 1998, three years into a project involving the synthesis and biological evaluation of hundreds of novel triterpenoids from the ubiquitous naturally occurring plant products oleanolic, ursolic, and betulinic acids, Gribble and his students synthesized "TP-155." This compound, now named Bardoxolone methyl, displays unprecedented anti-inflammatory activity and has just entered phase three clinical trials for the treatment of chronic kidney disease in patients with advanced diabetes. Bardoxolone methyl is an orally available first-in-class "antioxidant inflammation modulator" and is the most potent known inducer of the Keap1-Nrf2 pathway to enter clinical development. It works to suppress both oxidative stress and inflammation, which are responsible for several chronic diseases in addition to renal disease.

Since 1996 Professor Gribble has coedited the annual series "Progress in Heterocyclic Chemistry," and this past year he organized and edited two monographs, "Metalation of Azoles and Related Five-Membered Ring Heterocycles" and another about the chemistry and applications of indoles. With a colleague in Germany, Gribble wrote a review of "Heterocycles in Wine," and this past April he gave a plenary lecture, "Food Safety and Chemophobia," at the 2012 conference "Dose-Response: Implications for Toxicology, Medicine, and Risk Assessment" at the University of Massachusetts, Amherst. Last October, Gribble presented a lecture, "Food Contaminants and Chemophobia," at the International Conference in Amsterdam on Food Safety vs. Food Security—A Global Challenge.

Celeste Roper '62 moved to China Lake, California, after graduation, where she worked for three years as a literature chemist. She writes that she "retired" to raise two boys and returned to the Naval Air Warfare Center, Weapons Division, in 1989, this time as a general chemist in the materials branch. "Eventually, I moved to the chemistry

division and worked with the environmental issues with various missile programs to remove any chemicals that would prove harmful to the environment." She retired ("this time for real," she says) in 2002. (Lola) Celeste (Hennies) Roper was awarded the Naval Meritorious Civilian Service award for her part of the environmental program.

Lloyd "Al" West '67 worked with Donald Swinehart on gas phase thermal decomposition. He then obtained a doctorate in physical chemistry from the University of California at Berkeley in 1971 working with Gabor Somorjai in the area of surface chemistry. Following graduation he worked for Sandia National Laboratories for more than thirty-five years, first in Livermore, California, and then in Albuquerque, New Mexico. His career at Sandia started as a research chemist and he steadily progressed up the management ranks to the position of director of environment, safety, and health for a laboratory with 7,500 employees. He spent his last three years at the lab on leave to the Central New Mexico Community College (CNM) where he was the executive director of the Southwest Center for Microsystems Education, a National Science Foundation-funded regional center for Advanced Technological Education (ATE). Since he began his science career with support from the NSF both as an undergraduate and as a graduate student, this was a fitting way to conclude his career by assisting one of NSF's undergraduate programs. West retired from CNM and Sandia at the end of 1976 and now resides in Prescott, Arizona. He still works with the NSF by serving as an evaluator for several ATE grants in New York, Wisconsin, Missouri, and New Mexico. He also contributes to the University of Oregon by serving on the Dean's Advisory Council for the Robert Donald Clark Honors College.

1970s

Geoff Cooper, PhD '77, writes that it's been thirty-five years since he completed his PhD with Lloyd Dolby. "Those were good times I had in the UO graduate chemistry program, and I learned a lot from Lloyd, working on synthesis of alkaloids and prostaglandins, running the honors organic chem labs, and going on fishing expeditions," he recalls. "I've been honored to continue to enjoy Lloyd's friendship and support over the years; while I was going to law school at the UO from

2000 to 2003, he helped me out by letting me work summers doing organic synthesis at his company Organic Consultants there in Eugene."

After getting his law degree at the UO School of Law in 2003, Cooper has been working as a patent attorney in the organic molecular sciences with Schwegman Lundberg Woessner P.A. of Minneapolis, one of the leading patent law firms. He has been in Minnesota almost seven years, but now the firm has agreed to let him work in Oregon, so he and his wife, Sandie, will be returning to Oregon next month, where they will be living in Tigard. "I will still continue to prepare and prosecute patent applications for the firm, working entirely online," Cooper writes. "The Schwegman firm has pioneered the electronic docketing and desktop systems in the field of patent law, and it's paid off; we have "satellite attorneys" all over the USA. I am just so happy to be coming home to Oregon, where I plan to stay from now on. I'm proud to be a 'double Duck.'"

James "Jimmy" Roberts, PhD '77, writes that he has had a "long and fun career" since his time at the UO. Roberts was chair of neurobiology at Mount Sinai School of Medicine for fifteen years and spent the vast majority of his career as a research academic. However, four years ago he decided to "do something different" and moved to an all undergraduate institution, Trinity University in San Antonio, Texas, where he teaches neurochemistry, endocrinology, and developmental biology to college kids, and shows them how research is done in the lab. "A great way to finish off a long career," he writes. "I'm on sabbatical now at the Rosalind Franklin Medical School in Chicago doing proteomics and lipidomics (mass spec) on astrocytes and their secretions and their role in neuroprotection from Parkinson's disease. I learned science at the UO from the likes of Ed Herbert, Pete von Hippel, Frank Reithel, Ira Herskowitz, Sid Bernhard, and so on, and have Ralph Barnard to thank for teaching me how to teach students. I will forever be grateful!!"

Timothy Rolfe '75 entered Oregon as a postbaccalaureate student, and since sequencing of course work for a BS in physical chemistry was rigid, he ended up with a triple major—chemistry, computer science, and mathematics,

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Alumni News from All Over

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with a strong background in physics. All of those combined in his doctoral work at the University of Chicago for a PhD in theoretical physical chemistry studying computer simulations of molecular vibrational behavior. The MIT computer science department bought a Vax-11/780 computer in early 1983 and needed someone to coordinate preparation of the computer room, and then set up all of the internal procedures and accounting to allow users to access the computer, and Rolfe was part of the team in the chemistry department at the University of Chicago that had done that in 1980. After that experience, he writes that he chose to pursue computer science. "Computers were rather . . . larger back in 1980. The Vax-11/780 was in cabinets over six feet tall, more than a yard deep, and twelve feet or more wide," he recalls. After teaching in the mathematics and computer science department at Gonzaga University, he went to the University of Minnesota for a strong MS in computer science, and afterwards taught at Dakota State University in Madison, South Dakota, and at Eastern Washington University. As of July of 2011 he is enjoying his retirement as professor of computer science emeritus at Eastern Washington University.

Stephen Southworth '77 worked with Professor Tom Koenig synthesizing organic compounds and recording photoelectron

spectra of their thermal fragments. He completed his PhD work at the University of California at Berkeley and writes that the research there was "deep into atomic and molecular physics." Southworth has been at Argonne National Laboratory for seventeen years, working in a group using lasers and x-rays for basic atomic and molecular physics.

Ron Stenkamp '70 is currently a professor in the Departments of Biological Structure and Biochemistry at the University of Washington. He received his PhD from the UW in 1975, and after two years of postdoctoral research back east, he returned to join the research staff and faculty in Seattle. He carries out crystallographic studies of interesting biological macromolecules, including molecules such as rhodopsin and cell adhesion proteins.

1980s

After **Richard D. Ludescher** graduated with his PhD in 1984, he held a postdoctoral position at the University of Minnesota Medical School and was hired into the Department of Food Science at Rutgers, The State University of New Jersey in 1988. He is now a full professor. His research is on the physical chemistry of foods and biomaterials and the development and use of

luminescence (both fluorescence and phosphorescence) techniques to investigate their physical properties. Ludescher's current projects focus on studying molecular mobility in amorphous solid carbohydrates and proteins and on the development of novel luminescent nanoparticles as sensors for foods. He was appointed Cook Campus dean for undergraduate education in fall 2006. He has also won numerous awards for teaching at the department, college, university, and national level.

On July 1, 2011, Ludescher was appointed dean of academic programs at the School of Environmental and Biological Sciences at Rutgers (sebs.rutgers.edu/administration/personnel.asp#2), where he remains a professor in the Department of Food Science. Ludescher tells us more about his work: "As academic dean, I am responsible for approximately 3,500 undergraduate students majoring in twenty-five applied science and social science programs offered by the School of Environmental and Biological Sciences and allied schools at Rutgers, as well as approximately 600 graduate students enrolled in twelve graduate programs. These responsibilities cover academic courses and graduation requirements, budgets, and other administrative issues. Even with these extra administrative responsibilities, I maintain a research program investigating the physical properties of amorphous biomaterials and developing novel luminescence probes of the stability and quality of foods and food ingredients. I am also, along with my son, learning about whitewater rafting and kayaking.

Paul Yager, PhD '80, is currently chair of the Department of Bioengineering at the University of Washington, where he's been teaching and doing research since 1987. Paul's research interests include microfluidic devices for chemical and biochemical measurement, development of point-of-care diagnostic instruments, microfabrication technologies for microfluidics, and development of microfluidic-specific methods of analysis of biological samples.

The latest big push in the Yager lab is development of extremely low-cost microfluidics point-of-care diagnostic devices based on paper. The latest can be found at the Microfluidics 2.0 website (www.mf20.org). Please visit faculty.washington.edu/yagerp for more about Paul's research in microfluidics.



The chemistry department participated in the UO's Gold Medal Games, held during the summer 2012 Olympic track and field trials in Eugene. The event offered activities such as this demonstration of "oobleck"—a non-Newtonian liquid made from a mixture of cornstarch and water.

CONTINUED ON NEXT PAGE

1990s

Django H. Andrews '99 received a chemistry PhD from the University of Colorado in 2006 (at JILA with W. Carl Lineberger) and a JD from the University of Colorado in 2009. Andrews and his family recently relocated back to the West Coast, where he now practices patent law in San Francisco and Silicon Valley with Squire Sanders (US) LLP. Andrews writes that he is happy to speak with UO alumni and current students about using a chemistry degree outside of science, if that would be of interest to anyone.

Jeff Choate '99 didn't take the career path he intended. In fact, he says, it has "been anything but traditional." After graduating, he worked as a horticulturist for the Douglas County-Oregon State University (OSU) Cooperative Extension Service for about a year before enrolling in graduate school at OSU where he completed an MS in soil science in 2003. His intent was to return to work for the Extension Service, but budget cuts resulted in part-time, nontenure-track positions, so he started work on a PhD in soil science at the University of California at Davis. Jeff writes that he chose to leave Davis without completing a degree and returned to Springfield, Oregon, where he took a job at Jerry's Home Improvement Center. "I am currently the training manager at Jerry's," he says. "Fortunately, I've found opportunities to use my chemistry background along the way. My undergrad work in chemistry was excellent preparation for my graduate work in soil science, which focused on soil phosphorus chemistry. At Jerry's, I continue to use my chemistry background for subjects such as pesticides, fertilizers, and HAZMATs."

Matt Fry '93 sent us an update for last year's newsletter, in which he wrote about his career at Cell Signaling Technology in Boston, Massachusetts. After starting off his career as a group leader in the production department, he was promoted to head of the department, and later was promoted to director of products. He and his wife have also been expanding their family and now have a four-year old daughter named Kayla as well as daughter, Maria, who was born in May 2011. It has now been more than ten years since Matt and his wife moved to the Boston area and he says they are still busy and happy with their success there, although they miss



Gold Medal Game participants got to enjoy a variety of explosive demonstrations.

the Northwest but make it back from time to time to visit family and friends.

This year, Fry writes, "My career and role here with CST continue to grow with the company, which I feel very fortunate to be a part of. The Boston area continues to be an important hub for biotechnology and my degrees from the UO have certainly helped me take advantage of this and I am grateful for that." In noncareer-related news, Fry also writes that he has a much better chance of watching Oregon Duck football games on the East Coast, now that the nation has taken more notice of our hometown team!

Bradley Gardiner '96 graduated from Uniformed Services University School of Medicine in 2001. He traveled around the world as an Army Flight Surgeon and Public Health Officer. Gardiner's assignments included Korea, Germany, Afghanistan, and Iraq, Fort Lewis, Fort Knox, and Central Command in Florida. Brad writes that he is currently getting out of the military and looking for a place to live in southern Oregon.

Sergio Gurrieri, MS '92, PhD '94, earned his degrees in biophysical chemistry, following a BS in biophysical chemistry from the University of Catania in Italy in 1989. After graduating, Gurrieri returned to Italy where he enjoyed prestigious positions as a consultant and more than five years as a staff scientist at the Italian National Research Council in Catania. In 2000 he returned to the United

States as a visiting scientist at the University of California at Davis. He stayed in California and worked as a research and application scientist at Clontech and later, at Invitrogen.

After working as a senior scientist for Invitrogen, Gurrieri became their marketing manager. That led him to other marketing positions within the science world. In 2009, he began his own life sciences and biotechnology consulting company called SG Consulting. Since July 2011 Gurrieri has also been an investor and business advisor at Tech Coast Angels (TCA) in San Diego, California. Tech Coast Angels is the largest network of angel investors in the U.S. comprising five chapters and more than 300 members located across southern California. TCA supports early-stage entrepreneurs to turn game-changing ideas with high growth potential into successful, sustainable, and scalable businesses. TCA provides financial support, knowledge, coaching, and operational assistance. Gurrieri's primary focus is on biomedical technologies and life sciences companies. He is member of the biotech-biomed screening committee.

Geoff Lowman '98 finished graduate school at the University of California at Santa Barbara (PhD, 2003), completed a two-year postdoctoral appointment at MIT (Department of Chemical Engineering), and worked for the Department of Commerce at the National

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Participants from around the country enhance their green chemistry lab skills in the twelfth annual Green Chemistry in Education Workshop held in July at the UO.

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Institute of Standards and Technology (NIST) under a National Research Council Postdoctoral Fellowship. After moving back to Boston, Geoff began a career in industry at a start-up called Helicos Biosciences Corporation working on single-molecule DNA sequencing and eventually made the move back to the West Coast, where he now resides in Carlsbad, California. There, he is currently a staff scientist at Life Technologies, working on ion torrent semiconductor-based DNA sequencing technology. He writes that he has a lovely wife, Juliet, and two children, Sophia and Asher.

Nabil Mistkawi '93 earned his BS in chemistry and biochemistry from the UO and went on to earn his PhD in physical chemistry and materials science from Portland State University in 2010. Mistkawi has had some unique success since graduating from the UO. He writes that his contribution to science, the environment, and the Oregon economy were cited and recognized by President Obama and Governor Kitzhaber during President Obama's speech in Hillsboro, Oregon, on February 18, 2011, in the last four minutes of the speech. (View the video of the speech at www.whitehouse.gov/photos-and-video/video/2011/02/18/out-educating-competition). Mistkawi has worked as a microprocessor researcher and developer for eighteen years, and President Obama acknowledged his contributions to the company in his speech by saying, "During that time, Intel was trying to find a faster, more efficient way to process their microchips, but nobody could figure it out. And they asked at least eight other companies and research labs for help. Some said it couldn't be done. Others worked on it for nearly a year with no success. And so they asked Nabil if he wanted to give it a shot. Within three days—three days—he came up with a solution that is now saving this company millions of dollars a year."

Mistkawi's academic and professional accomplishments have been featured in the *Oregonian* (www.oregonlive.com/business/index.ssf/2010/09/partners_intel_covers_employee.html) and in several additional regional publications. He is the 2010 recipient of the Innovation in Technology Award sponsored by the Western Association of Graduate Schools and University Microfilms International (WAGS/

UMI). His dissertation was one of three selected out of hundreds across U.S. and Canadian universities to receive this award, and he was featured in a documentary produced by Intel Corporation in 2012. Mistkawi holds fourteen patents and has published several papers. He received the Portland State University Outstanding Young Alumni Award in 2011 and the Paul Emmett Achievement Award for Academic Excellence in 2009. Mistkawi is the recipient of two Intel Global Environmental Awards for inventing environmentally friendly chemical formulations for the semiconductor industry. He has earned numerous Intel awards in innovations and process technologies used in various Intel manufacturing processes and microprocessor products.

2000s

Jared Ford '02 went to Arizona and became a police officer after graduation. He writes that he pursued this route in order to work his way into the field of forensic science. After being a police officer for three years, Jared was hired by the Oregon State Police Forensics Division as a firearms and tool marks examiner. Two years into his career he was also trained as a crime scene investigator. After a total of six years as a forensic scientist working for the Oregon State Police he was promoted to director of the Central Point Laboratory. "I am also the president of the board for a nonprofit corporation I started called Central Oregon Desert Racing Association (CODRA) where we raise money for schools in struggling rural Oregon towns by promoting off-road racing events," Jared writes. "I currently reside in Grants Pass, Oregon, with my wife Jaymi of seven years and two beautiful children Isabella (4) and Logan (1)."

Ying Lin, PhD '07, studied synthetic molecular motors with advisor Bruce Branchaud and is now a chemistry reviewer at the Division of Dietary Supplement Programs, Center for Food Safety and Applied Nutrition, U.S. Food and Drug Administration in College Park, Maryland, reviewing premarket notifications for new dietary ingredients.

Gary Succaw, PhD '04, studied with Kenneth Doxsee. He writes that he has moved to Havre, Montana, where he accepted an associate professor of chemistry position at Montana State University-Northern. ■

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Sarah Brady, left, and Chantal Balesdent, right, at one of the Gold Medal Games demonstration tables. During the games, participants visited various locations on campus for demonstrations and activities to receive stamps. A full stamp card earned a replica gold medal.

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