



Message from the Chair



Chemistry overcomes fire - No doubt you have noticed that our newsletter has been published later than normal this year. We normally finish up the editing process and publish in late August and early September, but a serious setback interrupted the process this past August.

On August 24, 2015, a spill of flammable solvent ignited in CB370, the large organic chemistry research lab on the third floor, causing a small but intense fire. We are thankful that there were no injuries. All of the faculty and students evacuated quickly, and the Bellingham Fire Department responded within minutes. Three sprinklers in CB370 deployed, knocking down the fire and essentially extinguishing it by the time the fire fighters made entry, save a few smoldering cardboard boxes.

While the firefighters were still in the building, WWU Facilities managers were in contact with Belfor, a property restoration contract firm and arranged for them to be on site the next morning to assess the damage and create a plan for cleanup and reconstruction. Smoke and soot damage was largely contained to room CB370. Although the damage from the actual fire was relatively minor, water damage from the sprinklers was extensive. Water entered most of the laboratories and offices on the third floor and seeped down to involve labs and offices on the second floor as well.

I am happy to say that quick work by Belfor, University Facilities, and key staff members allowed an amazingly smooth drying and repair process. Offices and labs were ready for occupation prior to the start of fall quarter classes, less than one month after the fire. Many thanks to all those that helped get the building back in good operating condition! Special recognition is owed to Gary Carlton, Hla Win-Piazza, Carrie Annett, Stacey Maxwell, and Steve Sible for their efforts during this period. Students returning at the end of September, unless they followed Bellingham news, had no idea a fire had even occurred.

On a happier note, we have some new faculty and staff again this year. Margaret Scheuermann and Marc Muniz joined us as assistant professors. Margaret's arrival increases the size of the inorganic division from one to two, and Marc Muniz similarly doubles the size of the chemical education group. In addition to advanced inorganic chemistry, Margaret will teach the physical/inorganic labs and a general chemistry section this year. Marc is teaching in the general and physical chemistry courses in addition to his science education assignments. New non-tenure track faculty members are Gee McGrew and Maraizu Ukaegbu, and Sam Danforth (MS 2015) has filled the instrument specialist position. We were sorry to lose Tommaso Vannelli and Tony St. John, but wish them well in their new permanent positions at Whatcom Community College and Skagit Valley College, respectively.

Inside:

Department Donors	2
Alumni Spotlight	4
New Faculty and Staff	5
Pauling Symposium	8
Faculty Sabbaticals	9
Faculty Awards and Distinctions	11
Grant Funding	13
Faculty Publications	17
2014-2015 Awards	18
2015-2016 Scholarships	19
Outstanding Graduate	20
2014-2015 Graduates	21
Scholars Week 2015	22
Chem Club	24
Department Picnic	25
Conference Attendance	26

Our enrollments continue to be high, and this year we are offering two sections of the entire physical chemistry series and two sections of advanced inorganic chemistry. We strive to continue offering our students an outstanding education and research opportunities in the face of these enrollment increases. The department had another successful year with respect to external grants that will continue to provide the student research opportunities we are known for. I hope you enjoy reading about the accomplishments of our students and faculty in the following pages.

Cheers, Jim Vyvyan



Thank You to Chemistry Department Donors

We wish to extend a special thank you to the following alumni and friends of the department who donated to Chemistry Department Western Foundation funds from July 2014 through September 2015.

Our program has grown, and your donations are more crucial than ever. Our Foundation funds support a variety of activities including student scholarships and academic awards, undergraduate summer research stipends, student travel to conferences, department seminars, equipment purchase and repair, and events for department majors and alumni. We need and appreciate your support!

If you would like to make a gift, please visit the website: www.foundation.wvu.edu or call (360) 650-3027.

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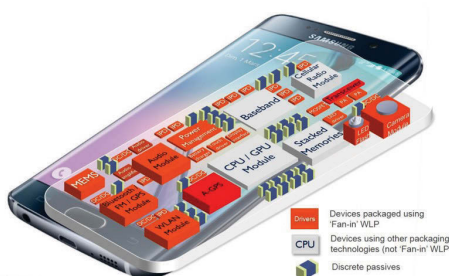
Chemistry Careers From the Front Line: The Semiconductor Industry

I am excited for the opportunity to share some of my career highlights since graduating from Western Washington University with both a bachelor's and a master's degree in chemistry; 1999 and 2001, respectively, with focused research under the mentorship of Dr. David Patrick. I got my start in the semiconductor industry as a process engineer at the end of 2001. I have never looked back. Little did I know from growing up in Tacoma and finishing college in Bellingham that the semiconductor industry had such a large infrastructure. There are definitely some familiar companies who design and sell central processing units (CPUs) including Intel and AMD, but the semiconductor industry is much larger than just the central processors. There are hundreds of device manufacturers, chemical and part suppliers, tool manufacturers, analytical and reliability labs, wafer foundries, and outsourced semiconductor assembly and test (OSAT) companies. Every one of these different areas can benefit from hiring a skilled chemistry graduate on their team. As a chemist, we have a foundation of solid skills that includes an understanding of chemical interactions, critical thinking, logical problem solving, and willingness to tackle difficult problems.



Doug Scott

My first job in the semiconductor industry was at Tokyo Electron Ltd (TEL), one of the leading suppliers of wafer processing equipment used in photolithography. Photolithography is the process used to make the circuitry on semiconductor wafers to allow for functionality. This functionality includes Bluetooth, near field communication, MEMS microphones, power converters, and image sensors along with CPUs. TEL is only one of many tool suppliers and generated about \$6 billion in revenue last year. After 4 years and 4 promotions at TEL, I transitioned to another company, FlipChip International, a leader in device packaging technology. Their technology is used to facilitate the attachment of functional semiconductor devices onto the final circuit boards. If one were to open up a cell phone for example, one will find a main circuit board with 50+ devices attached (see below). All of these devices need to be "packaged" to allow for the eventual circuit board attachment. The semiconductor packaging industry is generally outsourced by device manufacturers, collectively referred to as the OSAT industry. OSAT companies generate over \$30+ billion dollars in revenue per year. During 10 years at FlipChip, my work ethic, technical understanding, and leadership were recognized with a total of 9 promotions including Senior Director of Engineering. Beginning in 2015, I transitioned to a larger OSAT company known as Amkor Technology, one of the top 2 OSAT's in the world. My current title is Director of Wafer Level Packaging which involves a wider range of responsibilities in many different countries.



WLCSP penetration status in mobile platforms
(Source: Fan-in Wafer Level Packaging: Market and Technology Trends report, Yole Développement, May 2015)

Reflecting back at my journey so far, my ascent in the semiconductor industry has been exciting. I am thankful for the foundation of skills afforded by my training and mentoring by excellent professors at WWU. My advice to future chemistry graduates includes leveraging your solid scientific background and thought processes, logically finding solutions to problems, and knowing you will often work more than some consider normal business hours. I have heard this saying "don't work harder, work smarter". I have found if one works harder AND smarter, you can really realize success. The semiconductor industry like many other industries has a large supply chain and many avenues of entry. Although the job market is extremely competitive, do the background research, get an internship if possible, and show the organization you are targeting that you can add value to their company. WWU certainly offers exceptional scientific training; the rest is up to you. Good luck!

-Doug Scott



New Faculty and Staff

Marc Muniz joined the Chemistry and Science Mathematics and Technology Education (SMATE) departments in fall 2015 as an assistant professor. Marc grew up in New Jersey and attended Montclair State University where he received a BS in Chemistry, with a minor in mathematics, in 2009. As an undergraduate, he became interested in pursuing his interests in physical chemistry and science education. This ultimately led him to graduate studies at North Carolina State University, where his doctoral dissertation in chemistry education research focused on the development and assessment of analogical instructional materials in nanochemistry. After completing his PhD at N.C. State in 2014, he moved on to postdoctoral work at the University of Iowa. At Iowa, Marc worked on a project to develop and assess the efficacy of pre-lab instructional videos that were implemented in a physical chemistry laboratory course.



Marc Muniz

Marc's current research interests are primarily in the area of addressing students' generation of and interaction with multiple representations and models in upper division chemistry courses—particularly in the physical chemistry sequence. He is greatly looking forward to establishing a vibrant research group dedicated to making meaningful contributions to the body of knowledge in the area of chemistry education research and how this can inform practice in the classroom. Marc looks forward to engaging student researchers at Western in this process of discovery, as well as forming diverse collaborations with colleagues at WWU and other institutions.

When he is not pondering interesting questions concerning the teaching and learning of chemistry, Marc enjoys perusing the stacks at libraries and various independent bookstores for interesting reading material across a wide range of topics. He also enjoys playing board games, including Euro games, as well as some PC and "old school" console video games. His wife Tamera, new daughter Sierra (born December 2015!), their three cats (Roxie, Missie, and Erwin) and dog (a black lab named Sydnie), are happily settling into life in Bellingham.



Margaret Scheuermann

Margaret Scheuermann joined the Department of Chemistry in the autumn quarter of 2015 as an assistant professor. Her research interests are in the area of organometallic chemistry which lies at the interface of inorganic and organic chemistry while drawing on principles of physical chemistry.

A native of New York State and Yankees fan in remission, Margaret first ventured west as an undergraduate attending Scripps College in Claremont, CA. Her interest in science evolved into an interest in chemistry when she took on an undergraduate research project. In addition to undergraduate research at Scripps College, she spent summers working in labs at the University of Washington and the University of Edinburgh.

Margaret went on to graduate school at the University of Washington where her research focused on understanding how metal-containing molecules react with oxygen. She also spent four months as a visiting researcher at the University of Oslo learning about gold reactivity, computational chemistry, and cross country skiing. After earning her PhD, Margaret worked as a postdoctoral research associate at Princeton University studying cobalt catalysts.

When she isn't working, Margaret enjoys reading and exploring the great outdoors.



New Faculty and Staff (cont.)

Maraizu Ukaegbu joined the Department of Chemistry in July 2015 as a visiting assistant professor. He grew up in Nigeria and attended the University of Ibadan, Nigeria, where he earned a bachelor of science in industrial chemistry. As an undergraduate student at the University of Ibadan from 2003 – 2007, he discovered his passion for scientific research during his industrial training program at the Cocoa Research Institute of Nigeria.

Maraizu pursued his passion for scientific research at Howard University, where he worked in the Raman Research laboratory of Dr. Charles Hosten, his PhD Advisor. He earned a PhD degree in analytical chemistry. As a graduate researcher, he discovered his passion for spectroscopic and nanomaterials research and engaged in active research employing FT-IR, Raman and SERS spectroscopies, computational methods (DFT and PED), and electrochemistry. Maraizu's research focused on interfacial phenomena, which involved investigating the orientation of molecules adsorbed onto the surface of nanomaterials. Part of his research focused on synthesis and characterization of nanomaterials (gold and silver nanoparticles, graphene). In addition, Maraizu collaborated with scientists from the US Naval Research Laboratory located in Washington, DC. He also collaborated with research chemists in the Department of Chemistry, and pharmacist and research scientists from the College of Pharmacy and Medicine at Howard University. He was also a visiting researcher at the University of Maryland, College Park.

He is happy to be part of the Department of Chemistry family. One of his hobbies is meeting and interacting with students from diverse backgrounds. He enjoys studying, cooking, listening to music and playing soccer.



Maraizu Ukaegbu

Gee McGrew joined the department as a lecturer in the fall of 2015. Leaving Tacoma, WA for sunny Los Angeles, Gee attended the University of Southern California (USC) for a bachelor's degree, graduating as a Renaissance Scholar Prize Winner for majoring and minoring in too many fields of study (including chemistry). G's chemistry interests started with organic synthesis and catalysis, with research in electro-optic dendrimers at the University of Washington, and late transition metal catalysts for C–H bond functionalization at USC.



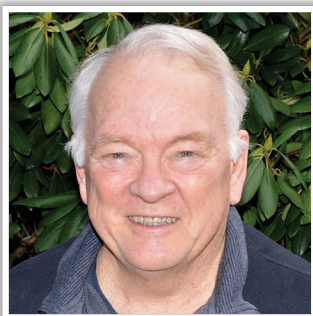
Gee McGrew

At the University of Pennsylvania in not-actually-always-sunny Philadelphia, Gee pursued a graduate degree in inorganic and organic chemistry. G initially dabbled in chiral lanthanide complexes before starting up a fresh branch of organometallic research, stereoselective deprotonative cross-coupling (DCC) reactions, in their graduate lab. After some postdoctoral research in CO₂ activation and work as an inorganic chemistry lecturer and NMR manager at the University of Vermont in Burlington, Gee is excited to return to the glorious Pacific Northwest and join the Western community.

G's non-chemistry interests include race, gender, and sexual minorities in society; increasing the accessibility of DIY and "maker" technology for youth and marginalized groups; skin care formulations; music; and scientific graphic design. You might have a textbook with G's cover art on your bookshelf right now. Gee prefers gender neutral (G/G's; they/them/their) and masculine pronouns.



New Faculty and Staff (cont.)



Steve Sible

Steve returns to our department as our fiscal technician. He has worked the last three years at the Research Sponsored and Programs Office as a fiscal analyst. Prior to that he was the Chemistry Department fiscal technician from February 2010 to July 2012. Before coming to Western, Steve was the chief financial officer for Industrial Credit Union here in town. His educational background includes a BS in business from Colorado State University and a MBA from the University of Colorado. Steve and his wife Kathy have been Bellingham residents for over 25 years. They have two children who have blessed them with five wonderful grandchildren.

Steve's hobbies include reading, jogging, traveling, and attempting to master the game of golf. Steve says, "It's really great to be back in the Chemistry Department. Everyone has been very welcoming and supportive - it's like I never left!!! I thoroughly enjoy working with the faculty and students and look forward to many more enjoyable years with all of you here at Western!"

Jennifer Griffith joined the department in September 2014 as an instructor, teaching classes in both general and organic chemistry. Jennifer is a Western alum, obtaining a bachelor's degree in chemistry and a master's degree in organic chemistry under Prof. James Vyvyan. In 2007 Jennifer moved to Vancouver, BC to attend the University of British Columbia where she completed a PhD in bioorganic chemistry under Prof. Martin Tanner.

During her graduate studies at UBC, many people would ask Jennifer what she wanted to do after graduation. Her response was always, "teach chemistry at Western". She is thrilled to be living out that dream. Jennifer currently lives in her hometown of Arlington, WA with her husband and two-year-old daughter, Gracelyn. The family enjoys hiking, biking, and watching football.



Jennifer Griffith



Amy Cully

Amy Cully returns to the Chemistry Department as the general chemistry lab coordinator after spending over five years teaching at community colleges in Washington state. She is a graduate of WWU's Chemistry Department, earning both BS (2007) and MS (2009) degrees (as Amy Gaudette). Amy is excited to be back at WWU utilizing her experience with instruction and attention to detail to provide an amazing and memorable lab experience for WWU students.

Amy has been married for nearly four years to Robin Cully, and they have a two-and-a-half year old girl named Adelaide. As a family, they try to get outdoors to enjoy the views the Pacific Northwest has to offer. She has lived in Skagit County her entire life except for her time as a student at WWU. She is excited for what she can bring to the department and to learn the art of snow shoeing this winter.



WWU Chemistry Department Hosts 2014 Linus Pauling Symposium

On October 11, 2014 students, faculty and friends from Western Washington University and the region had the opportunity to celebrate the 2014 Linus Pauling Award given to Professor Stephen L. Buchwald. The Pauling medal recognizes outstanding achievement in the field of chemistry and is given by the American Chemical Society. For Prof. Buchwald's "outstanding contributions to chemistry meriting national and international recognition," he was honored with the presentation of the award, a symposium and banquet - all of which were hosted by Western Washington University.

The ceremony was held in the Viking Union Multipurpose Room and included research presentations by Prof. Melanie Sanford (University of Michigan), Phil Baran (Scripps Research Institute) and David Nicewicz (University of North Carolina). Prof. Buchwald provided a plenary research lecture at the symposium and also provided a banquet presentation on perspectives for his field of research. Approximately 120 people attended the symposium, which also included research posters by students from Western and neighbouring institutions. Approximately 80 people attended the banquet and dinner where Prof. Buchwald was presented with the Linus Pauling Medal.

The Puget Sound section of the American Chemical Society donated the largest portion of the funding used for this event, and corporations such as BP and Strem Chemicals also contributed funding.



2014 Linus Pauling Medal Recipient
Prof. Stephen Buchwald (MIT)



Prof. Buchwald poses with symposium organizers / WWU chemistry faculty John Gilbertson, David Patrick, and David Rider. Also pictured are regional ACS president Despina Strong, Sean Muir (ACS Chair Oregon Section), and Tom Wilson (ACS Portland Section)



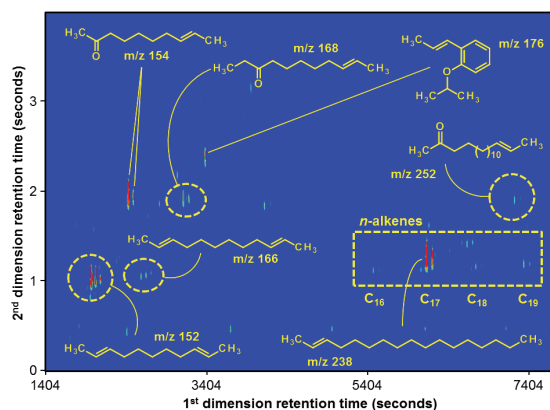
Over 80 attendees from WWU and the regional scientific community gathered to hear guest lectures and to honor Prof. Buchwald.



Faculty Sabbatical Highlight : Greg O'Neil

Prof. O'Neil spent fall and winter quarters as a visiting scientist at the Woods Hole Oceanographic Institution (WHOI) in the lab of Chris Reddy (Senior Scientist, Department of Marine Chemistry and Geochemistry). The majority of his time was spent completing experiments related to one aspect of the O'Neil lab's ongoing research related to algal biofuels. Specifically, Prof. O'Neil developed a method for the coproduction of biodiesel and jet fuel using two different classes of lipids extracted from an industrially harvested algae *Isochrysis*. Biodiesel is made from traditional fatty acids, whereas the jet fuel is produced from a unique suite of lipids known as polyunsaturated long-chain alkenones biosynthesized by *Isochrysis* and a few other taxonomically restricted algae such as *Emiliania Huxleyi*. Alkenone structures are characterized by a very long hydrocarbon chain (36-40 carbons, approximately twice as long as fatty acids), *trans* non-methylene interrupted double bonds, and termination in a methyl or ethyl ketone. Conversion of alkenones to jet fuel range hydrocarbons (C9-C16) was accomplished by olefin metathesis with 2-butene ("butenolysis"). The resulting complex mixture of products was analyzed using comprehensive two-dimensional gas chromatography (GC×GC) housed in the Reddy lab. GC×GC uses two serially joined columns to achieve higher resolution and allow for the separation of compounds based on two physical properties (e.g. boiling point and polarity). This technique allowed for the complete characterization of their alkenone butenolysis mixture (see below), and the data was included in a manuscript recently published in the ACS journal *Energy & Fuels* (O'Neil et. al 2015). Reddy and O'Neil also wrote an article for the magazine *Oceanus* (<http://www.whoi.edu/oceanus/feature/jet-fuel-from-algae>), and their work was featured as WHOI's "Image of the Day" (2/4/2015, <http://www.whoi.edu/image-of-day/two-for-one>).

While at WHOI, Prof. O'Neil also became involved in Dr. Reddy's ongoing research related to the Deepwater Horizon oil spill that occurred in the Gulf of Mexico in 2010. Over the course of 3 months (4/20/2010 – 7/15/2010) nearly 5 million barrels of oil leaked from the Macondo Well (MW) into the Gulf. Remnants of that oil persist in coastal areas, and the Reddy lab has been interested in characterizing the nature of this weathered oil not only as it relates to concerns such as toxicity, but also to better understand the complex processes associated with oil degradation in the environment. Previously, the Reddy lab had demonstrated that a newly formed oxygenated fraction had been created upon MW oil weathering (see Aeppli et al. *Environ. Sci. Tech.* **2012**, 46, 8799-8807). However, the exact nature of this oxygenated material (e.g. specific oxygen-containing functional groups present) was not known. As an organic chemist with training in synthesis, O'Neil approached this problem by performing reactions (e.g. reductions/oxidations) on weathered oil samples and monitoring bulk changes. To do so, O'Neil travelled to Fort Morgan, AL to collect oil-containing "sand patties". This work is ongoing and has yielded some important insights that they hope to publish soon.



Two-dimensional gas chromatography reveals the details of catalytic conversion of algal lipids into hydrocarbons for jet fuel



Prof. O'Neil gathers oil-contaminated sand from the Gulf of Mexico coast of Alabama to assess the lingering impacts of the Macondo Well oil spill.

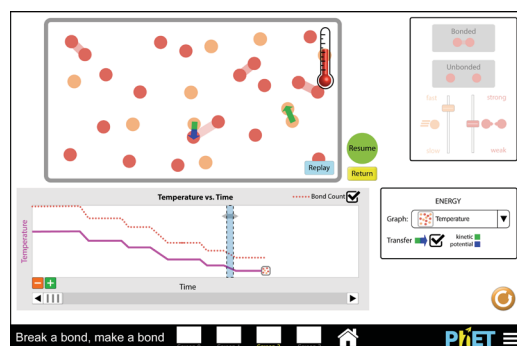


Faculty Sabbatical Highlight : Emily Borda

During the 2014-15 academic year, I took a two-part sabbatical that has informed my work as a professor of chemistry and science education. As a jointly appointed faculty member in chemistry and Science, Math, and Technology Education (SMATE), I have the privilege of regularly teaching future teachers. Although I have some knowledge of various K-12 teaching contexts from teachers I've worked with, I have never taught in a K-12 classroom myself and thus have limited knowledge about the context into which many of my students are heading. Therefore, during fall quarter 2014 I entered into a partnership with Miguel Boriss, a teacher at Fairhaven Middle School. There I observed, and sometimes taught, science lessons to eighth graders. My goals were twofold: First, and most importantly, I really wanted to get an "on-the-ground" sense for what it is like to be a K-12 teacher. Secondly, I wanted to get a sense for how students develop mental models of matter involving small particles, since this idea is typically first introduced in middle school.

As I expected, my middle school experience was more of an education for me than it was for the students. I learned how frenetic the pace of a middle school classroom can be, with four periods in one day and scant time to plan and regroup in between. However, I enjoyed the opportunity to try things a bit differently from period to period and felt myself yearning for the opportunity for this type of real-time instructional improvement when I came back to teach chemistry at WWU the following quarter. I also witnessed varied instructional strategies aimed at formatively assessing and responding to student thinking, some of which I'm excited to try to adapt to both my chemistry and SMATE teaching contexts. Finally, as I witnessed students developing their ideas about the small particle nature of matter, I became aware of just how differentially these ideas develop from student to student, as well as some of the common difficulties. Issues of scale, as well as connecting submicroscopic models to macroscopic observations, were particularly challenging for many students. Because I scanned much of the student work around small particle models, I now have a real set of student artifacts my future SMATE students can analyze and practice their response. In fact, I had students in my chemistry science education class do this during winter quarter 2015 when I was back teaching. I think this experience added a new and important dimension to their learning as future teachers.

During spring 2015, I took quite a different sabbatical, working with Drs. Emily Moore, Kathy Perkins, and others in the Physics Educational Technology (PhET) group at CU Boulder to develop an educational simulation. One of the most tenacious misconceptions students have with when learning chemistry is the idea that "bond breaking releases energy," and "bond formation takes energy," when really it is the other way around. I believe (as do other chemistry education researchers) one of the reasons this misconception is so frequent and so stubborn is because thermodynamics is most often taught, at least in general chemistry, on the bulk, or macroscopic, level. The relative absence of a small-particle model to explain energy changes in chemical reactions leaves students with few tools to reason through the relationship between energy and bonds. I therefore decided to partner with the PhET group, part of the Carl Weiman Science Education Initiative (SEI), the premier group for developing educational simulations for science, to develop a simulation that will function as a virtual small particle "laboratory" for students to explore the relationships between chemical bonds and energy (see inset image). This project is ongoing - one of the things I've learned is there is a lot more to the design of a simulation than I originally imagined. One has to balance user-friendliness against richness and complexity, authenticity against clarity, and often, one learning goal against another. Although this simulation will take a fair amount of additional time to develop (look for it in two years or so), it has caused me to think differently about my own instruction, in which I often have to balance some of the same tensions.



A new simulation designed by Prof. Borda could correct persistent misconceptions held by chemistry students

-Emily Borda



Faculty Awards and Distinctions

Smart Solar Window Team Wins P3 Award at National EPA Competition

In a visit to campus on May 1, Senator Maria Cantwell toured chemistry professor David Patrick's research lab, where she met with members of the Smart Solar Window team, a group that is developing windows for commercial buildings able to harvest UV sunlight and produce electricity. The team, consisting of students from Chemistry, Engineering, Design, Business, and Marketing, has been making waves with their window prototype, which they demonstrated to Sen. Cantwell. The team recently took part in an EPA-sponsored competition in Washington, DC, winning \$75,000 to support further development of the concept. They have also participated in several business plan competitions over the last two years, earning a total of \$25,000 so far, including \$5,000 at the University of Washington Business Plan Competition, where they were awarded the Wells Fargo Green Energy Prize. Patrick, along with marketing professor Ed Love serve as advisors to the team. Patrick says, "This is a group of very talented students who are taking meaningful steps toward making cities and communities more sustainable. Along the way, you have chemistry and engineering students learning to collaborate with design, policy, and business students, together developing a true interdisciplinary understanding of energy business, science, policy, and technology."



Senator Maria Cantwell tours the Karen Morse Chemistry Building and meets with the Smart Solar Window Team (May 1, 2015)

Chemistry Faculty Named Cottrell Scholars

Six faculty members from Western Washington University's Department of Chemistry were named Cottrell Scholars by the Research Corporation for Science Advancement (RCSA) on April 20, 2015. The faculty members named scholars are Mark Bussell, John Gilbertson, Janelle Leger, Greg O'Neil, David Patrick, and James Vyvyan. This award recognizes the commitment of Western faculty members to integrate their research and teaching and the quality of their work with students. Currently Western has more Cottrell Scholars than any other masters-granting university in the country, and the same number of scholars as the California Institute of Technology and Columbia University.

"We are very honored here at Western to have so many Cottrell Scholars. This is a tremendous achievement and an indication of the outstanding quality of our faculty and the leading-edge research they conduct with our students," said Catherine Clark, Dean of Western's College of Science and Engineering.

The RCSA has been recognizing the development of outstanding teaching in U.S. colleges and universities for more than 20 years, and has historically been a strong supporter of undergraduate research at WWU. The Cottrell Scholar Awards support the start of long-term, sustainable programs of research and also encourages early career faculty at research universities to conduct both high-quality research and educational activities.



Faculty Awards and Distinctions (cont.)

Chemistry Faculty and Graduate Student Honored with Mentoring Award

Western Washington University Professor of Chemistry David Patrick and graduate student Ryan Sumner of Vancouver were awarded the first Arlan Norman Award for Excellence in Student Mentoring on May 12. Arlan Norman was the founding dean of the College of Sciences and Technology at Western (now the College of Science and Engineering). The award recognizes a College of Science and Engineering faculty member for excellence in mentoring student research, with preference given to graduate research. It also provides a large stipend to support the summer research of a student selected by the faculty mentor. Said Patrick, "I know of no other university where the faculty and staff are more committed to helping students grow both as professionals and individuals, as here at Western. To be associated with this recognition honoring Arlan – who as dean was a valued mentor and role model to so many, including me – is really humbling."

Sumner is a graduate student in Chemistry developing new solar concentrators aimed at lowering the cost and increasing the efficiency of solar energy, and is a member of the award-winning WWU Smart Solar Window team. Support provided by the Arlan Norman award will enable Sumner to work full-time on his project during the summer. Sumner served in the U.S. Army in Iraq and earned his bachelor's degree from Western. "I would like to thank Arlan Norman for this amazing opportunity. I'm very appreciative of Western and all it has to offer. I enjoy my research because it has allowed me to expand my chemistry skills and knowledge as well as contribute to advancements in science," said Sumner.

WWU Chemistry Department Newsletter #16 was produced by:

John Antos (chair): writing, editing, layout, photography

Sal Russo: writing, editing

Amanda Murphy: layout, editing

74	183.85	99	(252)	52	127.60	86	(222)
W	Es	Te	Rn				
Tungsten	Einsteinium	Tellurium	Radon				

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External Grant Funding 2014-2015

Congratulations to the following chemistry faculty members who were awarded research grants in 2014-2015. ***This year our faculty members (along with some collaborators) brought in over \$2.0 million new research dollars to WWU to be spent over the next 3-5 years.*** This funding is critical to the growth of our department, and as detailed below includes funds for the acquisition of modern instrumentation and provides countless opportunities for students both on and off campus to participate in cutting-edge research. A summary of the projects and awards that received funding are given below.

Research Experience for Undergraduates (REU)

The NSF-funded Research Experiences for Undergraduates (REU) program in the WWU Chemistry Department recently received a second three-year round of funding (\$270,000 over three years). This effort was spearheaded by **Clint Spiegel** and **Greg O'Neil** and involves participation from numerous chemistry faculty. The purpose of the Chemistry REU program is to give undergraduates from around the country the opportunity to gain authentic research experiences. The program funds eight students each summer with a stipend and living expenses. The Chemistry REU program specifically emphasizes students from community colleges and small four-year universities that do not have access to research. Each year, the REU grant supports research training and various workshops that gives REU participants additional tools to excel in careers in chemistry or related science. The summer of 2015 was the first summer of the three-year grant.

State-of-the Art Instrument Acquisitions

X-ray Diffractometer - The WWU Chemistry Department was recently awarded an NSF Major Research Instrumentation (MRI) grant to acquire a new single crystal X-ray diffractometer through a proposal written by Professors **John Gilbertson** and **Clint Spiegel** (\$300,000). The new instrument, made by Rigaku, is a dual source diffractometer that is amenable to the structure determination of both biological macromolecules and inorganic metal-containing complexes. The new instrumentation will spark more collaborative research and experiential teaching within the department.

Nuclear Magnetic Resonance (NMR) Upgrades - In 2015, the Chemistry Department received an NSF Major Research Instrumentation (MRI) award titled: "MRI: Acquisition of High Sensitivity 500 MHz NMR for Faculty Research and Undergraduate Training at Western Washington University" (\$502,500). **Serge Smirnov** acted as the PI, while **Spencer Anthony-Cahill** and **John Gilbertson** served as Co-PIs. Multiple chemistry faculty contributed as the prospective users of the requested NMR spectrometer. A 500 MHz NMR spectrometer with a state-of-the-art broadband (^1H -X) and high-sensitivity triple-resonance ($^1\text{H}/^{15}\text{N}/^{13}\text{C}$) probes will be acquired for recording solution NMR data in the interest of research, training and teaching. Acquisition of the proposed instrumentation will transform and accelerate a number of active research projects in the areas of biochemistry, inorganic & synthetic/organic chemistry, natural compounds, material sciences and others. Selected research directions that will be pursued by WWU faculty include: **a)** Structure/dynamics and function of the cytoskeleton modulating proteins of the villin/supervillin family; **b)** Reduction of CO_2 molecules into useable C1 sources utilizing earth abundant metal catalysts; **c)** Structure/dynamics investigation of permutein myoglobins and single-strand hemoglobins as potential synthetic blood substitutes; **d)** Enantioselective synthesis of environmentally- and biologically-compelling natural products; **e)** Structure/dynamics of sortase enzymes complexed with their polypeptide substrates; **f)** Probing and design of conductive biomaterials; **g)** The polymer-directed synthesis of multimetallic nanoparticles for fuel cell catalysis and others. Importantly, the requested instrument will serve as a platform catalyzing new collaborative projects between WWU labs and will help to attract new tenure-track faculty.



External Grant Funding 2014-2015 (cont.)

Individual/Collaborative Faculty Research Grants

David Rider - Professor David Rider was a co-PI on research grants awarded from Zodiac Aerospace (\$159,996) and the Joint Center for Aerospace Technology Innovation (JCATI; \$99,902). In the former, the grant provides summer funding for the instruments, materials, and supplies for a team of 6 undergraduate interns from Chemistry and Engineering & Design to formulate and characterize new polymer resin systems for the manufacture of aerospace prepreg composites with improved fire, smoke and toxicity (FST) properties. In the latter, the grant provides funding for the team to continue these investigations into the 2015-2016 academic year with an additional focus on scale up and the macroscopic properties of multilayer laminates.



Rider Research Group

David Patrick - Professor David Patrick, in collaboration with WWU physics professor Brad Johnson, received an NSF RUI grant to investigate the growth of organic molecular crystals in complex solvents (\$320,000). Most modern electronic devices are based on inorganic semiconductors like silicon. For some applications though, significant cost or performance advantages could in principle be gained by changing to molecular semiconductors, composed of polymers or small molecules. Examples of technologies that could benefit from molecular semiconductors include less expensive, higher performance solar cells, thinner, mechanically flexible displays, and lower cost, higher efficiency lighting. Prior research has shown that for applications such as these, the microscopic structure of the molecular semiconductor domains - including their size, position, and crystallinity - critically affects performance. With support from this award, which was funded through the Solid State and Materials Chemistry program in the Division of Materials Research, Patrick and Johnson will use spectral imaging and highly controlled growth methods, combined with theory and modeling, to study molecular semiconductor crystallization in technologically important hosts. The outcome will be improved fundamental understanding of the factors affecting microscopic structure, and ultimately of ways to better control it. The research will be conducted primarily by undergraduate students. Because the research bridges physics and chemistry, students are benefitting from a rich experience working with faculty and other students with different academic and preparatory backgrounds, educating them to become collaborative problem-solvers with strong interdisciplinary skills.



O'Neil Research Group

Greg O'Neil - Professor Greg O'Neil received a Henry Dreyfus Teacher-Scholar Award. The \$60,000 grant will support research aimed at the development of new silicon and sulfone based reactions to synthesize biologically relevant targets. Examples include a sulfone addition/elimination approach to pharmacophorically relevant vinyl heterocyclic aromatics and silicon-tethered nucleophilic carbonyl additions for complex polyketide synthesis.



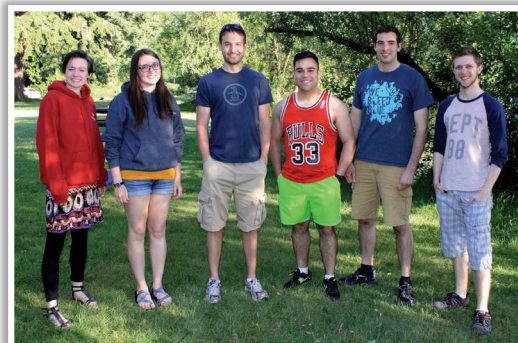
External Grant Funding 2014-2015 (cont.)



Bussell Research Group

Mark Bussell - Professor Mark Bussell is a co-PI on a new \$25,000 grant funded by The Cottrell Scholar Collaborative of the Research Corporation for Science Advancement to disseminate information on how to best prepare for a faculty position at a research-intensive predominately undergraduate institution.

John Antos - Professor John Antos received a Cottrell College Science Award (\$57,692) from the Research Corporation for Science Advancement in support of his group's effort to characterize the behavior of bacterial sortases. These enzymes have emerged as powerful tools for protein engineering, enabling the construction of protein derivatives for a broad range of therapeutic and basic research applications. The focus of this project is to systematically characterize the substrate preferences of multiple sortase homologs with the goal of identifying enzymes with unique in vitro reactivity. Overall, these studies will enhance the fundamental understanding of sortase enzymology, and will expand the scope of sortase-mediated protein modification.



Antos Research Group



Murphy Research Group

Amanda Murphy - Professor Amanda Murphy was awarded the Jean Dreyfus Boissevain Lectureship for Undergraduate Institutions (\$18,500) in 2015. This grant provides funds to bring a leading researcher to WWU to give a series of lectures, and also supports two undergraduate summer research stipends.



External Grant Funding 2014-2015 (cont.)

P. Clint Spiegel - In August of 2015, Professor Clint Spiegel was named a Henry Dreyfus Teacher-Scholar, which comes with an unrestricted research award of \$60,000 over five years. The Henry Dreyfus Teacher-Scholar Awards Program supports the research and teaching careers of talented young faculty in the chemical sciences at undergraduate institutions. The award is based on accomplishment in scholarly research with undergraduates, as well as a compelling commitment to teaching. Professor Spiegel will be leveraging this award to both move his current research with students forward as well as start new, exciting projects in structural biology.

Robert Berger – Professor Robert Berger received a Cottrell College Science Award (\$55,000 over 2 years) from the Research Corporation for Science Advancement. These funds will be used to support his group's research project entitled "Efficient Computational Screening and Chemical Understanding of Oxide Nanostructures for Energy Applications". Transition metal oxides exhibit remarkable diversity of composition and structure, and can be manipulated on the atomic scale in a variety of ways. These materials are of interest in energy applications such as solar cells and batteries. Because even a small number of oxide building blocks can form an infinite number of nanostructures with tunable electronic properties, experimental synthesis alone is unlikely to unlock the full potential of these materials. The primary goal of this project is to develop a novel, efficient computational approach – one that calibrates the relatively fast extended Hückel method to the results of the more accurate density function theory – to identify new oxide materials with desirable electronic properties. This work will help guide synthetic chemists and materials scientists by providing fundamental understanding of the electronic structure of oxides, and by predicting concrete routes to tune them.



Berger Research Group



Leger Research Group

Janelle Leger – Dr. Leger was recently awarded an ACS Petroleum Research Society grant titled "Understanding and Controlling Solid-State Ionic Currents and Electrochemical Doping in Conjugated Polymer Films," (\$70,000, three years). Emerging technologies, known as 'iontronic' devices, utilize the unique mixed ionic/electronic conducting character of conjugated polymeric materials. The Leger lab has developed a process by which remarkably robust fixed ionic junctions can be formed that is not subject to ion relaxation or redistribution. This is achieved by replacing the salt used in traditional iontronic devices with polymerizable ionic liquids (PILs) that can potentially be polymerized via radical initiation. This grant will fund a study designed to elucidate the nature of the electrochemical interactions between these species and the resulting structures formed, determine whether the reaction results in a covalent bond between the PIL and the conjugated polymer, and determine how the reaction and any resulting structural changes affects the physical properties of the polymer. Finally, the design of new PILs with improved properties for a variety of applications will be explored.



Chemistry Faculty Publications in 2014-2015

In the past academic year the chemistry faculty have published 16 articles/chapters detailing their research, which include 28 undergraduate and 9 master's chemistry student co-authors.

Note: *WWU undergraduate student co-author, †WWU MS student co-author

*Row, R.D.; *Roark, T.J.; *Philip, M.C.; *Perkins, L.L.; **Antos, J.M.** "Enhancing the Efficiency of Sortase-Mediated Ligations Through Nickel-Peptide Complex Formation." *Chem. Commun.* **2015**, 51, 12548-12551.

*Atterberry, P.N.; *Roark, T.J.; †Severt, S.Y.; *Schiller, M.L.; **Antos, J.M.**; **Murphy, A.R.** "Sustained Delivery of the Chemokine CXCL12 from Chemically Modified Silk Hydrogels." *Biomacromolecules* **2015**, 16, 1582-1589.

*Grote, C.; *Ehrlich, B.; **Berger, R.F.** "Tuning the Near-Gap Electronic Structure of Tin-Halide and Lead-Halide Perovskites via Changes in Atomic Layering." *Phys. Rev. B* **2014**, 90, 205202.

*Delgado, M.; *Sommer, S.K.; *Swanson, S.P.; **Berger, R.F.**; Seda, T.; Zakharov, L.N.; **Gilbertson, J.D.** "Probing the Protonation State and the Redox-Active Sites of Pendant Base Iron(II) and Zinc(II) Pyridinediimine Complexes." *Inorg. Chem.* **2015**, 54, 7239-7248.

Liyana, D.R.; †Danforth, S.J.; Liu, Y.; **Bussell, M.E.**; Brock, S.L. "Simultaneous control of composition, size and morphology in discrete $\text{Ni}_{2-x}\text{Co}_x\text{P}$ nanoparticles." *Chem. Mater.* **2015**, 27, 4349-4357.

Jin, S.; Sakurai, T.; **Kowalczyk, T.**; Dalapati, S.; Xu, F.; Wei, H.; Chen, X.; Gao, J.; Seki, S.; Irle, S.; Jiang, D. "Two-Dimensional Tetrathiafulvalene Covalent Organic Frameworks: Towards Latticed Conductive Organic Salts." *Chem. Eur. J.* **2014**, 20, 14608-14613.

Head-Gordon, M. (corresponding author); **Kowalczyk, T.** (64th out of 153 authors) "Advances in Molecular Quantum Chemistry Contained in the Q-Chem 4 Program Package." *Mol. Phys.* **2015**, 113, 184-215.

*Bradshaw, N.P.; †Severt, S.Y.; Wang, Z.; *Klemke, C.V.; *Larson, J.D.; Zhu, Z.; **Murphy, A.R.**; **Leger, J.M.** "ToF-SIMS Characterization of Silk Fibroin and Polypyrrole Composite Actuator." *Synthetic Metals* **2015**, 209, 490-495.

†Severt, S.Y.; *Ostrovsky-Snyder, N.A.; **Leger, J.M.**; **Murphy, A.R.** "Versatile Method for Producing 2D and 3D Conductive Biomaterial Composites Using Sequential Chemical and Electrochemical Polymerization," *ACS Appl. Mater. Interfaces*, **2015**, 7 (45), 25281-25288.

†Phan, I.T.; *Gilbert, G.J.; **O'Neil, G.W.** "Ring-Closing Metathesis Reactions of Acyloxysulfones: Synthesis of γ -Alkylidene Butenolides", *Synlett* **2015**, 1867-1871.

O'Leary, D.J.; **O'Neil, G.W.** "Cross Metathesis" in *Handbook of Metathesis, 2nd Edition, Volume 2: Applications in Organic Synthesis* (Ed. R. H. Grubbs, D. J. O'Leary) Wiley-VCH: Weinheim, Germany **2015**.

O'Neil, G.W.; Reddy, C.R. "Jet Fuel from Algae?," *Oceanus Magazine*, Woods Hole Oceanographic Institution, Woods Hole, MA **2015**. (<http://www.whoi.edu/oceanus/feature/jet-fuel-from-algae>)

O'Neil, G.W.; *Culler, A.R.; *Williams, J.R.; *Burlow, N.P.; *Gilbert, G.J.; Carmichael, C.A.; Nelson, R.K.; Swarthout, R.F.; Reddy, C.M. "Production of Jet Fuel Range Hydrocarbons as a Coproduct of Algal Biodiesel by Butenolysis of Long-Chain Alkenones." *Energy Fuels* **2015**, 29, 922-930.

†King, B.R.; *Swick, S.M.; *Schaefer, S.L.; *Welch, J.R.; *Hunter, E. F.; **O'Neil, G.W.** "Exploring a Ring-Closing Metathesis Approach to the Archazolid Macrocyclic." *Synthesis* **2014**, 46, 2927-2936.

†Baronov, A.; †Bufkin, K.; †Shaw, D.W.; Johnson, B.L.; **Patrick, D.L.** "A simple model of burst nucleation." *Phys. Chem. Chem. Phys.* **2015**, 17, 20846-20852.

*Brison, C.M.; *Mullen, S.M.; †Wuerth ME, *Podolsky, K.; *Cook, M.; *Herman, J.A.; †Walter, J.D.; Meeks, S.L.; **Spiegel P.C.** "The 1.7 Å X-ray Crystal Structure of the Porcine Factor VIII C2 Domain and Binding Analysis to Anti-Human C2 Domain Antibodies and Phospholipid Surfaces." *PLoS One*, **2015**, 10, e0122447.



2014-2015 Chemistry Awards

CRC Press Chemistry Achievement Award

Annalise Muscari

Outstanding Organic Student Award

Aaron Williams

Outstanding Organic Research Student

Jordan Dotson

Outstanding Analytical Student Award

Natasha Siepser

Outstanding Inorganic Student Award

Mayra Delgado

Hypercube Scholar Award

Benjamin Morgan

Sea Bong Chang Memorial Biochemistry Award

Johann Sigurjonsson

Advancing Chemistry Through Service (ACTS) Award

Christopher Grote

Stephanie Sharp

Outstanding Graduate Teaching Assistant

Michelle Wuerth

Outstanding Department Graduate of 2015

Nathan Bradshaw



First row (left-to-right): Michelle Wuerth, Stephanie Sharp, Natasha Siepser, Aaron Williams

Second row: Christopher Grote

Third Row (left-to-right): Nathan Bradshaw, Jordan Dotson, Annalise Muscari, Johann Sigurjonsson

Fourth Row (left-to-right): Benjamin Morgan, Mayra Delgado



2015-2016 Scholarship / Fellowship Recipients

WWU Chemistry Scholarship

Dane Stanfield
Diane Perez
Rebecca Szabo

Verna Alexander Price Chemistry Scholarship

Daniel Botamanenko

Jerry Price - Nancy Sherer Scholarship

Mikko Sayre

Ruth Watts Female Scientist Scholarship

Tess Clinkingbeard

Barbara French Duzan Scholarships

Luke DeGraaff
Pui Man Cheung
Matt Dean
Andrew Hollcraft

Rathmann Family Foundation Scholarship

Hope Spargo

Mickey and Carole Ghio Science Scholarship

Jesse Prelesnik

Oscar Edwin Olson Scholarship

Emily Sanders
Melany Fry

Knapman Chemistry Scholarships

Samantha Grosslight
Alexis Neuman

Women in Science Scholarship

Samantha Grosslight

Alumni Association Leader Scholarship

Diane Perez

Denice (Ambrose) Hougen Undergraduate Fellowship

Natasha Siepser

Mark Wicholas Research Fellowship

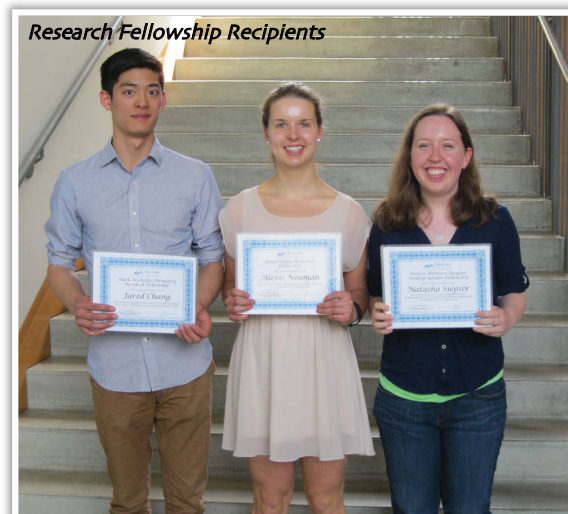
Jared Chang

Karen and Joseph Morse Research Fellowship

Jesse Prelesnik

Lowell Eddy Memorial Fellowship

Alexis Neuman



(left-to-right): Jared Chang, Alexis Neuman, Natasha Siepser



First row (left-to-right): Melany Fry, Emily Sanders, Alexis Neuman, Rebecca Szabo, Dane Stanfield

Second row (left-to-right): Pui Man Cheung, Daniel Botamanenko, Mikko Sayre, Tess Clinkingbeard, Andrew Hollcraft

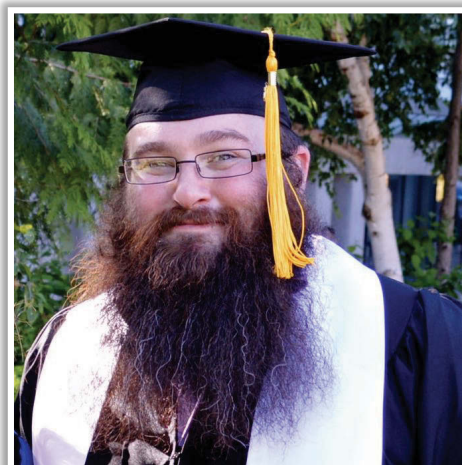
Third Row: Luke DeGraaff



Outstanding Graduate of 2015

Nathan Bradshaw

Nathan Bradshaw has been named the 2015 Outstanding Graduate for the Department of Chemistry. Nathan spent time in the Navy prior to college, and first came to WWU as a participant in our 2012 summer REU program. He then transferred to WWU the following year, and quickly integrated into the department. He is a very lively and outgoing person, and quickly made a positive impression on both the faculty and staff in our department. In addition to maintaining a high GPA, Nathan was actively involved in research through a joint project between the Leger and Murphy research groups. He is the second author on a paper published in *Advanced Functional Materials* (2014) and first author on a paper in *Synthetic Metals* (2015). He has presented at a large number of regional and national conferences including posters at the national American Chemical Society and the Materials Research Society, and gave an oral presentation at the American Physics Society meeting. Nathan is also incredibly passionate about outreach, and was the first to volunteer for any and all activities. He was very active in the department ChemClub, as well as several campus-wide clubs that promote diversity in the sciences. Nathan is currently getting settled into the PhD program in Materials Science and Engineering at Northwestern University.



Nathan Bradshaw at spring
commencement 2015



Find us on Facebook!
www.facebook.com/wwuchem



2014-2015 Chemistry Graduates

Congratulations to all **80** of our graduates from Fall 2014 to Summer 2015!

MS Chemistry

Markus Carlson
Samuel Danforth
Ryan Lyski
Keyvan Nikghalb
Audrey Taylor
Michelle Wuerth

BS Chemistry

Mitchell Abston
Jillian Adams
Natalie Anderson
Nathan Bradshaw
Andrew Breuhaus-Alvarez
Kyle Burns
Tyler Curtis

Conner Darlington
Mayra Delgado
Joseph Eidsness
Brad Farrell
Garrett Gilbert
Christopher Grote
Shaun Gundert
Satu Heiskanen
Keenan Komoto
Jesse Larson
Andrew Lindsey
Cadence Luchsinger
Benjamin Morgan
Warren Osborn
Cyrus Schaaf
Noah Schorr
Han Steger
Anzhela Storozhenko

Peter Topalian
Brennan Vanden Bos
Bryce Westerheimer
Biniam Woldehaimanot
Evan Yuhas
Joshua Ziegler

BS Biochemistry

Paige Atterberry
Orion Banks
Matthew Baysinger-Flom
Tamir Bresler
Kiley Brown
Jordan Dotson
Rowan Firethorne
Edwin Glueck
Saum Hadi

Cory Hamada
Daniel Harbeson
Igor Kaparchuk
Kevin Kenney
Victoria Martin
Heather Miears
Nate Miller
Eric Newman
Nicholas Ostrovsky-Snider
Lorena Perkins
Marina Philip
Soniya Pimparkur
Johann Sigurjonsson
Connor Stewart
Amanda Weis
Pauline Wiltz
Serena Wo
Kayse Zalmai

BA Chemistry

Anne Bailey
Akash Bhatella
Daniel Bronner
Marcus Galloway
Anders Helmbrecht
Laura Johnson
Jennifer Knight
Erik Larson
Richard Leuzzi
Devin Mattlin
Carlos Perez
Don Pham
Travis Salmi
Richard Schneider
Daniel Shively
Dylan Thier



Scholars Week 2015

The Chemistry Department had a large presence during WWU's 2015 Scholars Week event, which included a banquet for research students and their advisors to celebrate their achievements. Research students further had the opportunity to present their research in campus-wide poster sessions, which included over 150 posters from across the Western campus. Notably, 6 chemistry student posters were recognized with an *Outstanding Poster Award* (see below). This honor was conferred on less than 15% of the total number of posters presented.

The Chemistry Department also organized its own Scholars Day activities, which included presentations from WWU chemistry students, as well as a visit from a prominent scientist. This year the department was pleased to host Professor Kevan Shokat, who is an HHMI investigator and Professor of Cellular and Molecular Pharmacology at the University of California, San Francisco. Prof. Shokat is a pioneer in the development of chemical methods for investigating cellular transduction pathways, with a focus on protein and lipid kinases. Prof. Shokat spent two days interacting with students and faculty. His visit culminated in a symposium on May 15th, in which WWU chemistry students Jordan Dotson, Benjamin Morgan, Nicholas Ostrovsky-Snider, and Nathan Bradshaw all gave oral presentations as part of completing their Honors Theses, followed by a keynote address by Prof. Shokat. These activities were made possible by the Pavia-Lampman-Kriz Chemistry Endowment and The Western Foundation Chemistry Fund.



Graduate Poster Awards:

Sean Severt (PI: Amanda Murphy) "Production of Conductive Biomaterial Composites by Sequential Chemical and Electrochemical Polymerization"

Undergraduate Poster Awards:

Marina Philip and Lorena Perkins (PI: John Antos) "Applications in Nickel-Enhanced Sortase-Mediated Ligations"

Chris Grote (PI: Robert Berger) "Tuning the Electronic Structure of Tin and Lead Halide Perovskites through Layering, Strain, and Distortion"

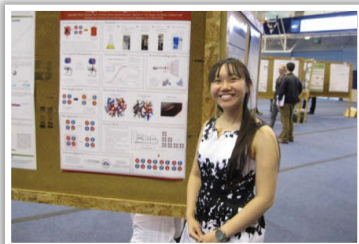
Tess Clinkingbeard (PI: Mark Bussell) "Synthesis of Nickel Phosphide Hydrotreating Catalysts: Effect of Sodium"

Taylor Blatz (PI: Amanda Murphy) "Modification of Conducting Polymers with Silk-Inspired Peptides for use in Biomedical Applications"

Satu Heiskanen (PI: David Rider) "Functionalization of Metal Oxide Surfaces for Photoelectrocatalysis of CO₂ Reduction"



Scholars Week Photos



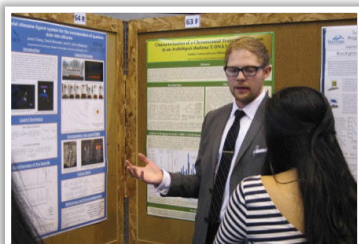
Serena Wo



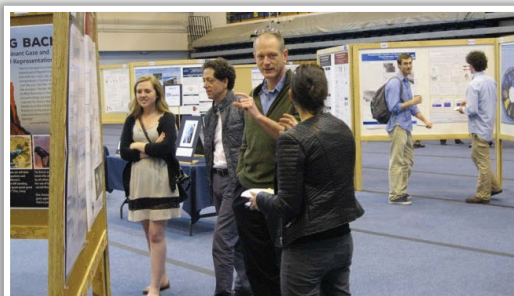
Jordan Dotson, Benjamin Morgan,
Nathan Bradshaw & Nicholas Ostrovsky Snider



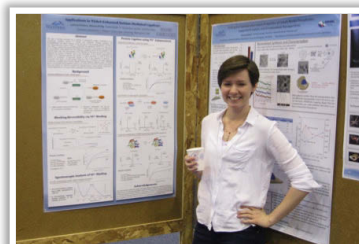
Jessalyn Rogers



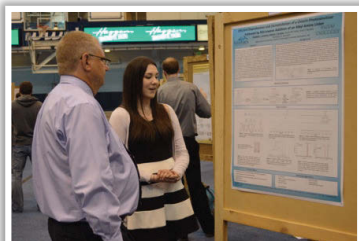
David Brewster



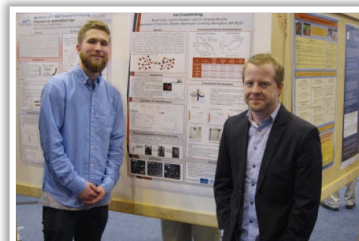
Kevan Shokat & Spencer Anthony-Cahill



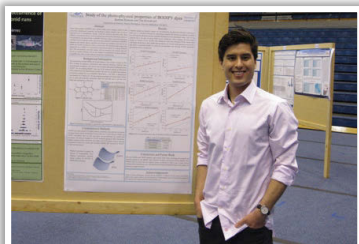
Lorena Perkins



Jim Vyvyan & Elizabeth Cummins



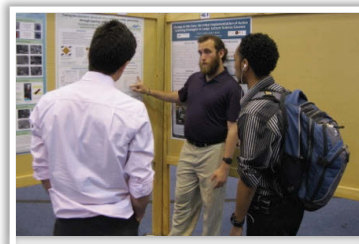
Connor Ransom & Brad Farrell



Keenan Komoto



Saum Hadi, Gerry Prody,
Steven Mahnke & Viktor Laszlo



Christopher Grote



Satu Heiskanen



Michelle Wuerth, Joanna Hoppins & Heather Miears



Jordan Dotson



Chem Club Continues Tradition of Outreach and Excellence

The 2014-15 academic year was an excellent one for Western's Chem Club (an official student chapter of the American Chemical Society since 1969) filled with outreach, professional development, and social activities. Last year's chapter officers were Christopher Grote (class of 2015) and Tess Clinkingbeard, who organized meetings and helped support a very large group of ambitious and enthusiastic members. For the first time in our memories, weekly meetings were more often than not standing room only. This commitment and energy of so many members resulted in the Chem Club being recognized by the ACS with an Outstanding Chapter Award for the 5th consecutive year! This prestigious award puts us in the select group of fewer than 50 student chapters (of nearly 400 total) that were recognized as outstanding for 2014-15. Last year, the chapter focused on the community beyond Western, putting on a Wizards of Western demo show at Skagit Valley College in Mt. Vernon, putting on demo shows at three local elementary schools and helping judge several science fairs, making copious quantities (somewhere around 15 gallons!) of liquid nitrogen ice cream for events like Mix-it-Up and Chempalooza, and rather than our usual canned food drive, we collected and donated household items to Northwest Youth Services. In addition to our traditional activities of bowling, trivia, and the picnic, the chapter also chose, invited, and hosted a speaker for one of the weekly seminars.

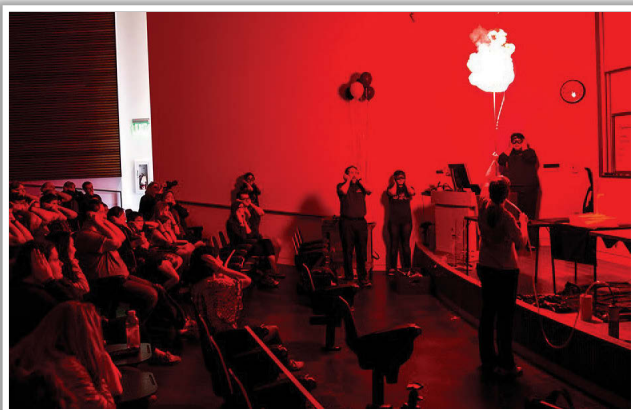
This year, the chapter is in the capable hands of Tess Clinkingbeard and Deanna Myers, both of whom will graduate in June. In 2015, Tess was selected to attend the American Chemical Society's *Leadership Institute* held in Dallas. Tess reports, "In Chem Club I have been able to develop my leadership skills, reach out to the community and help bring the department together and put on events that benefit our students and faculty. At the National Leadership Institute I met with other undergraduate chapter leaders, as well as the ACS members who are leaders in both academia and industry. Over the weekend of workshops, motivational speeches and times for self-reflection, I was able to learn to think about the type of leader I want to be, as well as come up with ways to improve our ACS student chapter!"

This fall was busy with several networking and outreach events co-sponsored with other science clubs, as well as bowling and the return of the Chemistry Tea. Already on the chapter's calendar for the remainder of the year are our traditional events such as: chemistry trivia night, t-shirt sales, the annual picnic, the Chemplosion! demo show during Back-2-Bellingham, several demo shows and science fairs at local elementary schools, and of course "heavy" involvement in Scholars Week in May. Those of you who helped move those poster boards in the past know what we mean. The chapter received a Community Interaction grant which we will use to put on a Wizards of Western show with students and faculty from Whatcom Community College, hoping to reach a different audience than our typical demo shows.

The chapter has also again received funding from the ACS to help students travel to the national meeting in San Diego in March. Being able to present their work is an exciting and transformative event for our students as they become fully engaged in the scientific community. Unfortunately, financial support for students has lagged behind, and the \$300 award doesn't go very far. The Chem Club wants to help address this situation by accessing gifts to support an endowed student travel fund. This fund would start by supporting student hotel rooms and as it grows would support additional items.

We would love to see those of you in the area at Back-2-Bellingham and at the picnic, stay tuned for details via the Facebook page (www.facebook.com/wwuchem).

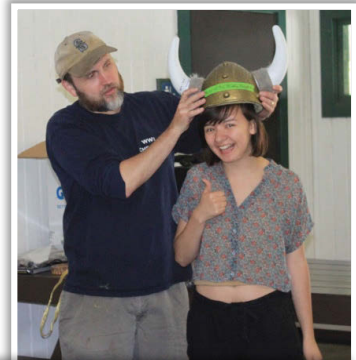
-Betsy Raymond & Steve Emory



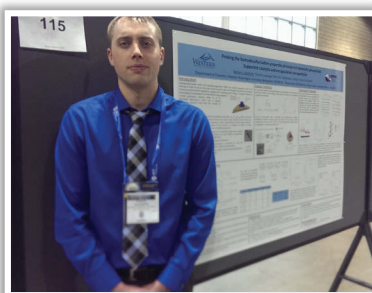
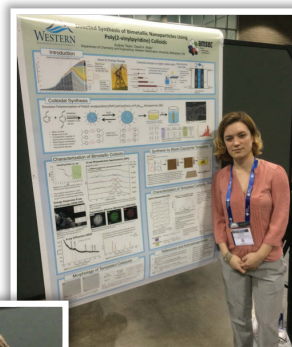
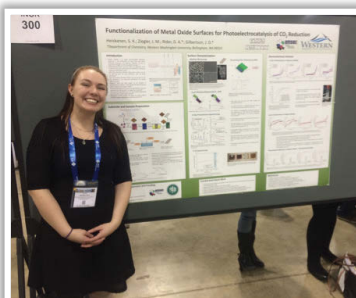
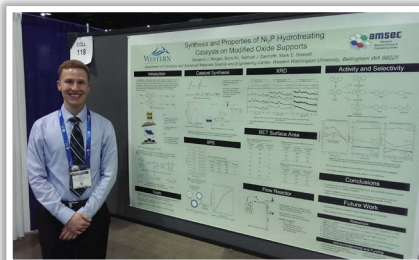
Chem Club lights up the audience at the Back-2-Bellingham Chemplosion! demo show



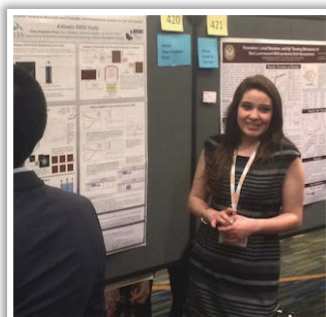
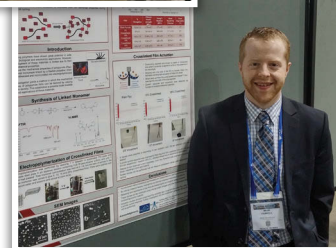
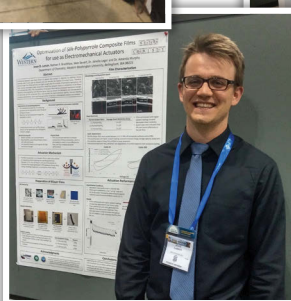
Department Picnic Photos 2015



Student Attendance at National Conferences



National ACS Meeting
March 2015
Denver, CO



Materials Research Society
April 2015
San Francisco, CA



American Physical Society
March 2015
San Antonio, TX



National ACS Meeting
August 2015
Boston, MA



Volcano Conference
February 2015
Pack Forest Conference Center, WA

