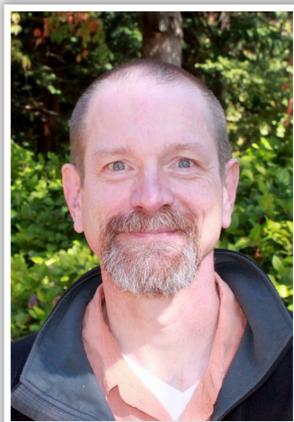


WWU Department of Chemistry 2016 Newsletter



Message from the Chair



Greetings! It is my pleasure to write a few opening remarks for this latest edition of the Chemistry Department newsletter. Looking over Jim Vyvyan's comments from the last three newsletters, I see that CHANGE is a constant theme. So it is again, and rightly so for a department focused on the transformation of matter...and students! Below I describe a few of the changes in Chemistry over the past year.

This past June, Jim's term as chair finished and mine began. I want to extend my heartfelt thanks to Jim for his leadership and hard work as department chair, which included dealing with significant challenges (e.g., increased enrollment pressures and access to courses; the building fire) and fantastic opportunities (e.g., hiring four new tenure-track faculty and welcoming seven new members of our staff, doubling the number of students in our graduate program). In addition, I owe a debt of gratitude to each member of our talented staff, who have been patient with me as I try to get up to speed on my new responsibilities. I am also grateful for the patience and support of the faculty and staff in the department who have rallied together to address the many challenges before us.

Chief among these are addressing enrollment pressures in major courses and maintaining our excellent research programs. We can't achieve the former without key contributions from our dedicated non-tenure-track faculty, who have shouldered much of the teaching in general and organic chemistry courses in response to opening more sections of upper division requirements (largely taught by the tenure-track faculty). On the research front we have much to celebrate: \$1.4M in new grant funding from external agencies, 36 student coauthors on the 22 papers published by our faculty last year, and 17 students presenting their WWU research at national conferences! Among our outstanding research students, the following graduates of our department were awarded prestigious NSF Graduate Research Fellowships: R. David Row (Antos lab, now at UC Irvine), Nathan Bradshaw (Leger and Murphy labs, now at Northwestern University), and Steven Swick (O'Neil lab, now at Yale)! Congratulations are also due to our Student Affiliates Chapter of the ACS (the Chem Club) for a sixth consecutive "Outstanding Chapter" award!

In addition to that good news, we are fortunate to have added an office assistant, Stephanie Morgan, to our staff. When you visit the office, hers is the first smile to greet you. We also welcome two new non-tenure-track faculty to our ranks: Dr. Natasja Swartz, who is teaching analytical and instrumental analysis, and Dr. Breia (Lewis) Salsbery, who is teaching in our general chemistry series. Some of you may remember Breia as an undergraduate and graduate student (with Prof. Chris Daley) in our program. This fall we are excited to be searching for two new tenure-track faculty with specialization in the areas of analytical chemistry and biochemistry/biophysics.

So, change has occurred and more change is afoot (stayed tuned...). I have only touched on a few of the remarkable achievements of our students, faculty and staff, and I trust you will enjoy reading up on many more in these pages. We are exceptionally proud of our students and their accomplishments here and post-WWU. Many of you have helped us realize those accomplishments through your generous donations of time and/or money to the department. I hope this edition of the departmental newsletter gives you a glimpse of how your generosity supports the efforts of our students to achieve their goals. We are sincerely grateful for your support. Thank you and best wishes!

Spencer Anthony-Cahill

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Thank You to Chemistry Department Donors

We wish to extend a special thank you to alumni and friends of the department who donated to the following Chemistry Department Western Foundation funds from July 2015 through June 2016.

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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Thank You to Chemistry Department Donors (cont.)

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James and Catherine Vyvyan

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WEsTeRn Chemistry Club Fund

Alderwood PTA 8.3.10
American Chemical Society - Puget Sound Section
Steven and Christy Emory



New Faculty and Staff



Stephanie Morgan

Stephanie Morgan joined the Chemistry Department as the office assistant in April 2016. Stephanie was born in south Florida, raised mostly in Woodinville, Washington and attended high school in New Orleans. Stephanie always knew she wanted to return to Washington for college, and Western was the only college she applied to. An art history major, Stephanie graduated from WWU in 2015 and has worked previously in the library and admissions office. She is excited to continue working at Western in the Chemistry Department.

Outside of the office, Stephanie volunteers as a dog walker with the Whatcom County Humane Society and enjoys reading, hiking, and traveling.

Sam Danforth joined the Chemistry Department in October 2015 as the new instrument technician. He is originally from central Wisconsin and received his B.S. there in 2013 from the University of Wisconsin-Eau Claire. Sam moved out west in the fall of 2013 to pursue a M.S. at Western studying heterogeneous catalysis under the direction of Mark Bussell. He completed his degree in the summer of 2015 shortly before joining the department as a staff member.



Sam Danforth



Breia Salsbery

Breia Salsbery returns to WWU for the first time since earning her M.S. in bioinorganic chemistry in 2004. Since then, she has spent time in research at Puget Sound Blood Center (now Bloodworks NW), Ph.D. study in Boston University's chemistry department, and at home as a mother to her two-year-old daughter, Karen. She and her husband of nine years, Sean, have another baby girl set to arrive at the end of January.

Breia's return is a homecoming, as the Everson, WA native lived the first 24 years of her life in Whatcom County. She is excited to be back and teaching at Western, which holds a special place in her heart. She currently lives in Marysville, WA and enjoys spending time with her family, going to concerts, and watching old episodes of the TV show Law & Order.



New Faculty and Staff (cont.)

Natasja Swartz joined the department as an instructor in analytical chemistry in the fall of 2016. Natasja received her B.Sc. in chemistry and B.A. in political science from the University of California, Santa Barbara in 2006 with emphasis in environmental chemistry and political philosophy. After working in biotech as a flavor chemist in sensory evaluation of natural products, she left her hometown of San Diego to help establish the Regional Lab for the Science of Cultural Heritage Conservation at Portland State University, where she earned her Ph.D in chemistry in 2015.



Natasja Swartz

Her graduate research focused primarily on the implementation of electrochemical and spectroscopic methods to evaluate and improve materials used for the protection of artwork. Working with industrial collaborators she developed environmentally sustainable polymer-clay nanocomposite clear coatings for corrosion control of outdoor metalworks on a monumental scale, such as sculptures and bridges. Alongside her own scientific endeavors, she is also passionate about mentoring research projects that emphasize public works. Outreach comes easy when chemistry collides with artwork and she feels fortunate to have mentored undergraduate and intern projects to characterize the materials in Islamic and Orthodox Christian manuscripts from Ethiopia, historic soils at Fort Vancouver, North American iron and copper artifacts found on the Lewis and Clark Trail, and a Han dynasty money tree from approximately 25 CE.

Natasja spent the last academic year at Pacific University as a visiting assistant professor of analytical chemistry to focus on teaching and research at a primarily undergraduate institution. There she partnered with faculty to develop, vet, and publish a quant lab experiment investigating fermentation kinetics of kombucha by HPLC to provide industry-relevant experience for undergraduates. She also mentored a senior-thesis project to monitor anthropogenic markers in wastewater effluent and jumped into a new field in collaboration with faculty in the philosophy department to explore what influences the “quantitative mindset” of an individual or group.

Her interests inside and outside chemistry are varied – ask her about them!



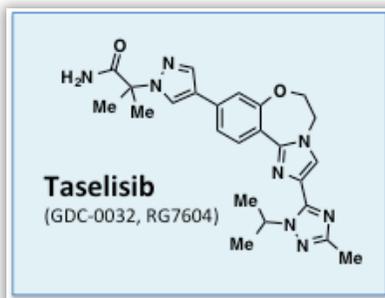
Find Us on Facebook!

Alumni Spotlight: Steve Staben

I was an undergraduate at WWU from 1998-2002. Originally enrolling as a 'pre-med' student, lecture and laboratory courses in organic chemistry (Profs. Pavia, Lampman, Kriz) as well as experience working in Prof. Vyvyan's lab attracted me to basic scientific research as an organic chemist. I graduated with a BS in chemistry, cum laude, in 2002. I have a lot of great memories from my time in the chemistry department at Western! I always felt incredibly supported by the faculty as well as my classmates. I had some really great times with Prof. Vyvyan's lab including a fun trip to the ACS meeting in Orlando. As a chemistry department and university Outstanding Graduate, I fondly remember the honor of having Prof. Pavia escort and introduce me during the graduation ceremony. I less fondly remember some really difficult spectroscopy (courtesy of Prof. Vyvyan) and metabolic pathway (courtesy of Prof. Anthony-Cahill) exams . . .



Dr. Steve Staben



I think that the training and mentorship I received while in the chemistry department at WWU put me in great position to pursue graduate studies in organic chemistry at one of the top graduate research institutions in the country, UC Berkeley. In the summer of 2002, I joined Dean Toste's lab as part of his first class of students. While in Dean's lab, I worked toward developing a variety of transition metal and organic catalyzed methods and applied them to natural product synthesis. I received my PhD in synthetic organic chemistry from UC Berkeley in 2007.



In 2007, I joined Genentech as scientist in the discovery chemistry group. As a medicinal chemist I am constantly inspired and motivated by how practical physical and synthetic organic chemistry can be creatively applied to solve complex, multivariable problems on the road to therapies that impact patient's lives. Every day I use my knowledge of organic synthesis, reactivity, interaction energy, conformation and physical properties to design new compounds toward specific pharmacological targets. The work is challenging and full of failure, but I've been very fortunate to contribute to the discovery of three compounds that have advanced to clinical development. I'm particularly proud to have played a large role in the discovery of Taselisib (GDC-0032). This PI3K-inhibitor is currently in late stage clinical trials for treatment of advanced metastatic breast cancer. My current position at Genentech is Senior Research Scientist and Project Team Leader. In this role, I lead interdisciplinary teams directed at novel targets in oncology and inflammatory disease areas. This career, where I can see basic scientific discoveries translate to improved human health, has been amazing!

I feel so fortunate to have both a successful career and a fantastic family. I live in the Bay Area with my wonderful wife Leanna and our two boys Blake (5-yrs) and Cole (5-mo). We are very much enjoying our lives in California, but I have to say, every once in a while, I miss the rain.

- Steve Staben, WWU class of 2002



Jean Dreyfus Boissevain Lectureship and Symposium

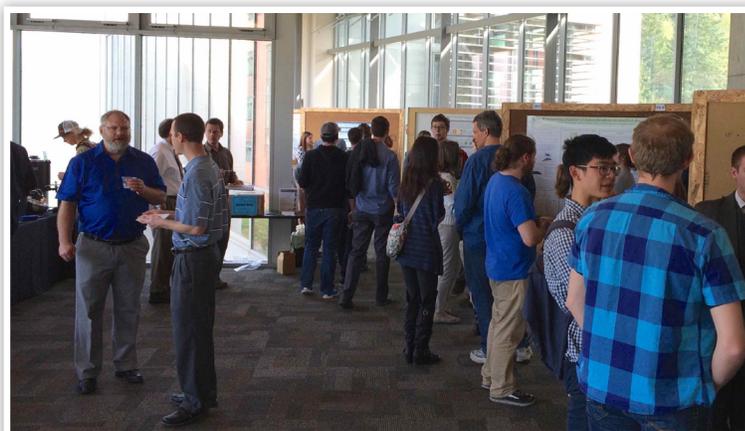
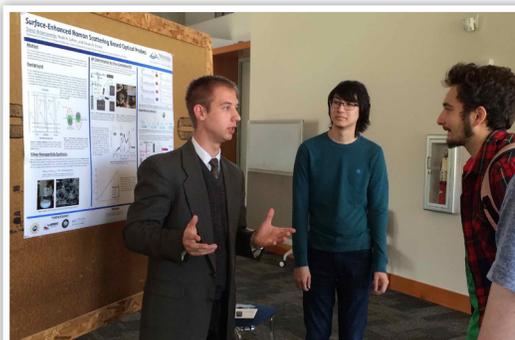
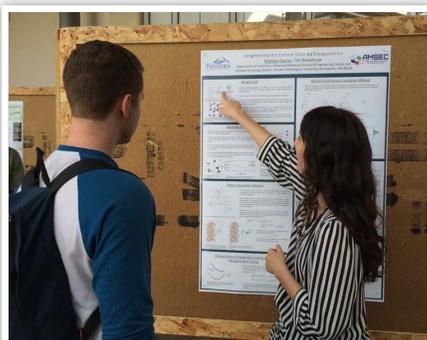


Prof. Craig Hawker (UCSB)

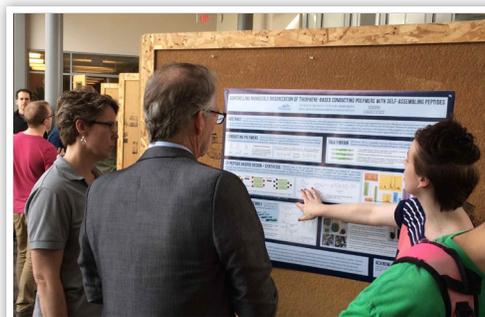
In 2016, the WWU Chemistry Department received the Jean Dreyfus Boissevain Lectureship award thanks to the grant writing efforts of Prof. Amanda Murphy. The purpose of this award is to provide funding to bring a prominent speaker to campus to interact broadly with students and faculty over the course of two days. In addition, the award provides summer stipends and travel money for two research students.

Prof. Murphy invited Prof. Craig Hawker from the University of California at Santa Barbara (UCSB) to be the guest speaker. Professor Hawker is the director of both the California Nanosystems Institute and Dow Materials Institute. He is also co-director of the Materials Research Lab at UCSB. He holds the Alan and Ruth Heeger Chair in Interdisciplinary Science, and is a member of the Materials Department and the Department of Chemistry and Biochemistry. Prof. Hawker has over 400 publications to date. His research group specializes in synthetic polymer chemistry, and the development of nanostructured materials with advanced properties and functions for microelectronic and biotechnology industries.

During his visit to WWU on April 7-8th, Prof. Hawker met with faculty from the chemistry, physics, engineering and biology departments, and hosted a Q&A session for students interested in pursuing a career in chemistry. Dr. Hawker gave a guest lecture in our Honors General Chemistry course where he described his recent involvement in the development and commercial production of a popular line of hair care products. A reception and student poster session was held in the skybridge of Academic West, where 20 posters were presented by chemistry, physics and engineering students. The event concluded with a keynote lecture from Dr. Hawker, in which he described efforts to use orthogonal functionalization of polymeric materials to design nanostructured systems inspired by marine organisms to produce novel hydrogels and surface coatings.



Natalya Garcia, Daniel Botamanenko and Taylor Blatz/Melany Fry received the student choice *Best Poster* presentation awards.



Faculty Sabbatical Highlight : John Gilbertson

Prof. Gilbertson spent fall and winter quarters as a visiting research associate in the Department of Chemistry at the University of California, Irvine (UCI) in the laboratory of Prof. Andy Borovik. The majority of his time was spent working on characterizing the electronic structure of rare and unusual copper(I) complexes. The geometry of copper complexes is intimately linked to properties such as electron transfer rate, as typified by the family of blue copper proteins (BCPs). The fast electron transfer rates in BCPs are due to imposed geometric constraints on the copper centers known as the “rack” or “entatic” states. In most copper complexes, Cu(II) can be found in distorted octahedral, square pyramidal, or trigonal bipyramidal coordination, while Cu(I) almost exclusively adopts a tetrahedral geometry. Cu(I) complexes that

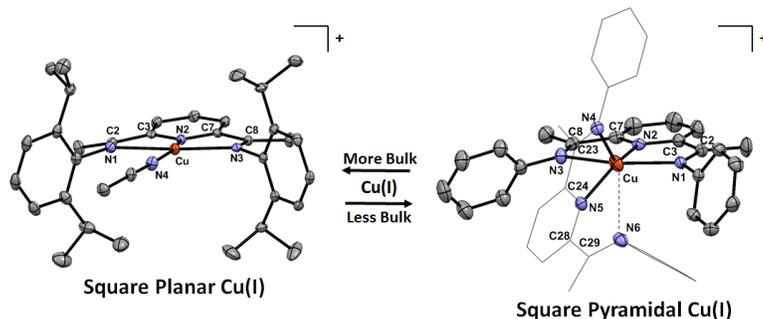
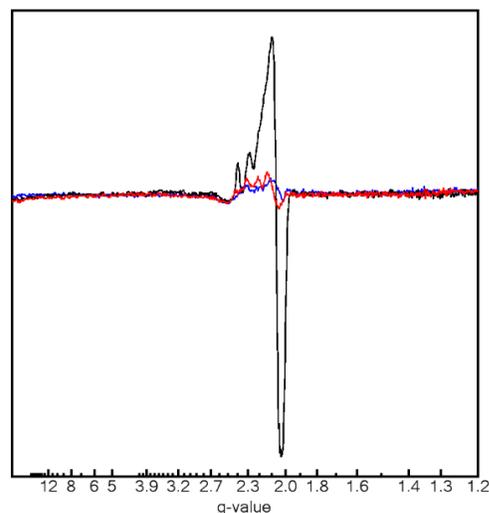


exhibit square planar geometry are rare, and in most cases are stabilized in multimetallic systems. Utilizing the sterically bulky tridentate pyridinediimine ligand, *i*^{Pr}PDI (where *i*^{Pr}PDI = 2,6-(2,6-*i*Pr₂C₆H₃N=CMe)₂C₅H₃N), the Gilbertson group reported a series of monometallic square planar Cu(I) complexes. The manuscript was coauthored by a WWU undergraduate researcher, Pui Man (Audrey) Cheung, and published in the RSC journal *Chemical Communications* (2016, 52, 4156-4159. DOI: [10.1039/C6CC00271D](https://doi.org/10.1039/C6CC00271D)).

Data that was crucial to the manuscript was the electron paramagnetic resonance (EPR) spectra obtained at UCI in the Borovik lab. EPR is a spectroscopic technique used to study molecules or atoms with unpaired electrons. These paramagnetic centers can undergo transitions between spin states and yield diagnostic information about the metal oxidation state. Cu(I) is a diamagnetic metal center that does not yield an EPR signal, while Cu(II) displays a classical $g = 2.01$ signal. The EPR spectra (shown to the right) elucidated the oxidation state of the copper center(s) to be Cu(I).

EPR data was also collected during the sabbatical on a dinitrosyl iron complex (DNIC) formed from the reduction of nitrite (NO₂⁻) to nitrogen oxide (NO). In biological systems, DNICs are one of the most common cellular NO-containing species and are considered a major pool for NO in mammals. NO has multiple functions in mammals including neurotransmission and vasodilation, and despite nitrite being long regarded as “useless”, it was recently realized that NO₂⁻ is a physiological source of NO. Nitrite reduction has been observed in multiple metalloproteins including (but not limited to) hemoglobin, myoglobin, cytochrome P450, cytochrome c, and nitric oxide synthase. The results of the nitrite reduction by the Gilbertson lab were reported in the RSC journal *Chemical Communications* (2016, DOI: [10.1039/C6CC05962G](https://doi.org/10.1039/C6CC05962G)). The manuscript was coauthored by WWU Master’s students Yubin Kwon and Mayra Delgado.



Overlaid EPR spectra of 1 mM solutions of a series of Cu(I) and Cu(II) PDI complexes.



Faculty Promotions

Clint Spiegel



During the 2015-2016 academic year, Clint Spiegel was promoted to full professor after nine years at WWU. Since joining the Chemistry Department in 2007, Prof. Spiegel has mentored over 45 undergraduate research assistants and seven graduate students. While the Spiegel research group has varied research interests, they're currently focusing on molecular studies that relate to health and human disease. Prof. Spiegel has received multiple awards from the National Institutes of Health to study the immune response to hemophilia A treatment and how bacterial ribosomes function and are inhibited by currently available antibiotics. Clint currently serves as director of the "Research Experiences for Undergraduates" program funded by the National Science Foundation, which is a program that brings 8-10 undergraduates from around the country to WWU for a full-time summer research project. In collaboration with John Gilbertson, Prof. Spiegel was also awarded an NSF Major Research Instrumentation grant to purchase a single crystal X-ray diffractometer for

determining structures of both inorganic complexes as well as biological macromolecules. In recent years, Clint has been fortunate to give presentations on his research related to hemophilia A as an Aflac Visiting Professor at Emory University Children's Hospital in Atlanta, Georgia and at a hemophilia A treatment symposium at Nationwide Children's Hospital in Columbus, Ohio. He was also recently named a Henry Dreyfus Teacher-Scholar, which is a five-year award to help support his research endeavors. In the classroom, Prof. Spiegel teaches seven different biochemistry-related courses which he continually works to evolve so as to best fit the need of each year's students.

Janelle Leger

Janelle Leger, who holds a joint appointment between the Department of Chemistry and the Department of Physics and Astronomy, was promoted to full professor in 2016. Research in the Leger lab focuses on several themes: devices for conversion of solar energy, organic electronic materials and devices, and nanomaterials and nano-optics. Since being hired as an assistant professor at WWU in 2008, Prof. Leger has involved 34 undergraduate students in meaningful independent research experiences and has recently taken on her first chemistry graduate student. Projects in the Leger lab are primarily student-led, with each student responsible for an independent piece of the research effort in terms of work done, intellectual contribution, and communication of research results. Her group has published 12 peer-reviewed papers or book chapters with a total of 24 undergraduate co-author citations representing 12 different students. Prof. Leger's students have also presented numerous talks and posters at the Materials Research Society (MRS), American Physical Society (APS), and American Chemical Society National Meetings. Prof. Leger enjoys teaching interdisciplinary courses at the boundary between physics, chemistry, and materials science. She is also active in promoting a diverse and inclusive environment for STEM majors at WWU.



Faculty Promotions

Amanda Murphy



Amanda Murphy (2001 WWU Alum of Engineering and Chemistry Depts.) joined the department in January 2010 and was recently promoted to associate professor. Amanda teaches organic lecture and lab courses, as well as upper division polymer and materials science courses. Amanda's research is centered on the development of biocompatible materials for bio-stimulation electrodes, electromechanical actuators and controlled drug delivery. To date, she has mentored 32 WWU undergraduates, 3 WWU chemistry master's students, 5 summer REU students, and 5 engineering technology students (senior projects). Her students have contributed to >40 different poster presentations on their work at both regional and national conferences, and have received several awards including travel awards from the American Chemical Society Polymer Science Division. In 2013, her student (Isabella Romero) was a finalist for the Western Association of Graduate Schools Distinguished Master's Thesis Award.

Amanda's group has published one book chapter and six peer-reviewed manuscripts that include 14 WWU undergraduates, two WWU master's students, one engineering student and two REU student co-authors. She has been awarded four external grants from the ACS-Petroleum Research Fund (\$50k), Research Corporation (\$48k), NSF (\$420k, Prof. Janelle Leger is co-PI), and the Dreyfus Foundation (\$18.5k), as well as several internal grants (totaling ~\$60k). To date, these grants have funded 37 undergraduate student summer stipends, two master's students (tuition and stipend for 1 year each), and several new instruments. During her time at Western, Amanda has also created two new little scientists that are now 5 years old and 1 year old, who ensure that there is never a dull moment in her life.

David Rider

David Rider, faculty member split between WWU's Chemistry and Engineering & Design Departments since 2010, was recently promoted to associate professor. David earned his BS from Simon Fraser University and PhD from the University of Toronto. He was a postdoctoral fellow with Dr. Jillian Buriak at Canada's National Institute for Nanotechnology at the University of Alberta. Since 2010, David has served as the PI or co-PI on numerous external grants, including an American Chemical Society Petroleum Research Fund (ACS PRF)-Undergraduate New Investigator award, a Research Corporation CCSA Single Investigator grant, as well as five separate Joint Center for Aerospace Technology Innovation grants and four separate summer research grants from Zodiac Aerospace. His group is currently funded by an award from the ACS PRF, and most recently he was a PI for a Murdock Charitable Trust Instrumentation award that will help to upgrade WWU's electron microscopy facility. David has mentored over 35 undergraduate

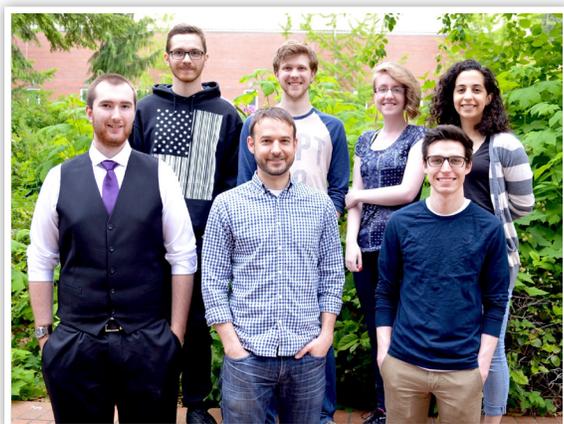


research assistants and four graduate students. His research group focuses on the synthesis, characterization and use of novel nanomaterials for electrocatalysis and new polymers and solutions for aerospace structures. David's group has developed templating methods for the synthesis of multimetallic nanoparticle catalyst arrays and developed new resin formulations for lightweight composite panels for aircraft interiors. This research is inherently interdisciplinary and exposes students to various aspects of synthesis, thin film processing, surface science, engineered materials, and materials science. David and his wife, Sara, have two children (Elena is 4 years old and Lydia is 4 months old).



External Grant Funding 2015-2016

Congratulations to the following chemistry faculty members who were awarded research grants in 2015-2016. ***This year our faculty members (along with some collaborators) brought in over \$1.4 million new research dollars to support research at WWU and collaborating institutions.*** This funding is critical to the growth of our department, and provides important opportunities for students both on and off campus to participate in cutting-edge research. A summary of the projects and awards that received funding is given below.



Antos Research Group

John Antos – Professor Antos received an Academic Research Enhancement Award from the National Institutes of Health (NIH) (\$355,151 for 3 years) for his work entitled “Enhancing the Scope and Efficiency of Sortase-Mediated Ligations”. Protein conjugates containing non-natural features are highly sought after for the study and treatment of a broad spectrum of human diseases ranging from metabolic disorders, to viral infections and cancer. Funds from this grant will support the development of new strategies for generating non-natural protein derivatives based on the reactivity of bacterial sortase enzymes. Further understanding and development of these mild enzymatic reactions will produce valuable protein engineering tools for basic biomedical research, and will also facilitate the synthesis of new classes of protein conjugates that can be used to study or combat a variety of human diseases.

Professor Antos was also recently named a Cottrell Scholar by the Research Corporation for Science Advancement. This distinction includes \$100,000 in research funding over three years. Funds from this award will be used for two major aims: (1) the structural characterization of particular sortase enzyme variants, and (2) the development of a research-based lab experience for the WWU organic chemistry curriculum in which WWU undergraduates will have the opportunity to design, synthesize, and test the activity of potential new antibiotics.

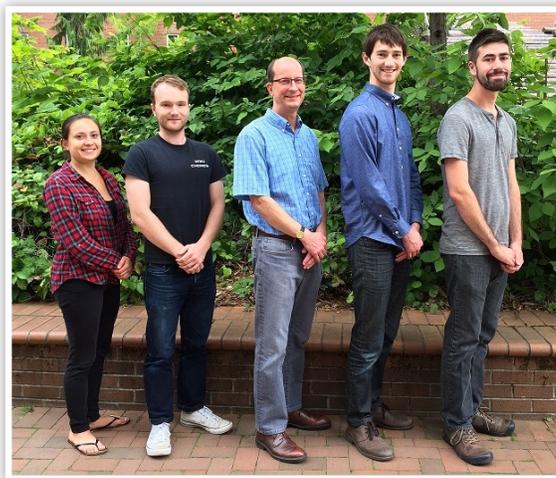
David Patrick - David Patrick and Prof. Steven McDowall (WWU Mathematics Department) received a \$27,000 grant from the Washington Research Foundation (WRF) to further develop and field test transparent solar-electricity generating windows, and to assess the commercial potential of the technology. These studies represent another step in the development of WWU’s solar window, which arose from a collaboration with Profs. John Gilbertson and Daniel Gamelin (UW Chemistry Department) supported by the National Science Foundation and Environmental Protection Agency. The WRF grant is supporting an interdisciplinary team of Western students from chemistry, electrical engineering, industrial design, and business led by Patrick who are building and testing prototypes, assessing commercialization opportunities, and competing in business plan and related student competitions.



External Grant Funding 2015-2016

Emily Borda – Professor Emily Borda and collaborators Andrew Boudreaux, Todd Haskell, and Sara Julin received a grant from the National Science Foundation for their project “Collaborative Research: Unifying Science for Students (USS): Investigating transfer within a coherent, interdisciplinary set of science courses” (Improvement of Undergraduate Science Education (IUSE), National Science Foundation, \$300,000 (\$250,000 to WWU, \$50,000 to PI Sara Julin at Whatcom Community College). A central assumption in most systems of education is that students can apply knowledge and skills beyond the context in which it was originally learned. However, evidence in the education research literature of successful applications of knowledge across contexts, also called *transfer*, has been scarce. In this project, research will be conducted within an undergraduate course series for future elementary teachers designed to develop coherent ideas about energy across four different science disciplines: physics, earth science, biology, and chemistry. A longitudinal study will generate quantitative measures of the transfer of energy concepts from the original learning context, physics, to a target domain, chemistry. Interviews, classroom observations, and analysis of written class work will be used to describe “what transfer looks like” by developing a taxonomy of discipline-specific transfer attempts. Finally, a quasi-experimental study will investigate the impact of metacognitive writing assignments on transfer. Documenting what works in supporting transfer is imperative because transfer is both known to be elusive and is an assumed outcome on which many education systems are built. Finally, this project may help to establish the integrated science course series as a model of teacher preparation, and science education in general, for potential adaptation at other institutions.

Mark Bussell and David Patrick – Professors Mark Bussell and David Patrick were awarded a grant from the Murdock Charitable Trust for their project “A Materials Science Research Alliance in the Pacific Northwest: Advancing Renewable Energy and Building Research Capacity at Predominately Undergraduate Institutions”. This grant will support research at a number of regional institutions, and represents a collaboration between multiple faculty (PI – Amy Spivey (University of Puget Sound), co-PI – David Patrick (Western Washington University), co-PI – Mark Bussell (Western Washington University), co-PI – Andrea Munro (Pacific Lutheran University), co-PI – Carlisle Chambers (George Fox University), \$240,000 (Alliance match: \$145,257).



Bussell Research Group

Greg O’Neil - Professor Greg O’Neil, in collaboration with former WWU chemistry professor Tim Clark (now at University of San Diego), received an NIH AREA grant to investigate new boron- and silicon-based reactions to synthesize biologically important small molecules (\$380,334). With support from this award, which was funded through the National Institute of General Medical Sciences, O’Neil and Clark will build upon their previous Matteson homologation and hydrosilylation success, extending that work to access synthetically challenging and medically relevant structures in fewer steps and with greater selectivities. The research will be conducted at both WWU and USD by primarily undergraduate students.



Chemistry Faculty Publications in 2015-2016

In the past academic year the chemistry faculty have published 22 articles/chapters detailing their research, which include 27 undergraduate and 9 master's chemistry student co-authors.

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

Vyvyan, J.R.; †Longworth (née Dimmitt), H. E.; *Nguyen, S. "Synthesis of (\pm)-centrolobine using a gold-catalyzed cycloetherification," *Synlett* **2016**, 2221-2224.

†Wuerth, M.E.; *Craggerud, R.K.; **Spiegel, P.C.** "X-ray Crystal Structure of the Human Factor VIII C2 Domain in Complex with the Classical 3E6 Inhibitory Antibody." *Scientific Reports* **2015**, 5, 17216.

*Hackler, R. A.; *Hollcraft, A. T.; *Kirkness, T. A.; Larson N. S.; Hoekstra, N. L.; **Rider, D. A.** "Relief of Cure Stress in Prepreg Composites with Engineered Voids: A Solution to Warping in Composite Phenolic Resin/Fiberglass Laminates" *Ind. Eng. Chem. Res.* **2016**, 55, 3568-3578.

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Chemistry Faculty Publications in 2015-2016 (cont.)

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2015-2016 Chemistry Awards

CRC Press Chemistry Achievement Award
Stephanie Neely

Outstanding Honors Chemistry Student Award
Star Summer

Outstanding Organic Student Award
Jessica Ho

Outstanding Organic Research Award
Jesse Prelesnik

Outstanding Analytical Student Award
Cassidy Crickmore

Outstanding Inorganic Student Award
Philip Romano

Hypercube Scholar Award
Jesse Prelesnik

Sea Bong Chang Memorial Biochemistry Award
Sam Witus

Advancing Chemistry Through Service (ACTS) Award
Tess Clinkingbeard
Deanna Myers
Daniel Botamanenko

Outstanding Graduate Teaching Assistant
Joanna Hoppins

Outstanding Department Graduate of 2015/2016
Natasha Siepser



Front row (left-to-right): Sam Witus, Cassidy Crickmore, Joanna Hoppins, Jessica Ho, Stephanie Neely
Back Row (left-to-right): Jesse Prelesnik, Deanna Myers, Natasha Siepser, Star Summer,
Tess Clinkingbeard, Daniel Botamanenko



2016-2017 Student Fellowships and Scholarships

WWU Chemistry Scholarship

Amy Morren
Diane Perez
Nicholas Whitcomb

Verna Alexander Price Chemistry Scholarship

Rebecca Szabo

Jerry Price - Nancy Sherer Scholarship

Mikko Sayre

Ruth Watts Female Scientist Scholarship

Hope Spargo

Barbara French Duzan Scholarships

Matthew Littleton
Stephanie Maxwell
Jade Porubek
Jonathan Wrigley

Women in Science Scholarship

Jessica Ho

HACH Land Grant Undergraduate Scholarship

Cassidy Crickmore
Megan Deshaye

Oscar Edwin Olson Scholarship

Khoa Le

Knapman Chemistry Scholarship

Samantha Grosslight
Ellie James

Women in Science Scholarship

Jessica Ho

Alumni Association Leader Scholarship

Anya Kalata

Denice (Ambrose) Hougen Undergraduate Fellowship

Samantha Grosslight

Morse Research Fellowship

Mikko Sayre
Carlos Enciso Lopez
Diane Perez

Wicholas Research Fellowship

Russel McFarland

Robert L. Hamilton Family Graduate Fellowship in Science

Mayra Delgado



First row (left-to-right): Ellie James, Mayra Delgado, Anya Kalata, Megan Deshaye

Second row (left-to-right): Diane Perez, Jonathan Wrigley, Carlos Enciso Lopez, Matthew Littleton, Rebecca Szabo

Third Row (left-to-right): Khoa Le, Cassidy Crickmore, Jessica Ho, Mikko Sayre

Fourth Row (left-to-right): Hope Spargo, Russell McFarland, Samantha Grosslight, Stephanie Maxwell



Outstanding Graduate of 2016

Natasha Siepser

Natasha Siepser, the Outstanding Graduate from the Department of Chemistry, graduated in June with a Bachelor of Science in Chemistry and a Minor in Materials Science. She was actively involved in research in the group of David Rider, an associate professor of chemistry and engineering & design. She has been proactive about securing funding for her project by drafting two successful WWU-sponsored research proposals and drafted and submitted a manuscript detailing her work. She presented her work at regional and national conferences, including the national American Chemical Society spring meeting of 2016, the 2015 Murdock College Science Research Conference, and the Puget Sound Section meeting of the American Chemical Society. Siepser is also passionate about outreach, and has been active in the Chemistry Club and even recently served as a panelist in a student-led workshop discussing graduate schools. She was the recipient of the Denice (Ambrose) Hougden Chemistry Undergraduate Fellowship in 2015, the Outstanding Analytical Chemistry Student Award in 2015, and the CRC Press Freshman Chemistry Award in 2013. Next, she will attend Indiana University to work on a doctorate in analytical and materials chemistry. Siepser is the daughter of Randy and Cheryl Siepser and is a graduate of Kentridge High School in Kent, WA.



Natasha Siepser

The WWU Chemistry Department Newsletter #17 was produced by:

John Antos (chair): writing, editing and layout

Amanda Murphy: editing, photography and layout

Sal Russo: writing and editing

Gary Carlton: editing and layout



2015-2016 Chemistry Graduates

Congratulations to all **90** of our graduates from Fall 2015 to Summer 2016!

BS Biochemistry

Erin Aldag
Nickolas Allen
Alexander Atwood
Taylor Blatz
Daniel Botamanenko
Richard Burns
Jared Chang
Luke DeGraaf
Brigham Dehn
Jayme Ehlers
Preston Ehrlich
Brian Foerster
Seth Freter
Viktor Golovin
Bassam Haddad
Jeffrey Hyde
Cameron Jarvis
Christopher Jones
Dominic Lusk
Steven Mahnke

Madeline Mathews
Clay Morrison
Alexis Neuman
Jesse Prelesnik
Sierra Reed
Jessalyn Rogers
Jakub Rynkiewicz
Emily Sanders
Catherine Shelton
Jackson Snyder
Micah Stumme-Diers
Ka Yi Tsui
Ryan Walsh
Samuel Witus

BS Chemistry

David Brewster
Emily Brown
Brian Carlson
Pui Man Cheung
Tess Clinkingbeard

Elizabeth Cummins
Conner Darlington
Steven Eiselt
Melany Fry
Natalya Garcia
Steven Gasca
Viktor Laszlo
Charlotte Mesecar
Catherine Miles
Deanna Myers
Benjamin Rogers
Philip Romano
Sophia Schiefelbein
Samuel Schneider
Natasha Siepser
Dane Stanfield
Trevor Stockdale

BA Chemistry

Adam Benton
Alex Blough-Swingen

Jacob Burbery
Andrew Hoffman
Andrew Hollcraft
Jared Ickert
Kristofer Lindenauer
Michelle Mauro
Mark McCauley
Zachary Meyer
Robell Morehouse
Colby Morris
Christian Moulaison
Carlos Perez
Penelope Plyler
Daniel Prall
Christopher Robertson
Sierra Southworth
Nicole Steed
Nathan Sundine
Jeremy Thompson
Bradley Verbon
Jennifer Wiebracht

MS Chemistry

Paul Cochran
Linda Grabill
Robert Henderson
Joanna Hoppins
Rachel Hubbard
Yubin Kwon
Iris Phan
Sean Severt
Ryan Sumner
John Williams
Alicia Wright



Scholars Week 2016

The Chemistry Department was very active during WWU's 2016 Scholars Week event, which included a banquet for research students and their advisors, as well as opportunities for students to present their research in campus-wide poster sessions. Notably, 11 posters from students involved in chemistry research were recognized with an *Outstanding Poster Award* (see below). This honor was conferred on only 15% of the over 160 posters presented this year.

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 Anna Krylov, who is a Professor of Chemistry at the University of Southern California. Prof. Krylov's research program seeks to explain the chemistry of open-shell species, including radicals and electronically excited states, through the development of electronic structure methods rooted in coupled cluster theory. Prof. Krylov spent two days interacting with students and faculty. Her visit culminated in a symposium on May 20th, in which WWU chemistry students Catie Shelton, Jesse Prelesnik, Catherine Miles, Sam Witus, and Alexis Neuman all gave oral presentations as part of completing their Honors Theses, followed by a keynote address by Prof. Krylov. All of these activities were made possible by the Pavia-Lampman-Kriz Chemistry Endowment and The Western Foundation Chemistry Fund.

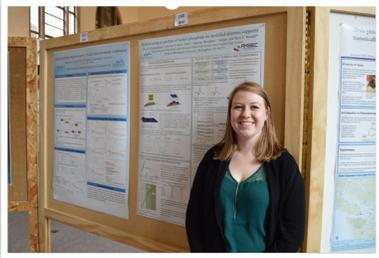


Undergraduate Poster Awards:

- Ka Yi Tsui and Nicole Onishi (PI: Robert Berger) "Geometrically designing the ideal environment for perovskite dopants"
- Tess Clinkingbeard (PI: Mark Bussell) "Hydrotreating properties of nickel phosphide on modified alumina supports"
- Catherine Miles (PI: Mark Bussell) "Nickel phosphide on boron doped alumina: new catalysts for heteroatom removal reactions"
- Deanna Myers and Luke DeGraaf (PI: Steven Emory) "Surface-enhanced Raman scattering optical fibers as chemical sensors"
- Natalya Garcia (PI: Tim Kowalczyk) "Simulating the excited state of an organic dye in solvent and in a porous medium"
- Emily Sanders (PI: Amanda Murphy) "Electrically conductive silk fibroin scaffolds for use as nerve conduits"
- Natasha Siepser (PI: David Rider) "Layer-by-layer thin film assembly and catalysis using polymer-capped Au nanoparticles"
- Samantha Grosslight and Hope Spargo (PI: James Vyvyan) "Intramolecular reductive Heck approach to guaipyridine alkaloids"
- Rachel Owen (PI: Janelle Leger) "Guided-wave plasmon polariton modes in high-index dielectric structures"
- Carly Fengel (PIs: Janelle Leger / Amanda Murphy) "Biocompatible silk-poly(pyrrole) composite trilayer electromechanical actuators"
- Nicholas Horvath and Jesse Prelesnik (PI: John Antos) "Evaluating nucleophile and substrate specificities of sortase A homologs for orthogonal reactivity"



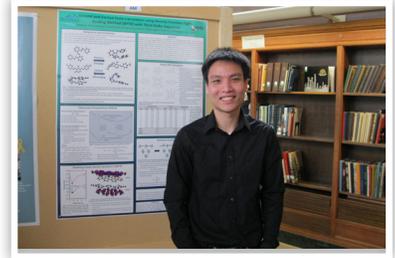
Scholars Week 2016 Photos



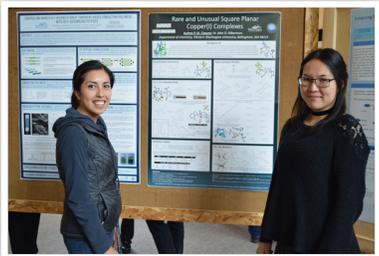
Tess Clinkingbeard



Jesse Prelesnik, Sam Witus, Catherine Miles, Catie Shelton & Alexis Neuman



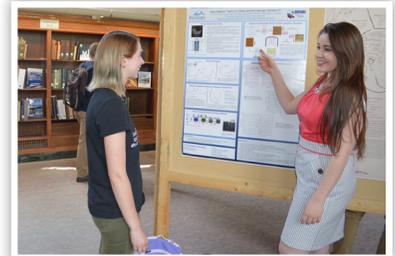
Khoa Le



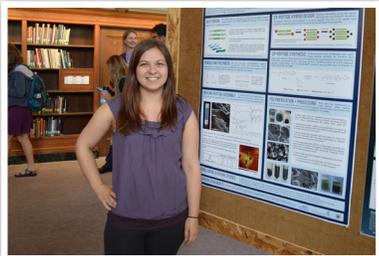
Mayra Delgado and Audrey Cheung



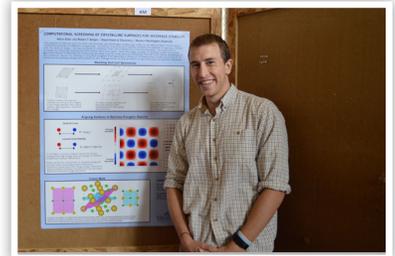
Betsy Raymond & Steve Emory



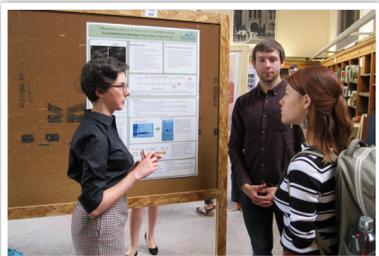
Diane Perez



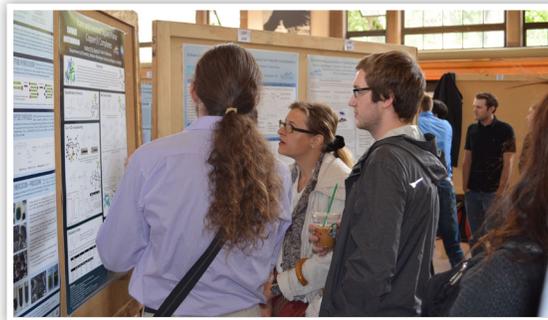
Melany Fry



Adam Elder



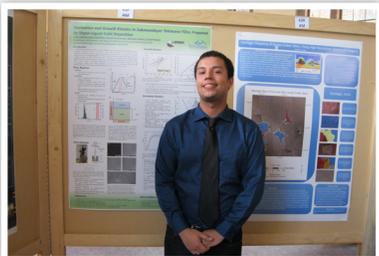
Jessalyn Rogers and Russell McFarland



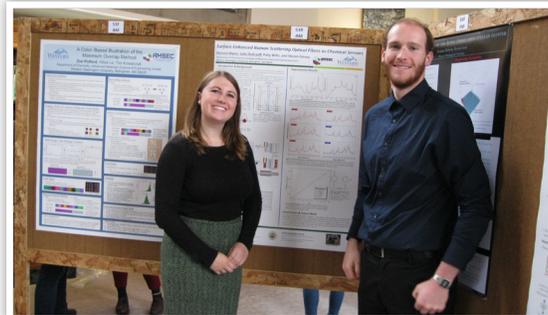
Tim Kowalczyk & Anna Krylov



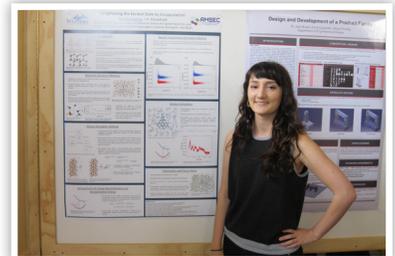
Nick Horvath & Jesse Prelesnik



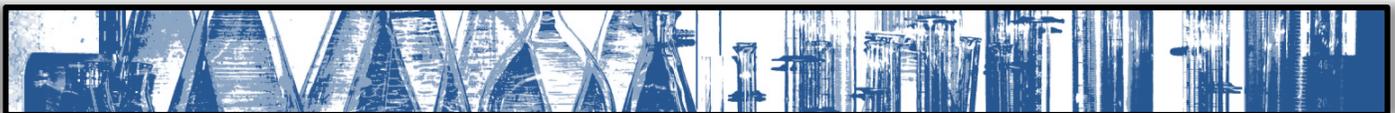
Robell Morehouse



Deanna Myers & Luke DeGraaf



Natalya Garcia



WWU Chem Club – A Tradition of Outreach and Excellence

WWU's Student Chapter of the American Chemical Society (aka the Chem Club) continues to build on its strong tradition of service to the department and the broader community. The 2015-16 Chem Club received an Outstanding Student Chapter Award from the American Chemical Society. This marks the 6th consecutive year the club has been recognized at this level and it would not have been possible without our students' generous donation of time, and the support of the department's faculty and staff!

The 2015-16 year was a busy one! Collaboration between student clubs in the College of Science and Engineering started to gain traction, with Mix it Up! in the fall, a Girl Scout experiment day, and a GEMS Academy in the winter. As always, liquid nitrogen ice cream is a favorite club demo and a true audience pleaser; we estimate that over the course of the year, we made nearly 10 gallons!

The club's outreach efforts continue to expand as well, with demo shows both on campus and at local schools. If you are in Whatcom or Skagit County and are connected with a school you think would enjoy a Chem Club demo show, please contact Dr. Raymond or Dr. Emory; we would love to expand our offerings. Additionally, if you are planning on being on campus for Back-2-Bellingham the weekend of May 19th-21st, plan on coming to Chempllosion! on Saturday afternoon to see many of our explosive demonstrations.

The club continues to host at least one major social event a quarter: Costume Bowling in the fall, Chemistry Trivia night in the winter (where the upcoming year's shirt is decided), and of course the picnic in the spring. The picnic was held at Whatcom Falls Park last year, as Fairhaven Park was reserved an entire year in advance, but the new venue worked well, and we will again hold the picnic at Whatcom Falls Park this coming year. Without the large hill for the last leg of the Molympics relay, a "dizzy dingbats" leg was added, which was not only very successful, but highly entertaining as well. Dr. Scheuermann handily won the title "Ruler of the Periodic Kingdom" in the Periodic Table Challenge, and it seems unlikely that she will be relinquishing that title anytime soon. The spring 2017 picnic will be held on Saturday May 27th, and alumni are always welcome.

All of these events are currently made possible through students' fundraising efforts such as selling beaker mugs and t-shirts. Please consider making a donation to the Chem Club fund to support our students and their activities. To keep up with the club, visit and like our Facebook page: www.facebook.com/wwuchem

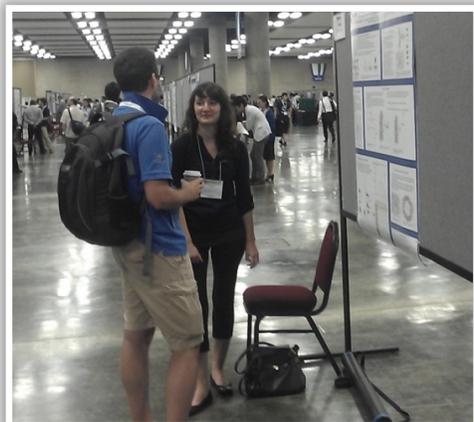
-Betsy Raymond & Steve Emory



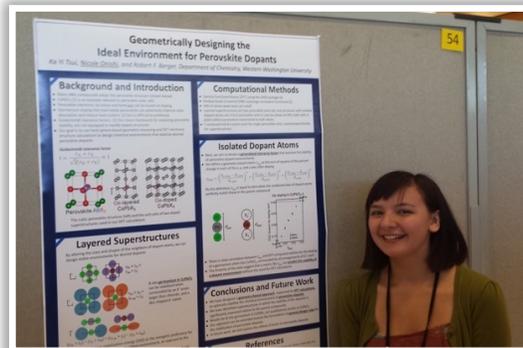
Department Picnic Photos 2016



Student Attendance at National Conferences

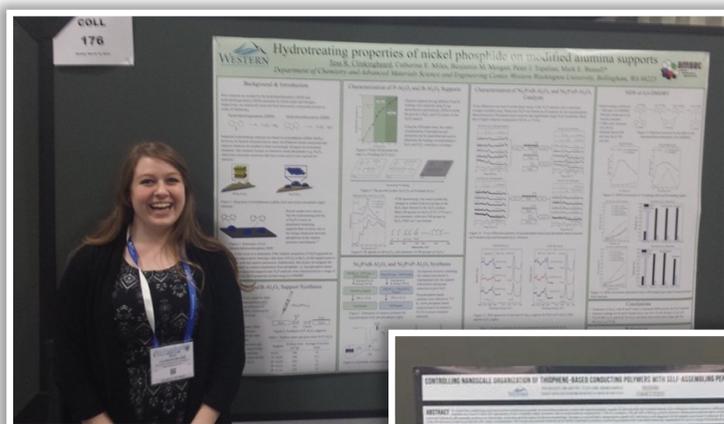


Natalya Garcia (Kowalczyk Lab)
Pacifichem
December 2015
Honolulu, HI



Nicole Onishi
(Berger Lab)
TACC
August 2016
Seattle, WA

Carly Fengel & Rachel Owen
(Leger Lab)
American Physical Society
March 2016
Baltimore, MD



Tess Clinkingbeard (Bussell Lab, top)
Taylor Blatz (Murphy Lab, bottom)
National ACS
March 2016
San Diego, CA

