

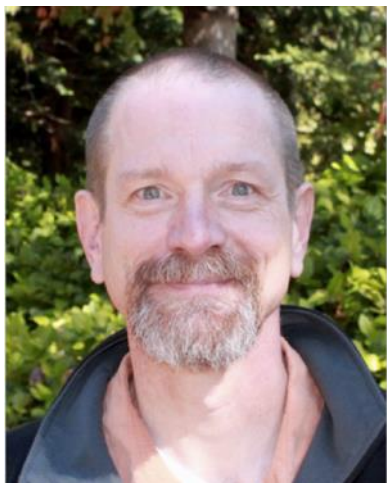


SPRING 2020 NEWSLETTER

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MESSAGE FROM THE CHAIR



Greetings!

From all the staff and faculty in the Chemistry Department, we send our best wishes for the health and well-being of you and your loved ones during these challenging times. We hope, once you get beyond these opening remarks (which are a mix of unfortunate as well as good news), that this newsletter will provide some brief diversion from the grim news of the COVID-19 pandemic and its consequences.

You are likely aware of some of these consequences for the WWU community, such as the move to online instruction for the Spring 2020 and Summer 2020 quarters. As of this writing, we are unsure how classes will be conducted in Fall 2020, though we expect social distancing will require that larger lectures are to be delivered online. As you can imagine, lab courses have been a challenge for us to adapt to remote instruction – especially the upper-division labs. We are also saddened to not hold Winter or Spring Commencement, nor our annual end-of-year celebration of our 2019-20 graduates and 2020-21 scholarship awardees. We are also uncertain about the status of research activity with students for the summer, though we hope to phase in more research activity as revisions are announced to State guidelines for managing the pandemic. Given that uncertainty, we opted to cancel the Summer 2020 Research Experiences for Undergraduates (REU) program that has been funded by the NSF for the past four years. Finally, another unfortunate consequence of the pandemic is the cancellation of the ACS Northwest Regional Meeting (NORM 2020), which was to take place here in late June.

In terms of brighter news, you will find in these pages a listing of many remarkable achievements of our students and alumni, as well as introductions to new staff and faculty. The involvement of students in externally-funded research remains the hallmark of our program, and this past year our faculty published 20 peer-reviewed papers with 37 student co-authors. We are also pleased to report several promotions for tenure-track and teaching faculty in the following pages. We also have staff changes to report: Many of our recent alumni benefitted from the advising they received from Stacey Maxwell, who recently finished her M.A. in Special Education and is now working at Lynden High School. As much as we all miss Stacey in the front office, I am pleased to welcome Miranda Abrashi to our staff. We also welcomed two new tenure-track faculty: Dr. Erin Duffy (Chemical Education) and Dr. Jay McCarty (Computational Biophysics). We were also successful in recruiting another Chemical



Education faculty member, Dr. Norda Stephenson, who we will be delighted to introduce in the next edition of the department newsletter.

This year we are featuring news of two recent alumnae, Anne and Andrea d'Aquino (WWU 2014 graduates), who have recently finished Ph.D. degrees at Northwestern University and are starting postdocs at Stanford University. Anne and Andrea were speakers at the 2014 WWU Commencement, and you can view their moving and uplifting remarks at this [link](#). The d'Aquinos have continued to excel not only in science, but also in the promotion of equity and inclusion in STEM fields. Their stories illustrate what we know to be true of so many of our graduates: They are using their superpowers to achieve much good in the world! I know I speak for the entire department when I say that we draw our inspiration from our students...past and present.

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 gifts to the department, and for those gifts we are truly grateful. Current circumstances have put the financial well-being of many in jeopardy. Many current students have lost their employment (including some who were planning to conduct grant-funded research this summer). Thus, if you are able to contribute to WWU this year, we ask you to consider donating to the [WWU Student Emergency Fund](#).

Finally, I want to express my thanks to our staff, faculty, students, alumni, and supporters for all you have done over the past four years to promote and improve the Chemistry Department, and to support our students as they pursue their aspirations. I am deeply grateful for the opportunity to work with all of you! I will be stepping down as department chair in June and I look forward to new leadership and fresh ideas from Prof. Clint Spiegel, who will be the next chair. May his first newsletter, a year from now, mark substantial progress during a welcome emergence from these challenging times.

With best wishes for your continued good health – THANK YOU!

Spencer Anthony-Cahill



DEPARTMENT GRADUATES

Congratulations to all **80** of our graduates from Fall 2018 to Winter 2020!

B.S. Biochemistry

Connor Aamot
Kendelyn Bone
Lia Cook
Nicole Corbett
Sergey Datskiy
Rahwa Demoz
Natasha Hessami
Larry Kelly
Chandler Kruck
Jennifer Le
Akashdeep Malhi
Jessica Mantchev
Kelly Mossman
Micah Nakao
Grace Nirenberg
Jade Porubek
Jami Pratt
Steven Reese, Jr.
Erin Rosenkranz
Kathryn Sickles
Derrick Smith

Paul Spaltenstein
Jordan Valgardson
Nicolas Velardi
Rachael West
Mary Witt

B.S. Chemistry

Diego Acevedo
Michael Berry
Sebastian Ceaser
John Crockett
Stuart Doty
Holly Jones
Seagan Keefe
Daniel Korus
Matthew Littleton
Evan Long
Walker Marks
Geoffrey McClarin
Briana Mulligan
Christopher Myers
Ayesha Nadeem

Karsten Newby
Nathan Oliveira
Sage Olson
Zachary Onorati
Evan Patamia
Jaswant Patara
Tori Quade
Jarrod Sage
Racine Santen
Matthew Smiley
John Springer
Star Summer
Reuben Szabo
Mia Tenbusch
Maggie Wang
Kelly-Marie Yokuda

B.A. Chemistry

Brandyn Black
Gunnar Carlson
Vixen Cope
Zachary Dugan

Tuesday Hanson
Andrew Hood
Zachary Landram
Madison Newman
Mathew Pearce
Logan Sizemore
Spenser Stumpf

M.S. Chemistry

Gabriel Bourne
Sarah Bowersox
Emily Brown
Sarah Clark
Joseph Gish
Nicholas Horvath
Tianqi Luan
Griffin Reed
Alyson Silva
Chris Swanson
Britt Tyler
Cooper Vincent

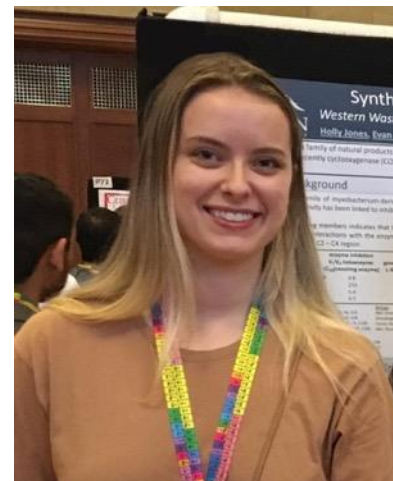


Spring 2019 Commencement

OUTSTANDING GRADUATES OF 2019

HOLLY JONES (OUTSTANDING UNDERGRADUATE)

Holly Jones was selected as the 2019 Chemistry Department Outstanding Undergraduate Student, in recognition of her remarkable achievements while completing a B.S. degree in Chemistry and a minor in Mathematics. What made Holly stand out among her peers was a combination of exceptional academic performance (cumulative 3.98 GPA), research accomplishments (as part of both Chemistry's Independent Study program and during the summer supported by the National Institutes of Health), commitment to and effectiveness as a Teaching Assistant, and service to the Chemistry Department (as a member of the Chem Club). Holly has been the recipient of numerous scholarships and awards including the Ruth Watts Female Scientist Scholarship (2018), the Outstanding Organic Student Award (2017), and the CSE Women in Science Scholarship (2017). Holly joined Prof. Greg O'Neil's research group in 2018, and worked on synthesizing and studying a family of anti-cancer natural products known as the archazolidins. Holly presented her research at the American Chemical Society National Organic Symposium at the University of Indiana. She plans to attend medical school.



EMILY BROWN (OUTSTANDING M.S. STUDENT)

Emily Brown, the Outstanding Chemistry Master's Student, graduated in December of 2018. Emily, who grew up in Burlington WA, completed her A.A. in General Studies at Skagit Valley College on her way to WWU. In the process of earning a B.S. in Chemistry (Class of 2016), Emily participated in undergraduate research in Prof. David Rider's group, and held part-time jobs and an internship as a lab intern at Janicki Industries in Sedro Wooley. As an M.S. student and graduate teaching assistant at WWU, Emily spearheaded a new project in collaboration between the Rider group and Safran Cabin (formerly Zodiac Aerospace) and was able to publish the results of her work during her first year (currently a Rider Group record!). Emily's thesis has laid the foundations for several ongoing and funded projects still underway in the Rider group. Since earning her M.S. degree, Emily has taken up a career as a Research & Development Chemist at Safran Cabin, and continues to collaborate with faculty and students at WWU. She wishes to thank



David Rider, Greg O'Neil, John Misasi, Mark Peyron, the Rider Group and its lab neighbors, as well as the Chemistry Department staff and especially Stacey Maxwell. Emily would also like to thank her parents Harlan and Rhonda Brown, and her grandparents John and Twyla Brink.

JOHANN SIGURJONSSON (OUTSTANDING M.S. STUDENT)

Johann Sigurjonsson, the Outstanding Biochemistry Master's Student, graduated in August of 2018. Johann came to WWU in 2010 and completed his B.S. in Biochemistry with honors in Winter of 2015. He joined the Anthony-Cahill research group in 2012, where he worked with mutants of human hemoglobin that we hope will ultimately lead to a useful oxygen-carrying therapeutic for treatment of acute blood loss. In collaboration with Prof. Clint Spiegel, Johann solved the X-ray crystal structure of a novel dimeric hemoglobin that he produced in the Anthony-Cahill lab. While an undergraduate, Johann made several poster presentations of his work (e.g., at the 2013 Protein Society Symposium in Boston), and gave oral presentations at the 2014 Murdock College Science Research Conference and the 2014 Volcano Conference on Chemical Biology. He was recognized by the biochemistry faculty as the Outstanding Biochemistry Student for 2015. In September of 2016, Johann returned to WWU to pursue a M.S. degree, and he once again joined the Anthony-Cahill group. For his M.S. research, he worked on a collaboration with the lab of Prof. John Antos, using sortase-mediated ligation to modify hemoglobins with "click chemistry" functional groups, as well as using sortase for direct ligation of hemoglobins. Johann established critical proof-of-concept for this new route into polymeric hemoglobins for use in critical care, and thereby set the stage for subsequent work in the lab. Johann started his M.S. research at the same time that Prof. Anthony-Cahill began as chair, and it is fair to say that Johann was effectively managing the lab during this time – something for which his advisor will be forever grateful! Following his thesis defense in August of 2018, Johann quickly found a position setting up and running a high-throughput X-ray crystallography lab at Omeros Corp. in Seattle. Johann worked there until moving to Seattle Genetics in September of 2019, where he is in the Conjugation Group.



NEW FACULTY AND STAFF

We are excited to welcome several new faculty and staff who joined our department in the past year!

MIRANDA ABRASHI, PROGRAM COORDINATOR

Miranda Abrashi joined the department as a Program Coordinator in October of 2019. Ms. Abrashi moved from Dallas, Texas to attend WWU in 2015, and graduated with a B.A. in Communication Studies and a minor in Business Administration. As a student, she was involved on campus as an Orientation Student Advisor, a Communication Department Ambassador, and Program Support Staff for Facing the Future – an on-campus publishing company. Ms. Abrashi worked as an Event Coordinator in Conference Services after graduating in June of 2019 and later joined the Chemistry Department. She is excited to be a part of a new academic department, learn more, and help students succeed in their chemistry program. When she isn't working, she enjoys camping, biking, cooking, taking photos, and spending time with her bunny, Graham.



ERIN DUFFY, ASSISTANT PROFESSOR

Erin Duffy joined WWU in the fall of 2019 as an Assistant Professor of Chemistry and Science Education. Raised in South Jersey, Dr. Duffy ventured north to Syracuse University, where she earned a B.S. in Chemistry in 2012. For graduate school, she moved to the Midwest to attend the University of Wisconsin—Madison. Advised by Prof. Etienne Garand, she used mass-selective vibrational spectroscopy to characterize structures and noncovalent interactions of molecular ions and clusters; her thesis centered on a ruthenium water oxidation catalyst and electrochemical intermediates.



After earning her Ph.D. in 2017, Dr. Duffy shifted her focus to chemistry education research. Her postdoctoral work with Prof. Melanie Cooper at Michigan State University provided her with valuable experience in qualitative research methods to assess teaching and learning within chemistry and



across scientific disciplines. At WWU, Dr. Duffy plans to leverage this experience to evaluate (and ultimately improve) teaching and learning of physical chemistry and in laboratory environments.

Outside of work, Dr. Duffy hopes to take advantage of Bellingham's relatively nice weather to get back into long-distance running outdoors. In the meantime, she enjoys the indoor activities of playing board games and spending time with her cats, Alchemy and Pogo.

JAY MCCARTY, ASSISTANT PROFESSOR

Jay McCarty joined the department as an Assistant Professor of Computational Biochemistry in the fall of 2019. Originally from Huntington Beach, California, Dr. McCarty received his B.S. in Biochemistry from the California Polytechnic State University in San Luis Obispo. He then moved north to obtain his Ph.D. in Chemistry from the University of Oregon, where he completed his graduate work in the group of Prof. Marina Guenza. His dissertation developed a theoretical framework for coarse-graining and modeling of complex macromolecular fluids by computer simulation. After graduate school, Dr. McCarty held a postdoctoral appointment in the Department of Chemistry and Applied Biosciences at ETH Zürich Switzerland, where he worked in the group of Prof. Michele Parrinello to develop new methods for atomistic level simulation of condensed systems. Most recently, he was a postdoctoral fellow in the Department of Chemistry and Biochemistry at the University of California Santa Barbara, working jointly with Prof. Joan-Emma Shea and Prof. Glenn Fredrickson to study problems related to protein folding, adsorption, and aggregation.



Dr. McCarty's research interests are in the use of computer simulations to study the dynamic behavior of biological macromolecules. This involves studying physical phenomena that occur on very long time scales, and his research uses a variety of computational strategies to improve the sampling of these rare events. His research seeks to answer fundamental questions of how complex molecular systems self-organize into supramolecular assemblies, and how local motion in proteins can propagate to global conformational changes. His work is highly interdisciplinary and has applications in biochemistry, materials science, neuroscience, and biophysics. Outside of research, he enjoys reading and traveling, and his hobbies include playing guitar, skiing, and tennis.



ALUMNI SPOTLIGHT

Drs. **Anne and Andrea d'Aquino** were 2014 graduates of our department (in Biochemistry and Chemistry, respectively). Both recently earned Ph.D.s from Northwestern University, and graciously agreed to share their experiences in our newsletter. We pick up the story shortly before their graduation from WWU.



On April 1, 2014, Anne and Andrea received notice that they had both received the National Science Foundation Graduate Research Fellowship and seized the opportunity to conduct graduate-level research at Northwestern University. During the summer of 2014, Anne and Andrea left Bellingham with just a few checked bags in hand and flew over 2,000 miles to Chicago, IL, where they began their new journey through graduate school.

Anne: While at WWU, I conducted research in the lab of Prof. Clint Spiegel where I studied the structure and function of an engineered human-porcine blood coagulation factor VIII protein using biochemical and protein crystallography techniques. After receiving my B.S. in Biochemistry from WWU, I was interested in pursuing research on the ribosome. As a graduate student in the Interdisciplinary Biological Sciences (IBiS) Program at Northwestern I joined the lab of Prof. Mike Jewett, where I worked on understanding and engineering the ribosome's active site.

The ribosome is the protein synthesis machine of the cell, and I like to think of it as the chef of the cell. Just as a chef reads a recipe and combines ingredients to make a dish, the ribosome reads cellular instructions and connects building block molecules (amino acids) to construct proteins. Similar to the final dish a chef produces, the ribosomes produce proteins – the molecules that maintain the health of the cell. My Ph.D. research aimed to understand how changes or mutations to the ribosome impacted its function and how these mutations can be leveraged to design and build specialized ribosomes with new functions.

Andrea: While at WWU, I conducted research in Prof. Bussell's lab where I developed heterogeneous hydrotreating catalysts for the production of cleaner fuels. Developing heterogeneous catalysts in the Bussell lab stimulated my fascination with Nature's catalysts: enzymes. I was particularly fascinated by the powerful ability of enzymes to switch their activity in response to a stimulus. Looking to harness this power in the lab, I joined the research group of Prof. Chad Mirkin at Northwestern University,



where I developed synthetic enzyme mimics using a combination of organic and inorganic chemistry approaches.

Anne: The transition to graduate school was not easy for us; as first-generation college students, we found navigating the graduate school environment to be quite challenging and intimidating. For starters, Andrea had joined a lab that had over 70 people (graduate students and postdocs)! You can imagine how different and challenging that was for her. We were incredibly lucky to have one another to help support each other through this big transition in our lives, and found support in our family, friends, and great mentors at WWU. We navigated the nuances of selecting labs and teaching undergraduate courses and overcame numerous obstacles in our research. Though challenging, we found graduate school to be incredibly enriching and stimulating. We had the opportunity to collaborate with a diverse range of scientists, to attend and present at national and international conferences, and to learn from other graduate students that had drastically different backgrounds from our own.

Andrea: Beyond our research, Anne and I were deeply motivated to bring science to the greater community. As first-generation college students, having tremendous mentors and leaders to look up to was important to our growth as individuals and as scientists and to our success in our educational careers.

Appreciating the importance of mentorship and influential role models, Anne and I began to brainstorm and implement a diverse range of programs and outreach events aimed at inspiring the next generation of scientists and promoting greater diversity within STEM.

Anne: During our second year of graduate school, we spearheaded a program called “HERStory” in collaboration with the Museum of Science and Industry. HERstory is now an annual outreach event at the Museum of Science and Industry and it aims to encourage young girls – particularly minorities – to pursue science in academia and beyond.

During our last years of graduate school, we got involved with Northwestern’s Prison Education Program (NPEP), a program that had profound impacts on our lives. NPEP is an initiative of Northwestern University to provide a high-quality liberal arts education to incarcerated students in Illinois in partnership with Oakton Community College and the Illinois Department of Corrections. Through this program, I had the incredible privilege of teaching college-level courses at Stateville Correctional Center – a maximum security prison in the state of Illinois – and in Division 10 of the Cook County Department of Corrections. Andrea also taught at Stateville Correctional Center and taught the program’s very first chemistry course.



Andrea: Graduate school is an incredible time and opportunity to not only conduct new research, but to also develop your science writing, teaching, and communication skills and to learn about entirely new areas of scientific research. During my third year of graduate school, I had the unique opportunity to attend the 67th Lindau Nobel Laureate Meeting in Lindau, Germany, as a U.S. delegate. It was an honor and a privilege to meet some of the most influential scientists and chemists in the world, and I left that meeting feeling inspired to continue conducting meaningful scientific research, and unafraid to do so in a new field of science. I began to realize that sometimes making great contributions to science means making great changes in your field of research. As I neared the end of my Ph.D., I became motivated to pivot into a new field of research and, specifically, immerse myself in the field of biomedical engineering.

Anne: In my fourth year of graduate school, I was nominated for, and received, Northwestern University's Presidential Fellowship. This fellowship allowed me to meet a broad range of Ph.D. candidates from backgrounds very different from my own. Discussing their research instilled a greater drive in me to diversify my research background. The importance and impact of interdisciplinary research became even more apparent to me as I spoke with students conducting research in areas ranging from the origins of language to the treatment of autoimmune diseases to ecological theory and even machine learning. I was even more motivated to pursue further research after my Ph.D., but to significantly change and diversify my research experience.

Andrea: After defending our theses, we both accepted postdoctoral positions at Stanford University. I am currently working in the lab of Prof. Eric Appel in the Materials Science and Engineering Department, where I am developing therapeutic biomaterials for drug delivery and the treatment of diabetes. Most recently, I was notified that I was one of 22 postdoctoral scholars to be named a Schmidt Science Fellow and feel incredibly privileged and honored to be supported in my research and career goals as I pivot into a new area of research.

Anne: For my postdoctoral research, I will be moving to Stanford in September and will be merging plant biology, engineering, and chemistry to study and understand metabolites involved in disease resistance in plants. By doing this, we can target and engineer pathways that enhance plant disease resistance.

Andrea: Western Washington University's Chemistry department did more than just prepare us for a career and life of science. WWU inspired within us a deep curiosity for science, instilled persistence within us for overcoming difficult challenges, but most of all, Western's Chemistry department has provided us unwavering encouragement and support throughout our academic journeys. For that we will always be tremendously thankful!



2018-19 STUDENT AWARDS

CRC Press Chemistry Achievement Award

Isaac Heiman

Outstanding Honors Chemistry Student

Kensington Hartman

Outstanding Organic Chemistry Student

Melody Gao

Outstanding Analytical Chemistry Student

Eli Doeblen

Outstanding Inorganic Chemistry Student

Nathan Oliveira

Outstanding Physical Chemistry Student

Kelly Yokuda

Hypercube Scholar

Reuben Szabo

ACS Senior Organic Chemistry Student Award

Evan Long

Sea Bong Chang Memorial Biochemistry Award

Jordan Valgardson

Advancing Chemistry Through Service (ACTS)

Douglas Baumgardner

John Crockett

Akashdeep Malhi

Chair's Award for Outstanding Student Initiative

Kristopher Aguayo

Lia Cook

Natasha Hessami

Kelly Yokuda

Outstanding Graduate Teaching Assistant

Britt Tyler

Outstanding M.S. Graduates

Emily Brown

Johann Sigurjonsson

Outstanding Department Graduate

Holly Jones

Presidential Scholar

Natasha Hessami

Fulbright Scholar

Natasha Hessami



2019-20 STUDENT FELLOWSHIPS AND SCHOLARSHIPS

WWU Chemistry Scholarships

Iain Mackley
Celena Wilson

Larry Heimark Chemistry Scholarship

Alexandra Hoff

Rathmann Family Foundation Scholarship

Rachael Gitnes

HACH Land Grant Undergraduate Scholarships

Jack Clemens
Andrew Hood
Brittany Mureno

Verna Alexander Price Chemistry Scholarship

Lucy Williams

Jerry Price - Nancy Scherer Scholarship

Ryan Hagmann

Ruth Watts Female Scientist Scholarship

Erin Rosenkranz

Knapman Chemistry Scholarships

Melody Gao
Dedeepya Gudipati

Barbara French Duzan Scholarships

Hanalei Lewine
Reilly Lynch
Izzi Piper
Estelle Ronayne

Alumni Association Leader Scholarship

Maya Noesen

Barbara Ellen Maguire Scholarship

Bodi Van Roy

Jarvis Memorial Summer Research Award

Tara Chin
Rachael Gitnes
Wyatt Parks

NSF REU Award

Melody Gao

Denice (Ambrose) Hougen Undergraduate Fellowship

Kristina Boyko

Karen and Joseph Morse Research Fellowships

Kristopher Aguayo
Connor Gallagher



OTHER STUDENT AND ALUMNI RECOGNITION

- **Melody Gao** (Biochemistry major and co-president of the WWU Chem Club) was awarded a 2020 Goldwater Scholarship.
- **Reilly Lynch** (Chemistry major) was one of 18 undergraduate students across the country to be named a 2020 ACS SCI Scholar.
- Recent department graduates **Khoa Le** and **Amy Morren** were awarded 2020 NSF Graduate Research Fellowships, and **Ellie James** received Honorable Mention.
- Dr. **Andrea d'Aquino** (2014 alum of WWU Chemistry) was one of 22 early-career scientists to be named a 2020 Schmidt Science Fellow.
- Dr. **Zachary Thammavongsy** (2011 B.S. and 2013 M.S. alum of WWU Chemistry) was one of 30 early-career scientists around the world to be named a 2020 CAS Future Leader by the American Chemical Society.

WWU CHEM CLUB

Under the leadership of Profs. **Betsy Raymond** and **Steven Emory** and student co-presidents **Melody Gao** and **Alexandra Hoff**, the Chem Club had another great year. Students have continued to be extremely generous with their time, and the Club earned a 9th consecutive Outstanding Chapter Award from the ACS and a Green Chemistry Award!



FACULTY AND STAFF PROMOTIONS

ROB BERGER PROMOTED TO ASSOCIATE PROFESSOR

Rob Berger joined the department in 2013 and was promoted to Associate Professor in 2019. His teaching primarily focuses in physical chemistry, and has also included courses in general chemistry and computational chemistry. In recent years, Dr. Berger has worked toward “flipping” his physical chemistry courses, recording videos with lecture content so class time can be used for problem solving and computer simulation activities. His favorite part of teaching is hearing a student begin a sentence with, “I thought I was going to hate p-chem, but...”

Dr. Berger’s research program focuses on the computational design and understanding of materials for energy applications. He and his students have made predictions about how best to design and tune perovskite materials for solar cells and photocatalysts. Over the past seven years, the Berger group has included fourteen undergraduate and three master’s students, and has co-authored ten peer-reviewed publications. The group’s research has been supported by over \$160,000 of external funding, including a Cottrell Scholar Award from the Research Corporation for Science Advancement in 2017. Many alumni of the Berger group have continued on to Ph.D. programs and teaching positions throughout the country.



SPENCER BERGER PROMOTED TO SENIOR INSTRUCTOR

Spencer Berger joined the department in 2013 and was promoted to Senior Instructor in 2019. She regularly teaches general chemistry lectures and laboratories, and currently serves on the General Chemistry Coordination Team. Dr. Berger also serves as the department’s Coordinator of GTAs (Graduate Teaching Assistants), a role in which she works with master’s students to develop their teaching skills.



EMILY BORDA NAMED DIRECTOR OF SMATE

Emily Borda began her new role as director of the Science, Mathematics, and Technology Education (SMATE) program at WWU in the fall of 2019. The SMATE program brings together faculty throughout the WWU College of Science and Engineering to recruit and prepare future elementary and secondary mathematics and science teachers. Dr. Borda has been a faculty member in Chemistry and SMATE since 2005. Her research group aims to understand how students build mental models of chemical phenomena, in order to more effectively design classroom and laboratory activities. Dr. Borda has held several leadership roles, including as: a member of the Leadership Team for the Advancing Excellence and Equity in Science (AEES) program; chair of the WWU General Chemistry Task Force; co-principal investigator of the Change at the Core (C-Core) program; chair of the Chemistry Department Assessment Committee; co-chair of the Committee on Undergraduate Education (CUE); and project co-director of the Whole School Partnership, which helped plan and deliver professional development to science, math, and English middle and high school teachers in Blaine, Mount Vernon, and Cape Flattery school districts.



ALEXI GUDDAL PROMOTED TO PROGRAM COORDINATOR

Since coming to Western in 2012, Alexi Guddal has found many opportunities to learn, grow, and apply herself towards making the world a better place. This promotion is no exception. Ms. Guddal has enjoyed working for the Chemistry Department for the last few years, where she has been able to learn many new skills. She has especially appreciated being a part of a department that takes pride in fostering students along their journey to successful careers. Her favorite part of the job is working with students, and she is thrilled that, as a Program Coordinator, she will be able to focus on that more. Ms. Guddal looks forward to this new phase in her career.



TIM KOWALCZYK PROMOTED TO ASSOCIATE PROFESSOR

Tim Kowalczyk was awarded tenure and promotion to Associate Professor in the spring of 2019. Dr. Kowalczyk joined the Department of Chemistry and the Institute for Energy Studies (IES) in 2014 through a search led by the Advanced Materials Science and Engineering Center (AMSEC). He has taught or co-taught over a dozen different courses across general, physical, and computational chemistry; materials science; and energy science and technology. Dr. Kowalczyk's research program examines photoactive organic materials through the lens of computational chemistry. Student researchers in the Kowalczyk group are developing and applying computationally efficient, approximate models of excited-state electronic structure to understand how energy is absorbed and converted in these materials. These efforts have been financially supported by grants from the ACS Petroleum Research Fund, NSF Research at Undergraduate Institutions, and a Cottrell Scholar Award from the Research Corporation for Science Advancement. The program was recognized with an OpenEye Outstanding Junior Faculty Award in Computational Chemistry in 2018. Dr. Kowalczyk established the IES Energy Ambassadors program in 2017 as the Snohomish PUD Professor of Energy Studies. Building on his efforts with colleagues to establish the Energy Science minor (2017) and B.S. degree in Energy Science and Technology (2019), Dr. Kowalczyk is excited to collaborate with everyone on supporting and sustaining robust, inclusive learning environments across Chemistry, AMSEC, and Energy Studies.



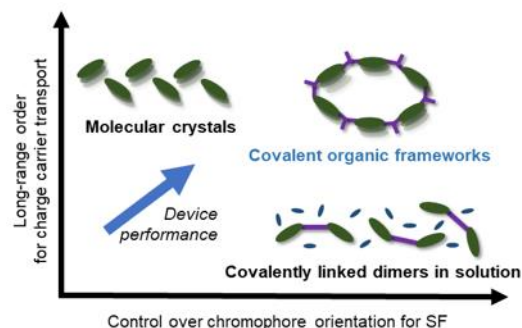
HOPE RINDAL PROMOTED TO SENIOR INSTRUCTOR

Hope Rindal has taught at Western for the past eight years, and is excited to be promoted to Senior Instructor. A biochemist by training, Ms. Rindal looks for opportunities to sneak biochemistry themes into general chemistry courses, which she teaches regularly. She has also been involved in course and lab development in the general chemistry series, and enjoys teaching biochemistry courses. Ms. Rindal is thankful to be a part of this department, and looks forward to the future here.



FACULTY AWARDS AND GRANT FUNDING

Tim Kowalczyk was awarded a Faculty Early Career Development (CAREER) Award (\$496,000 over 5 years) from the National Science Foundation, Division of Materials Research. The grant, “Theory-Guided Design of Porous Organic Frameworks for Energy Conversion and Storage”, will support Dr. Kowalczyk and several undergraduate and master’s research students in their development of specialized simulations to understand how electrons and energy are transferred within a class of materials known as covalent organic frameworks (COFs). Through this project, the Kowalczyk group aims to accelerate the development of COFs for renewable energy applications by providing a targeted computer simulation strategy to predict the behavior of electrons in these materials after they absorb visible light. The research aims of the project are integrated with efforts to promote energy literacy through Dr. Kowalczyk’s Energy Ambassadors program and the development of educational materials bridging multiple representations of energy conversion concepts.



Jeanine Amacher received a grant from the National Science Foundation for her project titled “The Role of Non-Motif Selectivity Determinants in Peptide-Binding Interactions” (\$349,908 over 3 years). Cells receive and respond to local signals to communicate with their environment, and errors in these cell signaling pathways can lead to a number of different human diseases. A significant challenge in describing this and other cellular pathways is that many interactions among signaling proteins rely on just a small number of contacts between their amino acid building blocks, leading to promiscuity and overlap in binding partners. With this award, the Amacher group will investigate how cell signaling proteins can specifically recognize one another with the number of contacts limited to 10 or less amino acids between them. This project characterizes every interacting amino acid involved in protein recognition for one set of proteins along the cell signaling pathway and elucidates how these interactions evolved. In addition, the project provides undergraduate and master’s-level students with firsthand experience in structural biology and protein biochemistry to prepare them for STEM-related careers.

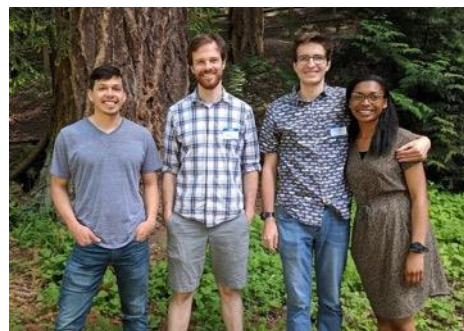


A team of faculty from across WWU was awarded two grants for acquiring new mass spectrometry instrumentation. This group was led by the Chemistry Department, with **John Antos** serving as the



principle investigator, and **Serge Smirnov**, **Greg O'Neil**, and Kathy Van Alstyne (Shannon Point Marine Center) serving as co-PIs. Along with these investigators, 17 additional faculty from WWU Chemistry, Biology, Environmental Science, Behavioral Neuroscience, and Engineering & Design contributed to the project. The two grants will fund the acquisition of a high-resolution liquid chromatography quadrupole time-of-flight (LC-QTOF) mass spectrometry system (National Science Foundation, \$499,946) and a matrix-assisted laser desorption/ionization (MALDI) mass spectrometer (M.J. Murdock Charitable Trust, \$318,500). These external funds will also be supplemented by generous commitments from WWU to support instrument operations and maintenance. In total, the project represents a nearly \$1.2 million investment in mass spectrometry, which is among the most powerful and widely used techniques for the identification and quantification of chemical compounds. As part of WWU's University Instrument Center, these new state-of-the-art mass spectrometers will provide a core institutional resource serving a broad range of research and teaching needs in fields such as synthetic chemistry, biochemistry, polymer science, marine ecology, and many others.

Mike Larsen received a grant from the American Chemical Society Petroleum Research Fund for his project titled "Development of the Thermal Guanidine Exchange Reaction for a New Class of Covalent Adaptable Networks" (\$55,000 over 2 years). In recent years, covalent adaptable networks have emerged as an interesting type of polymeric material, as they combine the desirable properties of thermosets (e.g., epoxies and resins) with the ability to be recycled.



This grant will enable the Larsen group to explore the fundamental aspects of a new chemical reaction they discovered and use it as the basis for creating a new type of these exciting polymers. It will involve 2-4 undergraduate researchers and a master's student over the two-year grant period.

Mark Bussell received a grant from the American Chemical Society Petroleum Research Fund for his project titled "Nickel-Palladium Phosphide Catalysts for the Selective Hydrogenation of Acetylene" (\$70,000 over 3 years). This project is focused on developing new catalysts for the selective hydrogenation of alkyne impurities present in ethylene and styrene monomers used in the synthesis of polymers. The new catalysts under development consist of nickel



phosphides having different stoichiometries in which a small number of Ni atoms are replaced with Pd atoms. The goal of the project is to probe whether the dilution of surface Ni metal atom ensembles with P atoms moderates the hydrogenation properties of the catalysts while isolated Pd atoms serve as sites for hydrogen dissociation and spillover to neighboring Ni sites.



FACULTY AND STUDENT PUBLICATIONS

In the past academic year, Chemistry faculty have published **20 peer-reviewed articles** detailing their research, which include **24 undergraduate (*)**, **12 graduate (†)**, and **1 REU (#) student co-author**.

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†Wang, M; *Hoff, A; *Doebler, JE; **Emory, SR**; **Bao, Y**. “Dumbbell-like silica coated gold nanorods and their plasmonic properties”. *Langmuir* **2019**, 35, 16886-16892.

*McClarín, GR; **Berger, RF**. “Confluence of structural distortion and A-site composition in the band gaps of perovskite niobate and tantalate photocatalysts”. *Phys. Rev. B* **2019**, 100, 045202.

Steele, JA; Jin, H; Dovgaliuk, I; **Berger, RF**; Braeckvelt, T; Yuan, H; Martin, C; Solano, E; Lejaeghere, K; Rogge, SMJ; Notebaert, C; Vandezande, W; Janssen, KPF; Goderis, B; Debroye, E; Wang, Y-K; Dong, Y; Ma, D; Saidaminov, M; Tan, H; Lu, Z; Dyadkin, V; Chernyshov, D; Van Speybroeck, V; Sargent, EH; Hofkens, J; Roeffaers, MBJ. “Thermal nonequilibrium of strained black CsPbI₃ thin films”. *Science* **2019**, 365, 679-684.

†Topalian, PJ; Liyanage, DR; †Danforth, SJ; *d’Aquino, AI; Brock, SL; **Bussell, ME**. “Effect of particle size on the deep HDS properties of Ni₂P catalysts”. *J. Phys. Chem. C* **2019**, 123, 25701-25711.

Clark, CD; Bowen, JC; De Bruyn, WJ; Keller, JK. “Optical characterization of chromophoric dissolved organic matter (CDOM) and Fe(II) concentrations in soil pore waters along a channel-bank transect in a salt marsh”. *Estuaries and Coasts* **2019**, 42, 1297-1307.

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[†]Baumgardner, DF; *Parks, WE; **Gilbertson, JD**. “Harnessing the active site triad: Merging hemilability proton responsivity, and ligand-based redox-activity”. *Dalton Trans.* **2020**, 49, 960-965.

[†]Cheung, PM; [†]Burns, KT; [†]Kwon, YM; *Deshaye, MY; *Aguayo, KJ; Oswald, VF; Seda, T; Zakharov, LN; **Kowalczyk, T; Gilbertson, JD**. “Hemilabile proton relays and redox-activity lead to {FeNO}^x and significant rate enhancements in NO₂[−] reduction”. *J. Am. Chem. Soc.* **2018**, 140, 17040-17050.

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*Patamia, ED; [†]Ostrovsky-Snider, NA; **Murphy, AR**. “Photolithographic masking method to chemically pattern silk film surfaces”. *ACS Appl. Mater. Interfaces* **2019**, 11, 33612-33619.

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*Spaltenstein, P; [†]Cummins, EJ; *Yokuda, K-M; **Kowalczyk, T**; Clark, TB; **O'Neil, GW**. “Chemoselective carbonyl allylations with alkoxyallylsilanes”. *J. Org. Chem.* **2019**, 84, 4421-4428.

Patrick, DL; [†]Schaaf, C; *Morehouse, R; Johnson, BL. “Multi-scale modeling of early-stage morphology in solution-processed polycrystalline thin films”. *Phys. Chem. Chem. Phys.* **2019**, 21, 9538-9546.

*Rainsberry, AN; *Sage, JG; **Scheuermann, ML**. “Iridium-promoted conversion of terminal epoxides to primary alcohols under acidic conditions using hydrogen”. *Catal. Sci. Technol.* **2019**, 9, 3020-3022.

[†]Smith, IW; *d'Aquino, AE; Coyle, CW; Fedanov, A; Parker, ET; Denning, G; Spencer, HT; Lollar, P; Doering, CB; **Spiegel, PC**. “The 3.2 Å structure of a bioengineered variant of blood coagulation factor VIII indicates two conformations of the C2 domain”. *J. Thromb. Haemost.* **2020**, 18, 57-69.



DEPARTMENT EVENTS

Jeanine Amacher organized the First Annual WWU Life Sciences Symposium, held at WWU on Friday, October 18, 2019. The goals of the symposium were to: unite biochemistry and molecular biology research at WWU; provide access and networking opportunities for students at WWU to Ph.D. students and postdocs in biomedical and life sciences; allow Ph.D. students and postdocs to give research talks at an outside institution; and bring together biomedical and life sciences research in the Pacific Northwest. The day-long program featured talks by graduate students, postdocs, and research scientists from Washington and Oregon (including 14 from the Seattle area), and a poster session highlighting WWU student research. More than 80 WWU students and faculty from Chemistry, Biology, Behavioral Neuroscience, and other departments attended. The symposium received rave reviews, and we hope it becomes an annual tradition!

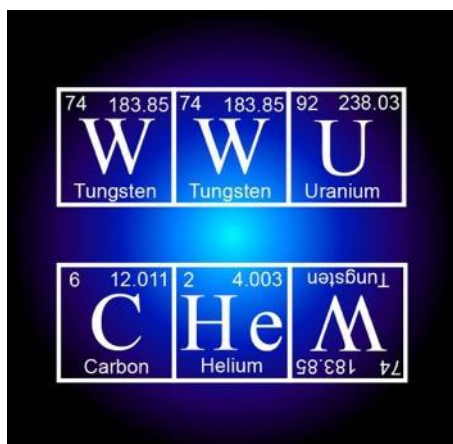


G McGrew joined with Andrew Lucchesi and colleagues to plan the inaugural Disability Studies and Action Collaborative (DSAC) UnConference, held at WWU on Saturday, October 19, 2019. This single-day event brought together faculty, staff, students, industry, and community members from diverse backgrounds to participate in seminars, working groups, and networking. The Chemistry Department, College, and WWU as a whole are engaged in dialogues aimed at addressing our systemic equity, inclusion, and diversity (EID) challenges from multiple angles. In particular, Chemistry is having critical conversations on how we can increase access and create more inclusive classroom and laboratory experiences. Stay tuned for more from Dr. McGrew as the DSAC steering committee works on developing a strong interdisciplinary program at Western.



SCHOLARS WEEK 2019

The Chemistry Department was honored to host Dr. **Charles Sykes**, the John Wade Professor of Chemistry at Tufts University, as its keynote speaker for Scholars Week (May 15-17, 2019). Dr. Sykes received his B.S. and M.S. degrees from Oxford University before moving to Cambridge University for his Ph.D. Dr. Sykes came to the U.S. in 2002 to join the research group of Prof. Paul Weiss at Penn State University as a postdoctoral fellow, and he subsequently joined the faculty at Tufts in 2005. Using scanning tunneling microscopy and other surface sensitive probes, Dr. Sykes and his students quickly established themselves as pioneers in the study of surface chirality, molecular motors, and single atom alloy catalysts. For this work, Dr. Sykes has received numerous awards, including the National Science Foundation CAREER Award, the Research Corporation Cottrell Scholar Award, and the Camille Dreyfus Teacher Scholar Award. In 2019, he was a co-recipient of the prestigious ACS Catalysis Lectureship for the Advancement of the Catalytic Sciences. Dr. Sykes is the author of over 120 peer-reviewed publications in leading journals such as *Science*, *Nature Materials*, and *Nature Catalysis*, and he has given over 150 invited talks at national and international venues.



WWU Chemistry Department Newsletter #20 was edited by Rob Berger, with contributions from staff and faculty, Anne and Andrea d'Aquino, and Western Today.

Find us on Facebook (www.facebook.com/wwuchem) and Twitter ([@WWUChem](https://twitter.com/WWUChem))!

INTERNATIONAL YEAR OF THE PERIODIC TABLE

The periodic table of chemical elements was discovered by Russian scientist Dmitri I. Mendeleev in 1869, with contributions from his German contemporary Julius Lothar Meyer. To celebrate the 150th anniversary of this fundamental discovery and its countless benefits to humanity, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) declared 2019 the International Year of the Periodic Table (IYPT). Celebratory events took place all over the world. Among those, the Governor of Washington and Mayor of Bellingham issued proclamations in support of science and education.

WWU Chemistry faculty organized an event in Bellingham celebrating IYPT. Financial assistance was provided by several organizations including the ACS (kudos to **David Patrick** for securing this support) and WWU Chemistry. **Catherine Clark** was instrumental in negotiating and securing the space in the Spark Museum in Bellingham. Advertising for the event, led by **Serge Smirnov**, focused on local schools.

The celebration took place on October 12, 2019. The audience was packed with around 150 attendees, mostly high school and university students, their teachers, and families. **Betsy Raymond**, **Steven Emory**, and WWU Chem Club students presented an impressive chemistry demo show. Serge Smirnov and Tommaso Vannelli



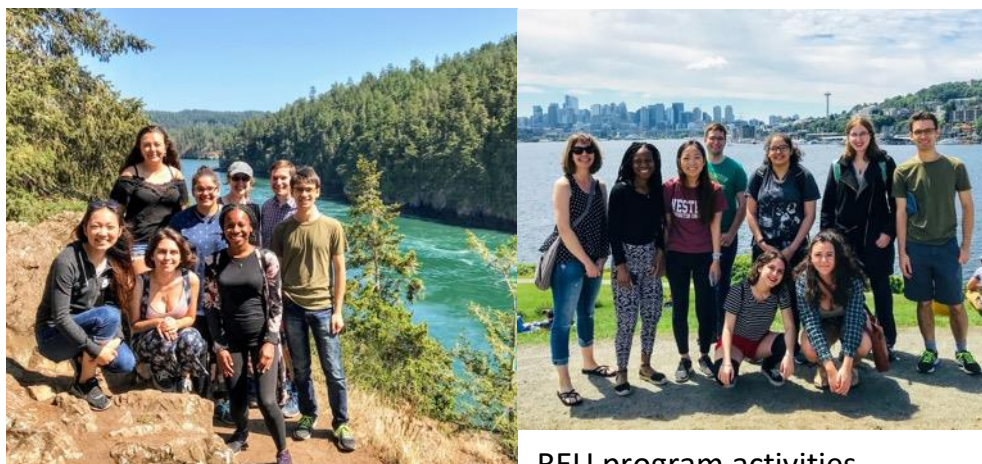
(Whatcom Community College Chemistry) co-led the rest of the show, a reenactment of a science conference involving five 19th-century scientists who helped set the stage for the discovery of the periodic table. The cast included Dr. Smirnov (Dmitri Mendeleev), WWU Biology professor Dietmar Schwarz (Lothar Meyer), WWU Chemistry professor **Tim Kowalczyk** (John Dalton), Dr. Vannelli (Amedeo Avogadro), and Bellingham High School teacher Svetlana Cuello (Antoine Lavoisier). Period costumes helped to convey the sense of the era. The five scientists presented their ideas and read quotes in their native languages (English, French, Italian, Russian, and German), provided explanations to the public, and answered questions from the audience.

Special thanks go to Tana Granack, Director of Operations at the Spark Museum, and to WWU ATUS (especially Robert B. Clark) for providing video equipment and recording the event. The video recording can be viewed at this [link](#).

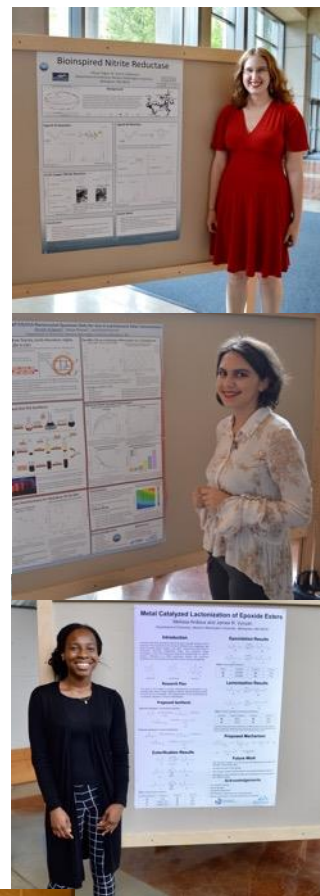


REU PROGRAM

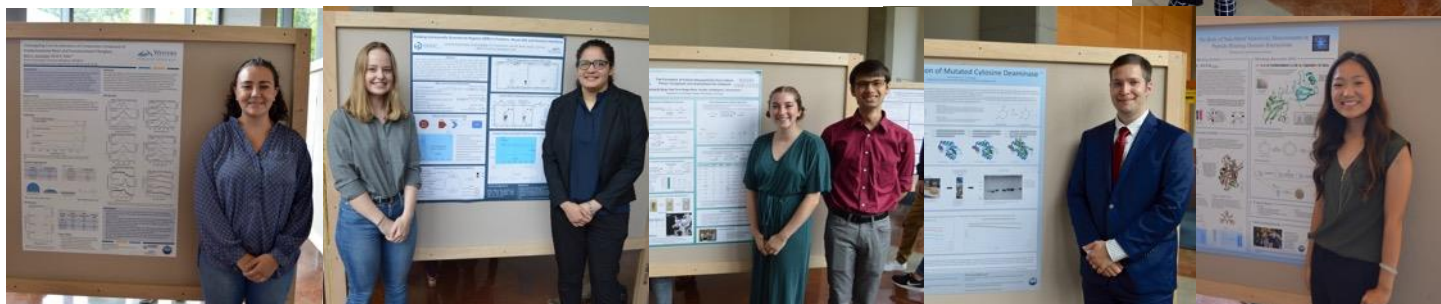
Summer 2019 marked the 8th year for our NSF-funded Research Experience for Undergraduates (REU) program. Eight students participated in the program: Morgan Archuleta (Western Colorado University), Kendal Dragotto (Reed College), Yasmine Panchmatia (Pierce College), Melissa Aridoux (Western Connecticut State University), Allison Teigen (Everett C.C.), Joseph Luther (Carleton College), Daniel Rayment (Everett C.C.), and Melody Gao (WWU). In addition to social outings to Seattle, whale watching, and Mt. Baker, the students also participated in a mini-symposium at the Shannon Point Marine Center with research students from Northwest Indian College. We were excited to welcome back alumni Nathan Bradshaw (2012 REU alum, 2015 WWU Chemistry alum) and R. David Row (2014 WWU Chemistry alum) as well as Prof. Margaret Stratton (UMass Amherst) for the final REU symposium in August.



REU program activities

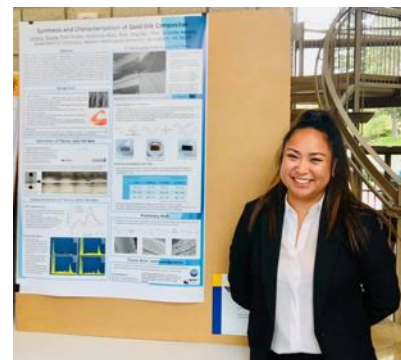
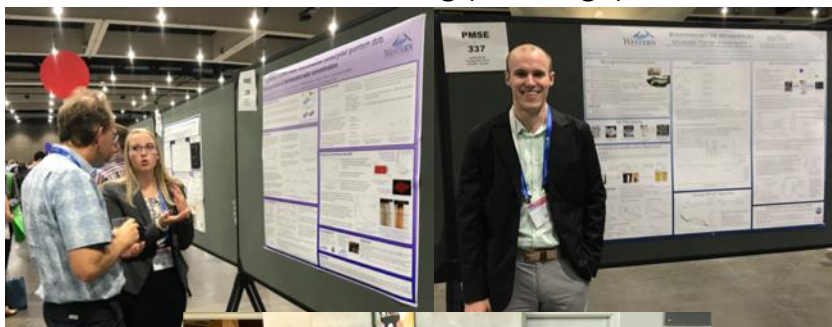


Students at REU symposium



PHOTOS FROM CONFERENCES

ACS Fall Meeting (San Diego)



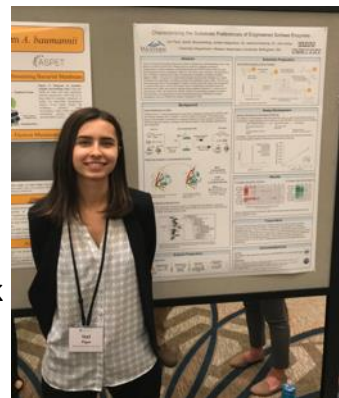
Kayla Koch
(Rider Lab)

Kian Hausken
(Murphy Lab)

Jeremy Talusig (Murphy Lab, ACS
Undergraduate Symposium, Tacoma)



WWU alumni event

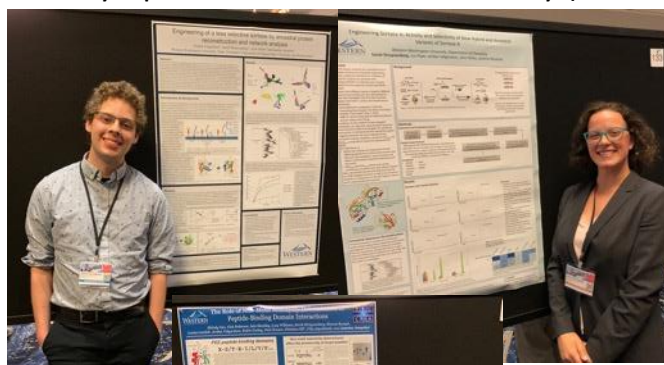


Izzi Piper (Antos Lab, M.J. Murdock
Conference, Vancouver WA)



Organic students and faculty (National
Organic Symposium, Bloomington IN)

Annual Symposium of the Protein Society (Seattle)

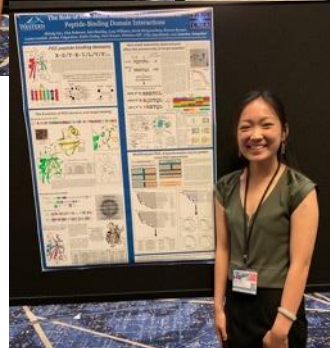


Jordan Valgardson
(Amacher Lab)

Sarah Struyvenberg
(Amacher Lab)



Stacey Maxwell's last day in our
department (REU Symposium)



Melody Gao
(Amacher Lab)



DEPARTMENT DONORS

We wish to extend a special thank you to alumni and friends of the department who donated to Chemistry Department Western Foundation funds from October 2018 through March 2020.

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 appreciate your support!

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