



## Message from the Chair

## Spring 2019 Newsletter



Greetings! It is my pleasure to write a few opening remarks for this latest edition of the Chemistry Department newsletter. As you will find in the following pages, there is much to report and celebrate!

The involvement of students in externally-funded research remains the hallmark of our program. This past year our faculty secured \$1.7M in new grant funding from external agencies, published 20 peer-reviewed papers with 45 student co-authors, and prepared over 30 students to present their WWU research at regional and national conferences! Our summer NSF-funded Research Experiences for Undergraduates (REU) program funded 10 summer research students and included a day-long symposium which featured seminars by two recent alumnae of the WWU REU program, both of whom are currently nearing completion of their PhD studies.

This past year, Tim Kowalczyk was recognized with two national awards. Tim was named a Cottrell Scholar and an OpenEye Outstanding Junior Faculty awardee. For the latter, Tim is the third honoree from a non-PhD-granting institution in the 22-year history of the award. In addition, Steven Emory was named the 2018 Elich awardee for excellence in teaching and Jim Vyvyan won the Arlan Norman mentorship award. Congratulations are also due to our Student Affiliates chapter of the ACS (the "Chem Club") and faculty advisors Steven Emory and Betsy Raymond, for an eighth consecutive "Outstanding Chapter" award!

We welcomed a new tenure-track faculty member to our ranks: Dr. Michael Larsen, who is teaching in the organic chemistry curriculum and does research in polymer chemistry. I am sorry to report that our colleague Dr. Marc Muñiz left WWU to accept a position in STEM education research at Rutgers, where we wish him well! We did successfully recruit Dr. Erin Duffy (Michigan State University) to fill the position, and we look forward to introducing Dr. Duffy in the next edition of the newsletter.

This past year has also presented challenges. An event we had planned to honor Mark Wicholas's leadership in bringing this department to national prominence was canceled following allegations of gender-based discrimination. This led to broader discussions of equity and inclusion in our department and the College. We are actively engaged in efforts to address current issues raised by students, staff, and faculty re: department climate and we are committed to ensuring that our program is welcoming and supportive for all members of the department. (See page 2 for more details.) I am happy to discuss these efforts in greater detail – you can reach me via phone or email.

I have only touched briefly on the remarkable achievements of our students, faculty, and staff, and I trust you will enjoy getting more detail in the following 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 gifts to the department. I hope this edition of the departmental newsletter gives you a glimpse of how your generosity supports the efforts and aspirations of our students. We are sincerely grateful for your support. Thank you and best wishes!

*Spencer Anthony-Cahill*

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## RE: Cancellation of Events on October 6, 2018 to Celebrate the Legacy of Mark Wicholas

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Dr. Mark Wicholas was chair of the WWU Chemistry Department from 1982-2007. During his career, he established a national reputation as an inorganic chemist and served many years in the Pacific Northwest section of the American Chemical Society. He was a strong advocate for the involvement of undergraduate students in faculty-directed research in chemistry, and to that end he led efforts in 2000 to secure ~\$2.2M in funding to transform the WWU Chemistry Department into a national model for the involvement of undergraduates in research. Following the death of Dr. Wicholas on November 20, 2017, we received email and letters from many of his colleagues and WWU alumni expressing their condolences and fond memories. Thus, it seemed fitting to organize an event to celebrate Dr. Wicholas's many professional achievements and, in particular, the critical role he played in promoting research opportunities for students at WWU and their continued success after graduation from our program. It was the remarkable achievements of our students and alumni that we intended to showcase in celebration of Mark's legacy on October 6.

Allegations of gender-based discrimination were made against Dr. Wicholas during our department retreat on September 18, 2018. During conversations the following week among the faculty and staff, we considered what the appropriate next steps would be in light of these allegations. As we engaged our students and the university administration in the discussion, it became clear that holding the event would undermine the very thing we hoped to celebrate – the promotion of student-faculty collaboration in research – and it would send a message antithetical to the commitment of the Chemistry Department and WWU to safe, inclusive, equitable, and diverse learning and working environments. The decision to cancel the event was not intended to reflect judgment on Mark or the allegations made against him. Rather it was intended to reflect the need to take such allegations seriously, to acknowledge the long-standing and pervasive issues of gender-based discrimination that persist in historically male-dominated fields, and most importantly, to take action to address these issues. We are deeply sorry for the inconvenience and confusion caused by the cancellation of the event with only a few days' notice.

In response to the discussions that have taken place among students, staff, faculty, and the College, the Chemistry Department has participated in a department climate survey and is working to develop training materials for all members of the department to ensure that the academic, administrative, and research environments are welcoming and inclusive, particularly to those students, staff, and faculty from historically underrepresented groups in STEM.



## Thank You to Chemistry 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 July 2017 through September 2018.

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](http://www.foundation.wvu.edu)) or call (360) 650-3027.

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Brent and Christine Barber  
Joel and Rebecca Barton  
Douglas Baumgardner  
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John Bittinger  
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Sheree Clark  
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Ted and Theresa Clowes  
Mary and Thomas Cullen  
Ann Dagle  
Andrea D'Aquino  
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Rhys and Brooke Lawson  
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John and Heloise Logan  
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Jamie M. Mitchell  
Karen and Joseph Morse  
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David Munch  
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James and Catherine Vyvyan  
John and Kathryn Whitmer  
The Estate of Mark Wicholas  
Richard and Kay Wojt  
Sheryl Wood  
Michelle E. Wuerth  
Sophia Zervas-Berg and Arvid Berg

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## New Faculty and Staff

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**Mike Larsen** joined the Department of Chemistry as an assistant professor in September 2018. A native of Colorado, Prof. Larsen attended Colorado College and received a BA in chemistry in 2009. Following a stint as the chemistry paraprofessional at Colorado College, he attended the University of Washington for graduate school and received his PhD in 2015. At UW, Prof. Larsen studied polymer chemistry under AJ Boydston, specifically the interplay between mechanical force and chemical reactions in polymeric materials. Following this, he worked as a postdoctoral research associate at the University of Minnesota under Marc Hillmyer, studying nanoporous polymers and postpolymerization modification.



Prof. Larsen's current research interests include the development of reactive polymers, the use of sustainable feedstocks to develop new polymeric materials, and additive manufacturing. He is excited to return to the Pacific Northwest and join the WWU and Bellingham communities. When not working, he enjoys outdoor activities such as hiking, backpacking, and snowboarding. His other interests include cooking, softball, and his cat Beaker.

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## Sal and Judy Russo Biochemistry Research Endowment

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**Sal Russo** served as a faculty member in the WWU Department of Chemistry from 1968-2005. This endowment was created to honor his contributions to the early development of the biochemistry program and to promote the education of future biochemistry students. Sal and his beloved Judy were married for 50 years until her death in 2017. This endowment also honors the memory of Judy and her devotion to family.





## Faculty Promotion

**John Antos** joined the Chemistry Department in 2012 and was promoted to Associate Professor in 2018. His teaching primarily focuses on organic chemistry courses and has also included upper-division biochemistry and protein engineering courses. Prof. Antos has always been enthusiastic about his role as an educator at WWU, and has particularly enjoyed developing new research-oriented lab experiences for the organic chemistry curriculum. He has also been active with multiple departmental and university committees, including serving as the department graduate program advisor since 2015, and serving on the Scientific Technical Services advisory council.



Prof. Antos's research program is focused on protein engineering, with a current emphasis on utilizing bacterial enzymes called "sortases" for the construction of novel protein derivatives. Multiple projects are currently underway, including a number of collaborations with other WWU faculty to explore the capabilities of these enzymes. Over the past six years, this work has involved the efforts of sixteen undergraduates, five master's students and four summer REU students. Many of these students have gone on to pursue advanced degrees in chemistry and biochemistry, or have begun careers in medicine and the biotechnology sector. Prof. Antos and his students have also given numerous presentations at events such as national American Chemical Society meetings and the Volcano Chemical Biology Conference. The Antos group has published four peer-reviewed papers and two invited reviews. This work has been supported by \$540,000 in grants from the National Institutes of Health, the Research Corporation for Science Advancement, and internal sources at WWU. This funding includes a prestigious Cottrell Scholar Award from the Research Corporation in 2016.



**Greg O'Neil** was promoted to Full Professor in the spring of 2018. His accomplishments during the promotion period include receiving an NSF CAREER Award and a Henry Dreyfus Teacher-Scholar Award. The O'Neil research group has published a number of papers in internationally recognized scientific journals that include many WWU undergraduate student co-authors. Prof. O'Neil also wrote two book chapters: "Cross Metathesis" in the *Handbook of Metathesis-2<sup>nd</sup> Edition* (Wiley-VCH) and "Jet Biofuels from Algae" in *Biomass, Biofuels and Biochemicals: Biofuels from Algae-2<sup>nd</sup> Edition* (Elsevier). Prof. O'Neil continues to enjoy teaching within the

organic chemistry sequence (lecture and lab), as well as several advanced electives he has developed such as Natural Products Chemistry and Biofuels. Among the most rewarding aspects of being a teacher-scholar for Prof. O'Neil has been seeing his students accepted into various prestigious graduate programs, medical schools, and places of employment.



## Faculty Awards and Distinctions

**James Vyvyan** was honored with the 2018 Arlan D. Norman Mentoring Award for his work with undergraduates and master's students at WWU. He is the third member of the Department of Chemistry to be recognized with this award in the last five years. (It was previously received by Clint Spiegel and David Patrick.) Prof. Vyvyan has mentored over 60 undergraduate researchers and 16 MS students in his 20 years at WWU, with over half of the students being women. He has published 15 independent research papers with 23 different undergraduate co-authors and 8 different MS students. Twenty of Prof. Vyvyan's students pursued PhD degrees. Some of these students are now on the faculty at both PhD-granting and predominantly undergraduate institutions. Others have found research positions at companies such as Genentech, Biogen, Seattle Genetics, and Gilead to name a few. Prof. Vyvyan's current research interests are centered on the synthesis of guaipyridine alkaloids with anticancer activity. The Norman Award came with a summer fellowship for an MS student, **Evangeline (Evie) Starchman**. Starchman's thesis research is on the synthesis of rupestines B and C.



Evie Starchman and Prof. James Vyvyan



Prof. Steven Emory (center) receiving the Elich Award

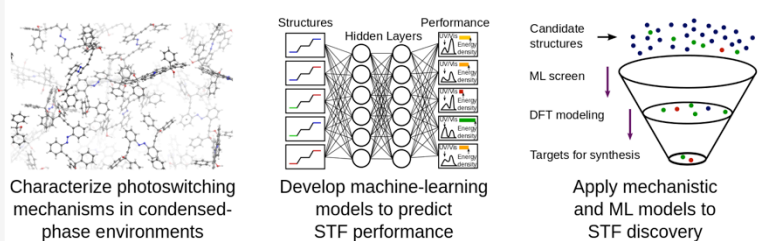
**Steven Emory** was awarded the 2018 Peter J. Elich Excellence in Teaching Award. This award is given annually to a faculty member from either the College of Humanities and Social Sciences or the College of Science and Engineering. Candidates are selected based on a range of criteria including course challenge level, impact, student engagement, passion, and energy. Prof. Emory joins a list of previous Chemistry Department faculty that have been recognized for excellence in teaching: Gary Lampman (1976), George Kriz (2000, first Peter J. Elich Award), James Vyvyan (2008), and Spencer Anthony-Cahill (2012). Since joining Western's Department of Chemistry in 2001, Prof. Emory has taught a range of courses including general chemistry, analytical chemistry, materials

chemistry, instrumental analysis, and special topics. His student research group focuses on the development of nanoparticle-based analytical imaging methods. Prof. Emory has incorporated several aspects of this research into the courses he teaches. He also demonstrates his passion for science education outreach through Western's award-winning Student Chapter of the American Chemical Society. By utilizing an array of student-centered learning techniques, Prof. Emory encourages all students to become actively involved in their own learning.



## Faculty Awards and Distinctions (continued)

**Tim Kowalczyk** was selected for the Fall 2018 OpenEye Outstanding Junior Faculty Award in Computational Chemistry. This national award, administered by the American Chemical Society Division of Computers in Chemistry, recognizes the scholarly achievements of early-career faculty in the area of computational chemistry. The award was conferred to Prof. Kowalczyk by representatives of OpenEye Scientific Software at the Fall 2018 National Meeting of the American Chemical Society in Boston, where Prof. Kowalczyk presented a poster on his research program as part of the award reception. Of the nearly 100 recipients of this award since its establishment, Prof. Kowalczyk is only the third to receive the award for a research program established at a primarily undergraduate institution.



Prof. Kowalczyk also received a Research Corporation for Science Advancement (RCSA) Cottrell Scholar Award (\$100,000 over 3 years). The Cottrell Scholars program “develops outstanding teacher-scholars who are recognized by their scientific communities for the quality and innovation of their research programs and their academic leadership skills”.

This award provides funds for early-career faculty to not only conduct research with students, but also to pursue innovative educational projects. Prof. Kowalczyk will use funds from this award to develop a computational screening protocol for the design of high-performance solar thermal fuels (STFs), organic molecular photoswitches that store and release energy through isomerization. Complementing this research initiative, Prof. Kowalczyk will develop and assess augmented educational simulations of physical and chemical energy conversions that bridge visual, graphical, and mathematical representations of energy concepts.

## Grant Funding

**Clint Spiegel** and colleagues were awarded a program grant from the National Heart, Lung and Blood Institute at the NIH to investigate the immune response against factor VIII in patients with hemophilia A. Hemophilia A is the most common severe congenital bleeding disorder in humans and is caused by deficiency of a blood coagulation protein called factor VIII. The most significant complication in the management of patients with hemophilia A is the development of inhibitory antibodies to factor VIII. The research in this project is directed towards understanding how these antibodies form, which may lead to methods to manage patients with factor VIII inhibitors or to prevent factor VIII inhibitors from developing. The U54 award is for \$8,000,000 over five years, of which \$530,000 is designated for structural biology work performed in the Spiegel lab during that time.





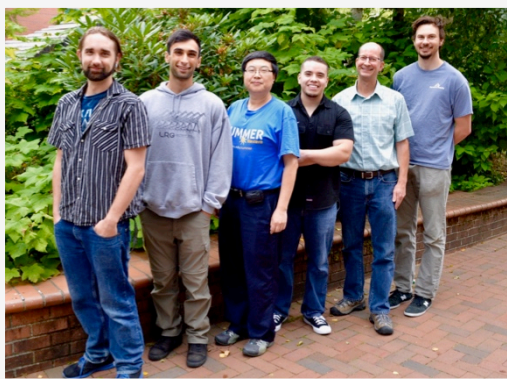
## Grant Funding (continued)

**Amanda Murphy** received a new Research at Undergraduate Institutions (RUI) grant from the National Science Foundation for her project titled “Protein Bioconjugation Strategies for Next Generation Silk Biomaterials” (\$388,946 over 3 years). In recent years, silk has become one of the most popular biomedical materials for applications ranging from drug delivery to creating artificial tissues. This grant will allow the Murphy group to develop new chemical modification strategies which will be used to design functional silk-based biomaterials with enhanced performance and integration with biological systems. In particular, they will focus on silk derivatives that will be valuable for *in vitro* and *in vivo* imaging applications and targeted drug delivery. This project will involve a total of 10-12 undergraduates and 2-3 master’s students over the three-year grant period. This grant will also provide one additional research stipend per summer for a local community college student.



Prof. Murphy was also awarded a Research Experiences for Undergraduates (REU) Site grant from the National Science Foundation (\$289,033 over 3 years). This program was first started in the Chemistry Department at WWU in 2010 and has now been renewed twice. The goal of the program is to provide undergraduate students who have limited access to chemistry research with an authentic research experience. Over the next 3 years, 8 participants per year will be recruited to participate in research projects at WWU over a 10-week period during the summer. (See page 15 for more details.)

**Greg O’Neil** received a grant from the National Science Foundation for his project titled “Accessing Asymmetric Carbon Atoms by Samarium(II)-Water Allylic Benzoate Reductions” (\$240,000 over 3 years). This project is focused on developing new reactions to access asymmetric carbon atoms with absolute control of their geometry. Many important molecules (e.g., medicinal natural products) and materials contain asymmetrically-substituted carbon atoms, and their function is often dependent on the three-dimensional arrangement of the groups connected to these atoms. The goal of this research is to investigate a new highly versatile and accessible method for asymmetric carbon atom synthesis. His approach harnesses the unique chemistry of samarium(II)-water complexes to achieve this goal.



**Mark Bussell** received a grant with co-PI Prof. Sean Mulcahy in the Geology Department from the Washington State Joint Center for Deployment and Research in Earth Abundant Materials (JCDREAM) for the “Structural Characterization of Earth Abundant Materials Using High Throughput X-ray Diffraction” (\$92,874 plus a \$30,000 match from WWU). This grant was used to purchase an X-ray diffractometer, which will be used in teaching and research by users in a number of departments and programs, as well as by industrial and community college partners.



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## Alumni Spotlight: Ken Apt

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A native of Bellingham, Ken Apt graduated *cum laude* from Western in 1967 with a chemistry major and physics and math minors. While an undergraduate, Ken worked as a research assistant, first in organic chemistry with Prof. Gary Lampman and then in nuclear chemistry with Prof. Ed Neuzil. These assignments hooked him on research; he wanted to go into nuclear chemistry. By co-authoring six scientific journal publications as a Western undergraduate, Ken had no trouble securing graduate research fellowship offers from MIT, Cal Tech, and other prestigious universities. He chose MIT, moved across country to Boston with his wife – then pregnant with their first child – and proceeded to study nuclear chemistry, receiving his PhD in nuclear chemistry four years later. Having that solid scientific research background from Western provided a major advantage for graduate school: getting accepted, pinning down a fellowship, and then completing the doctoral research.



Following graduate studies at MIT, Ken took a postdoctoral fellowship at Los Alamos National Laboratory. He later held several program and line management positions at LANL, including Program Manager for Arms Reduction Verification, Associate Division Leader for Chemical and Laser Sciences, and Assistant Associate Director in the Chemistry, Earth, and Life Sciences. Ken conducted basic and applied research at LANL in arms control verification, nuclear chemistry, nuclear reaction physics, analytical chemistry, isotope geochemistry, radioactive waste management, and environmental and atmospheric monitoring, and has over 80 publications in technical journals and national security policy fora.

Over the years at Los Alamos, Ken focused on international scientific cooperation and nonproliferation of weapons of mass destruction, including policy and systems analysis and arms control verification. Ken also served as a designated international nuclear safeguards inspector for two years with the International Atomic Energy Agency in Vienna, conducting safeguards inspections at diverse nuclear facilities. For more than eight years, he implemented the US Nuclear Material Protection Control & Accounting Program at VNIITF (a key site of the Russian nuclear weapons complex), conducting numerous on-site visits to Russian facilities. As the Middle East technical lead for the International Nuclear Safeguards Engagement Program of the US DOE's National Nuclear Security Administration (NNSA), he focused on nuclear safeguards capacity-building for partner countries in the Middle East, North Africa, and Southeast Asia. He was instrumental in establishing DOE NNSA nuclear safeguards-related engagement with governmental nuclear organizations in Algeria, Bahrain, Egypt, Jordan, Kuwait, Libya, Malaysia, Oman, Qatar, Thailand, United Arab Emirates, and Vietnam.

Following his planned reduction in effort for the DOE's NNSA in 2017, Ken has continued as a consultant through his limited liability company *Capstan Global, LLC*, where he advises on strategic planning and several national security policy studies.

A long-time resident of New Mexico, Apt lives in Santa Fe with his wife, the poet Mary Morris, and enjoys travel to foreign destinations in Europe, Latin America, and Southeast Asia. He has two daughters, one stepson, one granddaughter, and two grandsons. His hobbies include SCUBA diving in tropical waters and fly fishing in the mountains of New Mexico, Colorado, Montana, and Patagonia.





## Chemistry Faculty Publications in 2017-2018

In the past academic year, the chemistry faculty have published **20 articles** detailing their research, which include **27 undergraduate and 18 master's chemistry student co-authors**.

\*WWU undergraduate student co-author, †WWU master's student co-author

Shah, NH; **Amacher, JF**; Nocka, LM; Kuriyan, J. "The Src module: An ancient scaffold in the evolution of cytoplasmic tyrosine kinases". *Crit. Rev. Biochem. Mol. Biol.* **2018**, Sep 5, 1-29.

**Amacher, JF**; Hobbs, HT; Cantor, AC; Shah, L; Rivero, MJ; Mulchand, SA; Kuriyan, J. "Phosphorylation control of the ubiquitin ligase Cbl is conserved in choanoflagellates". *Protein Sci.* **2018**, 27, 923-932.

†Nikghalb, KD; \*Horvath, NM; \*Prelesnik, JL; †Banks, OGB; \*Filipov, PA; \*Row, RD; \*Roark, TJ; **Antos, JM**. "Expanding the scope of sortase-mediated ligations by using sortase homologues". *ChemBioChem* **2018**, 19, 185-195.

Coursault, D; Sule, N; Parker, J; **Bao, Y**; Scherer, N. "Dynamics of optically directed assembly and disassembly of gold nanoplatelet arrays". *Nano Lett.* **2018**, 18, 3391-3399.

\*Gormley, EL; **Berger, RF**. "Binding maps for the study and prediction of bimetallic catalyst surface reactions: The case of methanol oxidation". *Int. J. Quantum Chem.* **2018**, 118, 25606.

**Berger, RF**. "Design principles for the atomic and electronic structure of halide perovskite photovoltaic materials: Insights from computation". *Chem. Eur. J.* **2018**, 24, 8708-8716.

†Grabill, LP; **Berger, RF**. "Calibrating the extended Hückel method to quantitatively screen the electronic properties of materials". *Sci. Rep.* **2018**, 8, 10530.

\*Irby, SM; **Borda, EJ**; \*Haupt, J. "Effects of implementing a hybrid wet lab and online module lab curriculum into a general chemistry course: Impacts on student performance and engagement with the chemistry triplet". *J. Chem. Educ.* **2018**, 95, 224-232.

†Burns, KT; \*Marks, WR; †Cheung, PM; Seda, T; Zakharov, LN; **Gilbertson, JD**. "Uncoupled redox-inactive Lewis acids in the secondary coordination sphere entice ligand-based nitrite reduction". *Inorg. Chem.* **2018**, 57, 9601-9610.

\*Garcia, NA; **Kowalczyk, T**. "Extension of intramolecular charge-transfer state lifetime by encapsulation in porous frameworks." *J. Phys. Chem. C* **2017**, 121, 20673-20679.

Tsui, JH; †Ostrovsky-Snider, NA; Yama, DMP; \*Donohue, JD; Choi, JS; Chavanachat, R; \*Larson, JD; **Murphy, AR**; Kim, DH. "Conductive silk-polypyrrole composite scaffolds with bioinspired nanotopographic cues for cardiac tissue engineering". *J. Mater. Chem. B* **2018**, 6, 7185-7196.



## Chemistry Faculty Publications in 2017-2018 (continued)

\*WWU undergraduate student co-author, †WWU master's student co-author

\*Hagler, JR; \*Peterson, B; **Murphy, AR**; Leger, JM. "Performance of biocompatible silk-polypyrrole actuators under biologically relevant conditions." *J. Appl. Polym. Sci.* **2019**, *136*, 46922.

McIntosh, K; Smith, A; Young, LK; \*Leitch, MA; Tiwari, AK; Reddy, CM; **O'Neil, GW**; Liberatore, MW; Chandler, M; Baki, G. "Alkenones as a promising green alternative for waxes in cosmetics and personal care products." *Cosmetics* **2018**, *5*, 34.

Aeppli, C; Swarthout, RF; **O'Neil, GW**; Datz, SD; Nabi, D; Ward, CP; Nelson, RK; Sharpless, CM; Reddy, CM. "How persistent and bioavailable are oxygenated Deepwater Horizon oil transformation products?" *Environ. Sci. Technol.* **2018**, *52*, 7250-7258.

**O'Neil, GW**; \*Yen, TQ; †Leitch, MA; \*Wilson, GR; †Brown, EA; **Rider, DA**; Reddy, CM. "Alkenones as renewable phase change materials". *Renew. Energ.* **2019**, *134*, 89-94.

Butler, T; \*Alden, SE; Taylor, M; Deese, S; **Rider, DA**; Laskoski, M. "Oligomeric phthalonitriles and tetrakis(phenylethynyl)benzene blends with improved processing and thermal properties". *J. Polym. Sci. A Polym. Chem.* **2018**, *56*, 2630-2640.

†Curtis, T; †Taylor, AK; \*Alden, SE; \*Swanson, C; \*Lo, J; \*Knight, L; †King, A; Gates, BD; **Emory, SR**; **Rider, DA**. "Synthesis and characterization of tunable, pH-responsive nanoparticle-microgel composites for surface-enhanced Raman scattering detection". *ACS Omega* **2018**, *3*, 10572-10588.

†Miears, HL; †Gruber, DR; †Horvath, NM; **Antos, JM**; Young, J; †Sigurjonsson, JP; \*Klem, ML; \*Rosenkranz, EA; Okon, M; McKnight, CJ; Vugmeyster, L; **Smirnov, SL**. "Plant villin headpiece domain demonstrates a novel surface charge pattern and high affinity for F-actin." *Biochemistry* **2018**, *57*, 1690-1701.

†Gruber, DR; †Toner, JJ; †Miears, HL; Shernyukov, AV; Kiryutin, AS; Lomzov, AA; Endutkin, AV; Grin, IR; Petrova, DV; Kupryushkin, MS; Yurkovskaya, AV; Johnson, EC; Okon, M; Bagryanskaya, EG; Zharkov, DO; **Smirnov, SL**. "Oxidative damage to epigenetically methylated sites affects DNA stability, dynamics, and enzymatic demethylation." *Nucleic Acids Res.* **2018**, *46*, 10827-10839.

†Carlson, MA; \*Haddad, BG; †Weis, AJ; \*Blackwood, CS; \*Shelton, CD; \*Wuerth, ME; †Walter, JD; **Spiegel, PC**. "Ribosomal protein L7/L12 is required for GTPase translation factors EF-G, RF3 and IF2 to bind in their GTP state to 70S ribosomes". *FEBS J.* **2017**, *284*, 1631-1643.



## 2017-2018 Chemistry Awards

**CRC Press Chemistry Achievement Award**  
Izzi Piper

**Outstanding Honors Chemistry Student**  
Spencer Johnson

**Outstanding Organic Student**  
Aaron Helms

**Outstanding Analytical Student**  
Kyle Juetten

**Outstanding Inorganic Student**  
Alena Rainsberry

**Outstanding Physical Student**  
Amy Morren

**Hypercube Scholar**  
Emily McCracken

**Sea Bong Chang Memorial Biochemistry Award**  
Leah Huey

**Advancing Chemistry Through Service (ACTS) Award**  
Cassidy Crickmore  
Stephanie Neely  
Alena Rainsberry

**Chair's Award for Outstanding Student Initiative**  
TQ Yen

**Outstanding Graduate Teaching Assistant**  
Elizabeth Cummins

**Outstanding MS Graduates**  
Mayra Delgado  
Ian Smith

**Outstanding Department Graduate**  
Ellie James



**First row (left-to-right):** TQ Yen, Leah Huey, Izzi Piper, Aaron Helms  
**Second row (left-to-right):** Spencer Johnson, Elizabeth Cummins, Alena Rainsberry, Amy Morren, Kyle Juetten



## 2018-2019 Student Fellowships and Scholarships

### WWU Chemistry Scholarships

Rahwa Demoz  
Arcadia Tullis

### Verna Alexander Price Chemistry Scholarship

Evan Patamia

### Jerry Price - Nancy Sherer Scholarship

Star Summer

### Ruth Watts Female Scientist Scholarship

Holly Jones

### Larry Heimark Chemistry Scholarship

Brittany Mureno

### HACH Land Grant Undergraduate Scholarships

Jack Clemens  
Andrew Hood

### Knapman Chemistry Scholarships

Dedeepya Gudipati  
Erin Rosenkranz

### Barbara French Duzan Scholarships

Kendelyn Bone  
Natasha Hessami  
Evan Long  
Briana Mulligan

### Denice (Ambrose) Hougen Undergraduate Fellowship

Evan Patamia

### HHMI EXROP Award

Lia Cook

### NSF REU Awards

Kendelyn Bone  
Jordan Valgardson  
Maggie Wang

### Karen and Joseph Morse Research Fellowships

Dedeepya Gudipati  
Evan Long  
Erin Rosenkranz

### Arlan Norman Award for Excellence in Student Mentoring

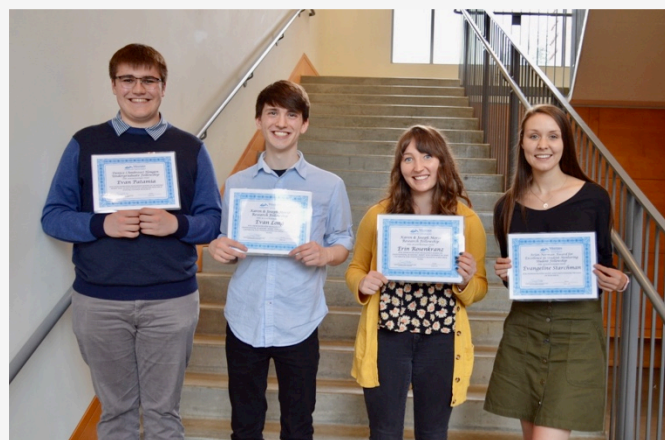
Evangeline Starchman, with Prof. James Vyvyan

*Scholarship Recipients*



**First row (left-to-right):** Rahwa Demoz, Natasha Hessami, Arcadia Tullis, Kendelyn Bone  
**Second row (left-to-right):** Evan Patamia, Star Summer, Erin Rosenkranz  
**Third row (left-to-right):** Andrew Hood, Evan Long, Jack Clemens, Holly Jones

*Research Fellowship Recipients*



**Left-to-right:** Evan Patamia, Evan Long,  
Erin Rosenkranz, Evie Starchman

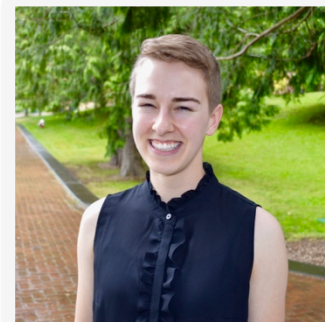




## Outstanding Graduates of 2018

### Ellie James (Outstanding Undergraduate Student)

Ellie James was an exceptional student, obtaining a BS in Biochemistry and a minor in Materials Science while maintaining a GPA of 3.75. Ellie was the recipient of numerous chemistry scholarships including the Barbara Ellen Maguire Scholarship (2017), Denice (Ambrose) Hougen Undergraduate Research Fellowship (2017), and the prestigious two-year Knapman Scholarship (2016-18). Ellie joined Prof. Amanda Murphy's research group in the spring of 2016, and spent two years working on the design and synthesis of peptide-based conducting "wires" for use in electronic biomedical applications. Ellie is a co-author on a peer-reviewed publication describing this work, and is currently writing another manuscript. Ellie has given several presentations on her research both inside and outside of WWU, most recently at the ACS national meeting in New Orleans. Ellie was also in the WWU Honors Program, and presented her thesis to the Chemistry Department in May 2018. In addition to her academic pursuits, Ellie heavily contributed to the broader campus community by serving on several academic student advisory boards. Ellie served as a Resident Advisor for several years and a Senior Resident Director for two quarters overseeing a five-building, 575-resident community. Ellie has been accepted to the Molecular Engineering PhD program at the University of Washington, where she began in the fall of 2018.



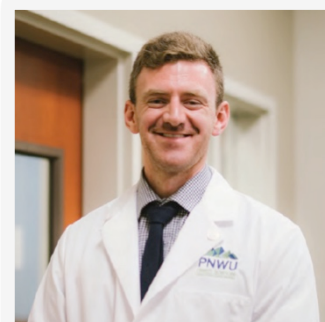
### Mayra Delgado (Outstanding Graduate Student)

Mayra Delgado was selected as the Outstanding Graduate Student in Chemistry for the 2017-2018 academic year. Mayra obtained her BS in Chemistry from WWU in 2016, and continued on in the MS program. As a graduate student at WWU in Prof. John Gilbertson's research group, she was a co-author on four manuscripts (plus a fifth from her undergraduate work). Three of her manuscripts are published in the journal *Chemical Communications*, which is the flagship journal for RSC. Her fourth paper is published in *Inorganic Chemistry*. Her four papers have 21 citations (total) in less than two years, another indicator of the significance of her work. She was a TA in the general chemistry series and a recipient of the Robert L. Hamilton Family Graduate Fellowship in Science. She presented a poster at the ACS national meeting in San Francisco, in addition to poster presentations at the WWU Graduate Conferences. You can find her picture on WWU advertising propaganda all over the university, and her profile was highlighted in Alaska Airlines' December 2016 issue of its inflight magazine, *Beyond*.



### Ian Smith (Outstanding Graduate Student)

Ian Smith was selected as the Outstanding Graduate Student in Biochemistry for the 2017-2018 academic year. As a graduate student in Prof. Clint Spiegel's research group, Ian worked to introduce new mammalian cell culture techniques to the lab for the study of the immune response to hemophilia A treatment, as well as played a critical role in moving the Spiegel Lab to make room for our new hire in Biochemistry, Prof. Jeanine Amacher. Ian's research largely focused on determining the X-ray crystal structure of a bioengineered variant of the human blood coagulation factor VIII. The structural details uncovered by Ian's work will help to develop new, more effective therapeutics for the treatment of hemophilia A, which have been submitted for publication following his graduation. Some of Ian's work has been highlighted at the Graduate Student Symposium at WWU, the Volcano Conference in Chemical Biology, the International Symposium of the Protein Society, and will be presented at the annual American Society of Hematology symposium in December 2018. Following graduation, Ian has enrolled in medical school at the Pacific Northwest University of Medical Sciences in Yakima, Washington.





## 2017-2018 Department Graduates

Congratulations to all **68** of our graduates from Fall 2017 to Summer 2018!

### **BS Biochemistry**

Nicholas Blair  
Austin Bradford  
Fong Chang  
Sarah Comley  
Luke Damstedt  
Megan Deshaye  
Claire Doran  
Randy Grant  
Galen Herz  
Jessica Ho  
Scot Hook  
Leah Huey  
Ellie James  
Robert Johnson

Liam Knight  
Lillian Konek  
Johnny Mueller  
Riley Ochs  
Delbert Oxborrow  
Connor Pham  
James Ryncarz Jr.  
Sukhdip Singh  
Nathan So  
Christian Squires  
Kristen Stewart  
Serena Streich  
Sarah Swan  
Martha Torujo  
Emily Tripp  
Maereg Woldekiros

Jon Wrigley  
Tian Qing Yen  
Charles Young

### **BS Chemistry**

Sasha Alden  
Douglas Baumgardner  
Tanner Bergevin  
Liam Carmody  
Haley Doran  
Justin Doyle  
Michael Jenkins  
Connor Kitzan  
Greg Larson  
Michael Leitch

Stephanie Maxwell  
Kylie McCoy  
Emily McCracken  
Alec McDougall  
Amy Morren  
Quynh-Nhu Nguyen  
Eve Pavkov  
Alena Rainsberry  
Griffin Reed  
Evangeline Starchman

### **BA Chemistry**

Ian Alderson  
Meaghan Arellano  
Cassidy Crickmore

Chelsea Davison  
Sean McCord  
Stephanie Neely  
Emily Schneider  
Dylan Spence  
Frederique Teotonio

### **MS Chemistry**

Kyle Burns  
Elizabeth Cummins  
Sierra Reed  
Johann Sigurjonsson  
Ian Smith  
Trevor Stockdale



Spring Commencement 2018



## Summer Research Program

Our summer research program continues to be a vibrant and vital part of our department mission. In the summer of 2018, we were able to provide summer research stipends from internal and external grants for **49** undergraduate students and **17** master's students. The Chemistry Department also awarded four summer fellowships to Evan Patamia (Denice Hougen Undergraduate Fellowship), Erin Rosenkranz and Evan Long (Karen and Joseph Morse Research Fellowship), and Evangeline Starchman (Alan Norman Student Fellowship).

This also marked the 7<sup>th</sup> year for our NSF-funded Research Experiences for Undergraduates (REU) program. The main goal of our program is to provide undergraduate students from community colleges and small universities with an authentic research experience that is not available at their home institutions. Nine students participated in the program: Meredith Boxx, Kristina Boyko, Johnny Buck, Reuben Crew, Dagem Getahun, Mari Marshall, Simone Rumph, Reed Starks, and Maggie Wang. This year, the directorship passed from Clint Spiegel to Amanda Murphy, who will oversee the program for the next three years. The end-of-summer symposium featured talks from Charlotte Cialek (2012 REU alum), Andrea D'Aquino (2013 REU alum and 2014 WWU Chemistry graduate), Lisa Marcaurelle (Vice President, Enko Chem, Woburn, MA), and Jacob Hooker (Harvard Medical School, Cambridge, MA).



**Top:** REU students at Mount Baker (left), in downtown Seattle (middle), and at Deception Pass (right)

**Bottom:** Poster presentations at the end-of-summer REU symposium





## Scholars Week 2018

The Chemistry Department was honored to host Nobel laureate Dr. Bruce Beutler for Scholars Week (May 16-18, 2018). Dr. Beutler received his undergraduate degree from the University of California at San Diego in 1976, and his MD degree from the University of Chicago in 1981. After two years of residency at the University of Texas Southwestern Medical Center, he became a postdoctoral fellow and then an assistant professor at the Rockefeller University (1983-1986). While there, Dr. Beutler purified mouse tumor necrosis factor (TNF) and discovered that it was an endogenous mediator of inflammation, and was the first to neutralize TNF activity using antibodies. In 1986, he returned to Dallas as an HHMI investigator, where he designed recombinant inhibitors of TNF, still widely used to treat rheumatoid arthritis. His interest then focused on how TNF production was triggered by bacterial infections. By employing a method called positional cloning, Beutler's group was able to identify the receptor for bacterial lipopolysaccharide, a strong inducer of TNF synthesis. This molecule was the Toll-like receptor 4 (TLR4), and is a key component of our innate immune response. His work led to an appreciation of precisely how the innate immune system becomes activated during infection, and Dr. Beutler shared the 2011 Nobel Prize in Physiology or Medicine with Jules Hoffman and Ralph Steinman.



Dr. Beutler moved to Scripps Research Institute in 2000, and by inducing germline mutations at random with a chemical mutagen, deciphered signaling pathways activated by TLRs. Returning to UT Southwestern in 2011, he developed methods for extremely fast identification of mutations that cause phenotype, ultimately making it an instantaneous process.

Dr. Beutler is currently a Regental Professor and Director of the Center for the Genetics of Host Defense at the University of Texas Southwestern Medical Center at Dallas. Before he received the Nobel Prize, his work was recognized by the Shaw Prize (2011), the Albany Medical Center Prize in Medicine and Biomedical Research (2009), election to the National Academy of Sciences and Institute of Medicine (2008), the Frederik B. Bang Award (2008), the Balzan Prize (2007), the Gran Prix Charles-Leopold-Mayer (2006), the William B. Coley Award (2005), the Robert-Koch-Prize (2004), and other honors.

While at WWU, Dr. Beutler had lunches with students, dinners with faculty, interacted with students at the poster sessions, gave a fabulous lecture in CHEM 473 (Molecular Biology) on the history of his research and its nuances, and finally gave the keynote address at the Chemistry Department symposium. The title of his keynote address was "Discovering genes essential for immune function." Also in the Chemistry symposium, 2018 department graduates Leah Huey (Anthony-Cahill lab) and Ellie James (Murphy lab) presented their Honors research.

Dr. Beutler was impressed with both the quality and breadth of research occurring in our department. His visit generated considerable interest among the students, especially those from the molecular biology course. As always, we are indebted to the Pavia, Lampman, and Kriz endowment for making valuable visits like this possible, and we thank Dr. Beutler for making time for us in his busy schedule!



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## WWU Chem Club Celebrates 50 Years of Excellence

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The past year has been another good one for the Chem Club, marked by our 8<sup>th</sup> consecutive Outstanding Chapter Award from the ACS and a Green Chemistry Award as well! Our students continue to be extremely generous with their time, performing demo shows at local elementary schools, performing experiments with K-8 students on campus, and with numerous department service events. Of course, volunteering is rewarded with fun social events (Costume Bowling Night, Chemistry Trivia, etc.), as well as the popular picnic at the end of the year. This year's picnic is Saturday, June 1<sup>st</sup> at Whatcom Falls Park. As always, alumni and friends of the department are welcome and encouraged to attend.

In addition to 2019 being the International Year of the Periodic Table (IYPT) recognizing the 150<sup>th</sup> anniversary of Mendeleev's periodic table, this year marks the 50<sup>th</sup> anniversary of WWU's Chem Club. Doubtless things look a little different now than they did back in 1969 in Haggard Hall, but we suspect many of the student Chem Club experiences (social activities, outreach to schools, etc.) are fairly similar. If you participated in Chem Club activities over the years, we ask you to please share your favorite stories and/or pictures via Facebook ([www.facebook.com/wwuchem](http://www.facebook.com/wwuchem)) or email ([elizabeth.raymond@wwu.edu](mailto:elizabeth.raymond@wwu.edu), Subject: Chem Club memories). We plan to compile and share these at our annual Chempalooza (i.e., fall kick-off party) in September.

Chem Club looks forward to another 50 great years of serving the department, university, and community!

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### WWU Chemistry Department Newsletter #19 was produced by:

Rob Berger: editing, layout  
Alexi Guddal: information gathering  
Gary Carlton: artwork

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

6	12.011	2	4.003	74	183.85	53	126.9	16	32.07	112	(270)	39	88.91
C	He	M	I	S	Tr	Y							
Carbon	Helium	Tungsten	Iodine	Sulfur	Trentium*	Yttrium							

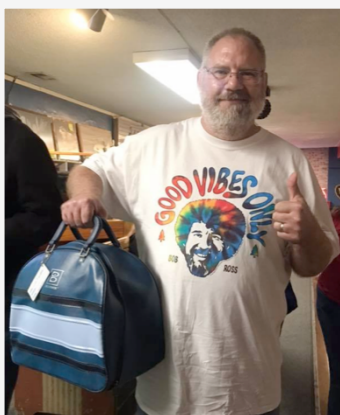


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## Photos from 2018 Department and Chem Club Events





## Student Attendance at Regional and National Conferences



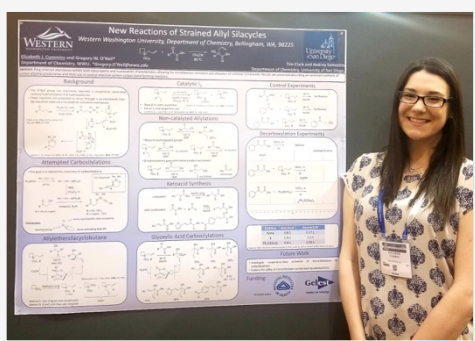
Prof. Margaret Scheuermann, Geoff McClarin, Reuben Szabo, Natty Prommin, Gabriel Bourne, Haley Doran, and Kelly Yokuda – ACS NORM, June 2018, Richland



Sierra Reed (Antos Lab) – ACS National Meeting, March 2018, New Orleans



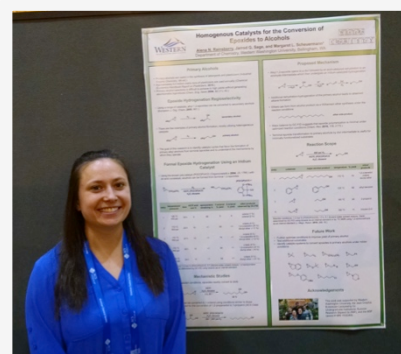
Liam Knight, Ellie James, Stephanie Maxwell, and Evie Starchman – ACS National Meeting, March 2018, New Orleans



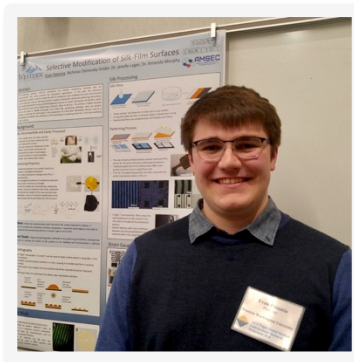
Elizabeth Cummins (O'Neil Lab) – ACS National Meeting, March 2018, New Orleans



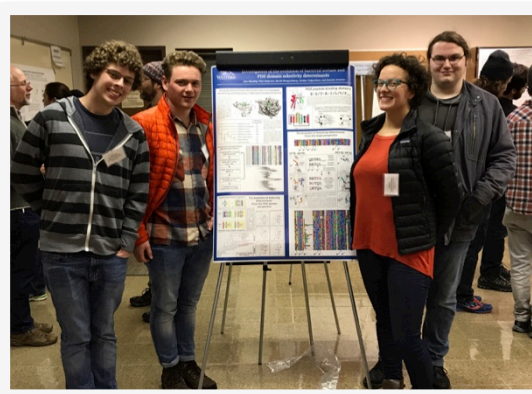
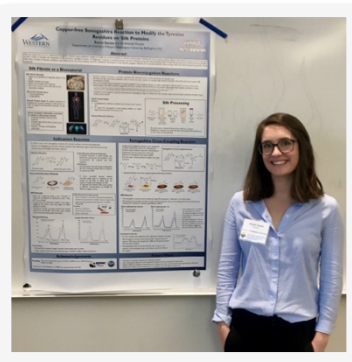
TQ Yen, Michael Leitch, and Prof. Greg O'Neil – International Conference on Algal Biomass, Biofuels, and Bioproducts, June 2018, Seattle



Alena Rainberry (Scheuermann Lab) – ACS National Meeting, March 2018, New Orleans



Evan Patamia and Racine Santen (Murphy Lab) – ACS Undergraduate Symposium, April 2018, Olympia



Jordan Valgardson, Nick Pederson, Sarah Struyvenberg, and Iain Mackley (Amacher Lab) – Volcano Conference, March 2018, Pack Forest

