Department of Chemistry 2022 NEWSLETTER

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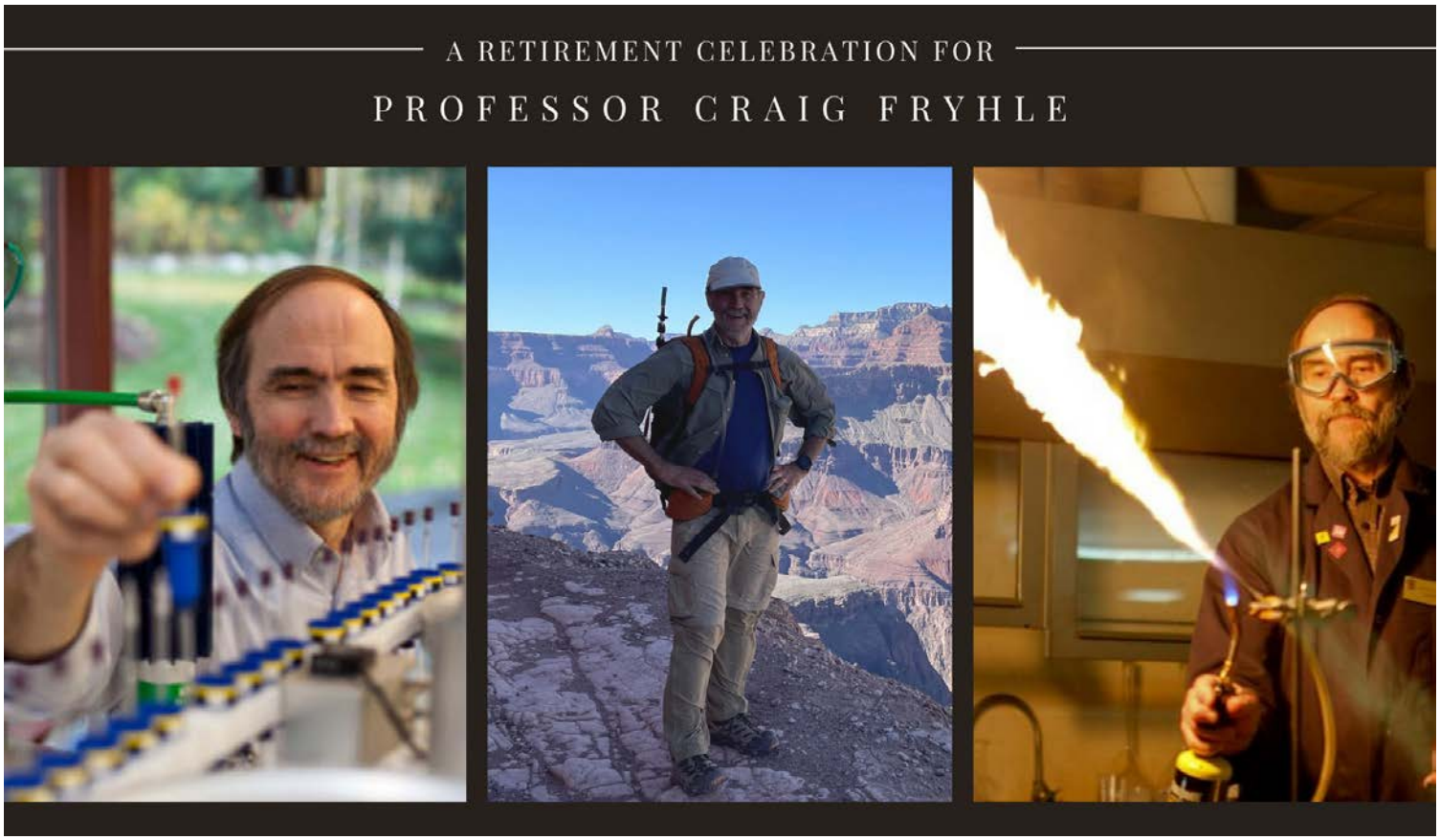
Greetings from the PLU Chemistry Department!

The 2021-2022 academic year was quite busy as we welcomed students back to campus for in-person teaching. It was a delight to have the students back and to provide hands-on laboratory experiences again. We also said farewell to our colleagues Dr. Craig Fryhle and Dr. Sailaja Arungundram who are transitioning into retirement and a new position, respectively.

This upcoming year looks just as eventful as we welcome Dr. Angie Boysen and Dr. Valeriy Smirnov to the department. We are also starting off the new academic year with new and improved instrumentation including a Shimadzu HPLC and prep HPLC and updated components to our GPC. These improvements are all possible thanks to the generous support of our donors and the PLU Division of Natural Sciences (soon to be the College of Natural Sciences).

Thank you for your continued interest in our activities. I invite you to share news with us by sending me an email at chair@chem.plu.edu. You can stay up to date by visiting our department webpage (https://www.plu.edu/chemistry/) and following us on Facebook (https://www.facebook.com/PLU.chemistry/)

Phase Transitions



We celebrated the career of Dr. Craig Fryhle in May with a Retirement Celebration. It was wonderful to see and hear from so many alumni, colleagues, and friends. Craig has been a leader in our department and in the local chemistry community for decades. He is a co-author of one the most widely used undergraduate organic chemistry textbooks in the world. His excellent teaching, his dedication to science, and his service to the broader chemistry community were recognized in 2019 when he was named a Fellow of the American Chemical Society.

Dr. Craig Fryhle served as department chair from 1999-2015. During that time he oversaw the hiring of six new tenure-line faculty and was PI or co-PI on grants that brought approximately $1,000,000 to PLU including the NSF MRI grant that supported the purchase of our Bruker 500 MHz NMR spectrometer. His dedication to ensuring that PLU chemistry students are trained to use state of the art instrumentation has become a hallmark of our program.

We continue to be grateful for all the ways Craig supported the department and the larger chemistry community during his time at PLU. As Craig begins phased retirement, we look forward to seeing him around and hearing about all his future endeavors.

Introducing Dr. Angie Boysen

Hi PLU Chemistry! I am very excited to join the department this fall and am thankful for the opportunity to introduce myself.

On my move to Tacoma from Chicago, IL, where I was working as a postdoctoral fellow, I passed through my hometown of Boulder, CO. Growing up there, with the help of my family, teachers, and the Rocky Mountains, I developed a love for both the outdoors and science. I combined these two interests in college, at Stanford University, by majoring in chemistry and by taking as many research internships as possible. This allowed me to use chemistry to study the environment.

After graduating college, I pursued science education by working for the Oregon Museum of Science and Industry in Portland, OR. I also worked as a ski instructor during this time, I guess that's a theme for me – take something I'm super into, be it chemistry, ecology, or skiing, and teaching it!

After working as an educator for a few years, I decided to jump back into the laboratory and got a PhD in Chemical Oceanography from the University of Washington, Seattle, followed by a postdoctoral position at the University of Chicago. My research focuses on understanding the activity of marine microorganisms. Sometimes it is hard to convey why these diverse but extremely tiny ocean creatures matter, but one analogy is that microorganisms living in the oceans are as important to the planet's health as the microorganisms living in our bodies are to our health. They can keep things in a beautiful balance or throw things way out of whack. I use instruments like mass spectrometers to measure molecules (both small organic molecules called metabolites and much larger proteins) made and used by marine microorganisms.

Depending on my particular scientific question, I collect samples from various ocean environments or I grow microbes in the lab. I think of the molecules I measure as the currency and the tools of microbes - microbes can't talk to us or to one another, but we can trace their activity and interactions through the chemical exchanges they make, the signatures they leave behind, and the proteins they use. Measuring these molecules is often a big challenge, and a lot of my research focuses on developing and honing chemical analysis techniques. Studying the marine environment is fun for many reasons: it is super important, there is so much we don't know, and you sometimes get to go out on ships. Being at PLU where I'll get to continue using chemistry tools to research microbes in the marine environment with excellent students, is a dream come true.

I can't wait to get into the classroom and the lab with all of you and learn together!

Summer Research

Eight students participated in student-faculty chemistry research at PLU summer 2022

Waldow Research Group
Lindsey Brock
Jackie Lindstrom
Sandy Montgomery
Emily Struck

Yakelis Research Group
Daniel Bensen
Brady Grahe
Paige Hinman
Lauren Lazarte

The Yakelis lab develops new ligands for lanthanides to illuminate the roles of RNA in cells

Dr. Neal Yakelis was awarded a RAISE (Research Across Institutions for Scientific Empowerment) grant from the M. J. Murdock Charitable Trust in May 2022. This 3-year collaborative grant of ($215,500 from the Murdock Trust will support Dr. Yakelis and three other primary investigators – Dr. Wade Grabow (Seattle Pacific University), Dr. Minhee Lee (Seattle Pacific University), and Dr. Clarisse van der Feltz (Northwest University) – in their work with undergraduate student-researchers to design new luminescent probes for RNA. The proposal entitled "Development of novel light-up RNA aptamer-fluorophore probes with tunable optical properties" is an interdisciplinary endeavor that builds on the team's strengths in luminescent lanthanide complexes (Dr. Lee), organic ligand synthesis (Dr. Yakelis), and RNA aptamer development (Drs. Grabow and van der Feltz).

Funded through the Murdock grant and PLU matching funds, Dr. Yakelis mentored four current PLU undergraduates during the 2022 Natural Sciences Summer Undergraduate Research Program (NSSURP) at PLU: Daniel Bensen ('24/25), Brady Grahe ('23/24), Paige Hinman ('23), and Lauren Lazarte ('24/25).

Dr. Yakelis and "The Yak Pack" (as the lab dubbed itself) had opportunities to meet with their collaborators over the course of the summer to discuss goals, present their research progress, and enjoy some group lunches. The grant will continue to fund research by Dr. Yakelis and two full-time student researchers during each of the next two summers, as well. Thanks to the M.J. Murdock Trust and PLU for supporting this exciting new research project!

Instrumentation

We begin the 2022-2023 academic year with improved instrumentation. We received a generous donation of equipment and instrumentation from Metagenics just before transitioning off-campus for the start of the pandemic. This spring and summer, we worked with Shimadzu to refurbish and install the donated equipment and now have a new (to us) HPLC and prep-HPLC. We were also able to upgrade our GPC and used funds from the PLU Division of Natural Sciences to purchase a new multiangle light scattering detector for the GPC that allows for the determination of absolute molecular weights. These instruments were used by our research students this summer.

We also refurbished and installed an autosampler on our microwave reactor that will allow us to incorporate microwave reactions in organic chemistry laboratory experiments. All of these improvements have been possible thanks to our generous supporters and funding through our department budget, our chemistry gift fund, and the division of natural sciences.

Open Lab Slated for Significant Improvements

To some of our alumni, the Rieke Science Center still feels like the newest building on campus, but it's actually over 35 years old. Improvements are needed to support our strong science and pre-health science programs and to better equip students to learn as we continue to experience an escalating healthcare staffing crisis and disproportionate health outcomes.

During the last few years, the PLU community has invested in strategic upgrades to Rieke, and I think you'll be excited to know that the Open Lab is slated for significant improvements. In fact, planning and design work for the improved Open Lab has already begun. Highlights of the renovated Open Lab will include:

- 4 flexible lab spaces (2 for Chemistry, 2 for Physics)
- more fume hoods in Chemistry
- improved security & safety
- mostly transparent walls that keep science on display and student gathering spaces.

Given the currently estimated $8.5 million scope of the Open Lab improvements, fundraising has begun, and an anonymous PLU alum has made a significant lead gift of $2 million to kickstart the improvement. Pending additional funding, equipment procurement is expected to begin in 2023, with construction slated for the summer of 2024 to mitigate impact on the student and faculty experience.

If you would like to learn more about how you can support the success of the Open Lab project, please reach out to Dr. Andrea M. Munro, Chair of the Chemistry Department at chair@chem.plu.edu or munroam@plu.edu.

Renovation Design - Hall

Renovation Design - Lab