

Chemical Engineering Newsletter

University of Wyoming
College of Engineering & Applied Science



March 2021
Spring Issue

MESSAGE FROM THE DEPARTMENT HEAD:

This is my last newsletter as department head. The end of this period marks five years since I was appointed head and six years since Chemical Engineering became its own separate department. It has been a privilege to serve in this capacity. It is almost a cliché, but the response to the pandemic has changed how we do our jobs and we operate on campus. We have to admire resilience among all the different groups that form this academic ecosystem, but we should not forget of all of those that still experience the negative impacts of the so-called new normal. This semester saw the return to more face-to-face learning experience and the anecdotes tell us that many students crave a real, more direct learning mode. After all, we are gregarious as human beings and social creatures. The University of Wyoming, like other schools, is facing budgetary constraints, but our community has maintained its resolve. We should always remember why we do our jobs.

In spite of challenges, our students, staff and faculty continue to be a source of inspiration. Faculty and staff have redoubled efforts to assist our student and our community at large in the mist of all the hurdles involved with new delivery modes as well as emotional and mental impacts resulting from the evolving situation. UW prepares to a return to real normalcy in the fall semester with precautions, but eliminating the social distancing limits that should allow us to have our students come back to the classroom. We will continue to be vigilant and the summer will tell if the plans will materialize.

We continue to work on the **Process Control and Instrumentation Engineering (PCI)** minor. Dr. John Tatar-ko, JT, keeps injecting his boundless enthusiasm into the program to make it a success. His dedication to our students is admirable. This program will benefit from the presence of the E.G. Meyer Visiting Industry Professor, Renee Schoenborn. We look forward to working with her in the next academic year. We are also preparing to close a new ABET accreditation cycle, under Dr. Holles' guidance, as our ABET champion. Our teaching offering has expanded, including courses such as Vaccine Manufacturing, taught by Dr. Michael Pishko.

On the research side, our faculty continue to thrive. Prof. Saman Aryana was recently selected as the new Occidental Chair in Energy and Environmental Technologies. He will work closely with the School of Energy Resources and we wish him all the success. Several faculty are contributing with research on Covid-19 diagnostic technologies. Entrepreneurship is flourishing with several companies being launched by faculty, postdocs and students. We see a bright future in these initiatives. Our department continues to expand cross-disciplinary collaborations.

Our students report here on the status of the student chapters, AIChE and SWE. Many of our undergrad and graduate students are award-winners. Please join us to celebrate their accomplishments. Our Industry Advisory Board (IAB) is as committee to work with us as always. We will hold our spring meeting online, but look forward to gathering again face to face. We are blessed to count with such a talented group of professionals that care about the wellbeing of everyone in the department.

Light comes after the dark. Please, take a few minutes to enjoy our Newsletter!



Dr. Vladimir Alvarado

DR. DAVED BAGLEY NAMED INTERIM ASSOCIATE DEAN OF CEAS

Drs. David Bagley and David Mukai have been named interim associate deans in the University of Wyoming's College of Engineering and Applied Science. Bagley will join the college's leadership team and lead in key areas to support graduate education and research endeavors. He replaced Paul Dellenback, who retired last May.

"I am excited to welcome Dave Bagley to our leadership team. He will provide strategy and vision that serve both students and faculty members," says Cameron Wright, interim dean of the UW College of Engineering and Applied Science. "Dave's accomplishments as a faculty member -- and his commitment to our mission and values -- have prepared him very well for this crucial role that spans both education and research."

Bagley says the College of Engineering and Applied Science has a "proud tradition" of developing students, new ideas and technologies that benefit the citizens and industries of Wyoming and outside the state.



"I look forward to working with our terrific faculty, staff and students to build on that tradition as we work to further improve the well-being of the people and economy of Wyoming through exceptional graduate education and technical innovation," he says.

Bagley began his UW career in 2005 as an associate professor in the Department of Civil and Architectural Engineering, and was appointed head of that department in August 2007, a position he held through December 2010. In July 2008, Bagley was promoted to professor and, in January 2011, Bagley was appointed head of the Department of Chemical and Petroleum Engineering, a position he held through March 2015 when he returned to the professoriate in the newly created Department of Chemical Engineering.

He has been published in numerous peer-reviewed journals and other publications, and he is a member of various job-related associations. Congratulations, Dr. Bagley!

— *Institutional Communications, June 2020*

CEAS: CHEMICAL ENGINEERING STUDENT AMBASSADORS

CEAS Student Ambassadors help promote the College of Engineering and Applied Science in various ways, including: prospective student recruitment, retention of current students, acting as liaisons with the general public, participation in alumni and donor-relation activities and sharing their student experiences with diverse audiences.

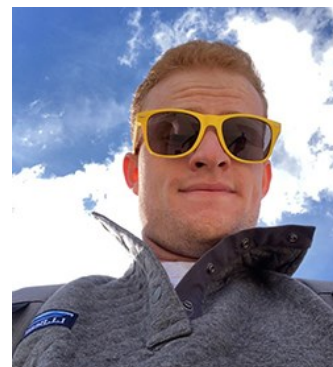


Geetu Thuruthiyil Babu

"I'm a senior in Chemical Engineering with a concentration in Bioengineering. I'm an international student, born and raised in Dubai, United Arab Emirates. Home to almost 200 nationalities, land of equal opportunities to all and beautifully multi-cultural, my hometown has shaped me into the person I am today. I chose UW because of the outstanding engineering program which has been an incredible learning experience. I find senior year to be the most exciting as I'm able to work on areas I'm most passionate about, like my mRNA vaccine development senior project. I'm beyond thrilled to be given an opportunity to share my excitement with young minds and inspire them and pique their interest in engineering and related fields and see the innumerable opportunities that come with it. I have been a part of Explore Engineering, the K-12 program, Multicultural Student Leadership Initiative, Engineers without Borders and a Mental Health Wellness Ambassador at UW Wellness Center, Half Acre. Currently, I'm a part of AIChE, EWB, I work as a tech at the UW IT Department and part of the UW COVID Shield team, assisting with testing and processing at the Wyoming State Veterinary Laboratory."

"I'm beyond thrilled to be given an opportunity to share my excitement with young minds and inspire them" - Geetu Thuruthiyil Babu

"I am a fourth year Chemical Engineering student at the University of Wyoming. I transferred to the university last year, from Powell, Wyoming, where I was born and raised. I am currently the President of WyoGold and a University of Wyoming Brand Ambassador. I have been involved with INBRE, carrying out research, all four years of my college career, and am currently an INBRE Transfer Fellow. I work conducting research in a Bioengineering lab on campus. In my very rare spare time, I enjoy being outside hanging with my dog or friends and try to enjoy a variety of outdoor activities throughout the year. I also enjoying dabbling with my guitar or reading (non-academically, of course!)."



Gareth Flowers

LARAMIE SCIENTISTS DEVELOPING COVID-19 ANTIGEN TEST

Laramie-based CellDrop Biosciences, Metrohm Raman and the University of Wyoming's Oakey biomedical engineering laboratory are working with the Massachusetts Institute of Technology researchers to develop a fast, accurate COVID-19 test they hope could alter the course of the pandemic.

Ben Noren, a UW Chemical Engineering graduate and CEO of CellDrop Biosciences, started working on hydrogel engineering about four years ago. "Think, building tiny structures out of fancy Jell-O," explains the CellDrop website. The cornerstone technology, for example, stores stem cells in microscopic hydrogel drops before being injected into a person. CellDrop's COVID-19 test uses saliva samples to identify whether SARS-CoV-2 the virus that causes COVID-19 — is present in a person's system. Unlike other saliva-based tests, this one relies on a special protein developed by MIT researchers that will bind itself to a specific antigen emitted by the virus.

This is where Noren's hydrogel comes in. To create the COVID-19 test, they attach the MIT-developed protein to the hydrogel which is then dehydrated to store the protein. If the MIT protein finds the antigen it's looking for, the laser will pinpoint the solution and return a positive test result "within milliseconds," Noren said. The tests will have two applications but Noren said one version of the test will employ the lasers, which would be a more accurate test.



He envisions airports using these tests to screen passengers before they board a flight or organizers of large public events using them to screen attendees while they're in line to enter a building. They're also working on a home-based test that a person could take multiple times over the course of several days to ensure they aren't carrying the virus. That test would work similarly to a pregnancy test and the team of researchers working with Noren have had a lot of early success. Although they haven't started formal testing yet, Noren's goal is to have 1,000 tests ready to send to the NIH by summer. He also stressed that even if the tests are readily available in the near future, they aren't a replacement for getting vaccinated.

— *Casper Star Tribune*, March 2021

PHD STUDENT RECEIVES NAMS TRAVEL AWARD

The Elias Klein Founders' Travel Supplement is a \$500 award to reimburse travel and registration cost for the 2021 North American Membrane Society (NAMS) Conference (currently scheduled for August 28th to September 2nd) to allow student Anastasia Kastl the opportunity to attend and present her research at the conference. Approximately 20 students are chosen each year for the award and it requires the student to present their research at the 2021 NAMS conference.

“If the MIT protein finds the antigen it’s looking for, the laser will pinpoint the solution and return a positive test result” - Casper Star Tribune

“I am very honored to have received this award as this will be the first professional conference I am able to attend since starting graduate school at UW. It will be a very good experience for me to present my research as well as get a feel for what other researchers in the membrane field are investigating.” Kastl’s research specifically focuses on Covalent Organic Frameworks (COFs), a novel 2-D Material developed in 2005, and optimizing the COF membrane formation process to aid in making COF membranes an industry alternative to distillation and other energy intensive separation processes. COF membrane are especially promising for industry as they have exhibited high flux and selectivity on the lab scale, properties that are difficult to obtain with a typical polymer membrane.

— Anastasia Kastl, PhD



North American Membrane Society

College of Engineering & Applied Science

Chemical Engineering

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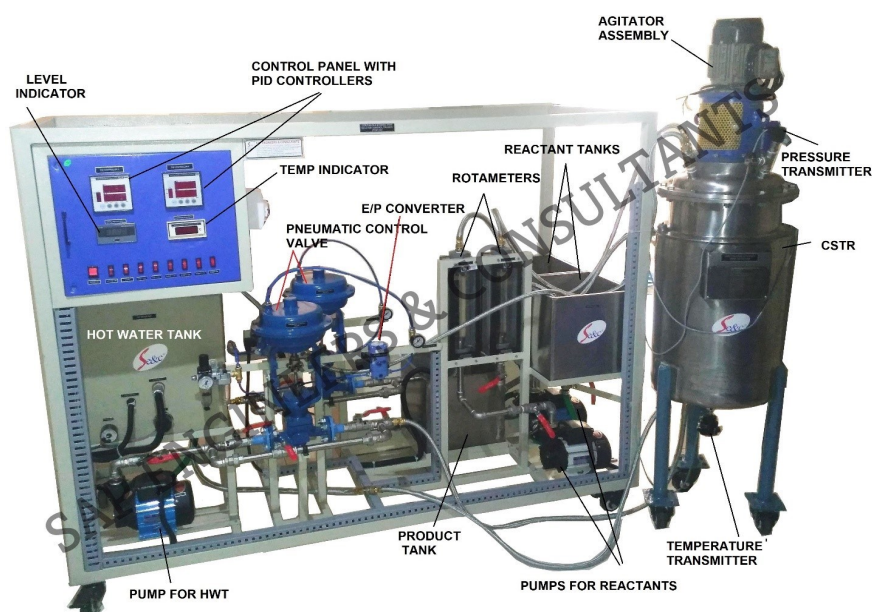
E-mail:
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PROCESS CONTROL AND INSTRUMENTATION MINOR

12 pieces of state-of-the-art lab equipment for the Process Control and Instrumentation minor will be arriving later this month. This will permit our students opportunities to commission, program, operate, and control unit operations identical to those throughout industry. In addition, this acquisition will offer an upgrade for Senior-level lab courses in Chemical Engineering. The ultimate goal is the inclusion of more students from Petroleum, Mechanical, and Electrical Engineering within the minor. An on-line certificate in Process Control and Instrumentation is envisioned for the very-near future.

— Dr. John Tatarko



Here is a fully-controlled and instrumented Continuous Stirred-Tank Reactor (CSTR) on order from SAP Engineering, India. Just one of the many pieces on-route to UW!

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