

# SEMESTER NEWSLETTER

## Message from the Chair



Removing the mask mandate after spring break has given us more breathing room for face-to-face interaction. At the departmental level, noteworthy progress has been made. The student lounge in the Buchanan

Engineering Laboratory (BEL) building was furnished and is being used heavily by students. The low-use research labs surrounding the lounge are being converted to teaching labs so that students will have a central place to do homework or hangout in a close vicinity. A big thanks to Nord Foundation for their generous donations to make this happen.

The department adopted the Accelerated 4+1 Masters of Engineering program that allows current undergraduate students to get graduate degrees in one additional year while paying in-state undergraduate tuition. In addition, both Chemical and Biological Engineering Programs are now listed as a part of the Western Regional Graduate Program (WGRP). The WGRP program allows students from WICHE states ([www.wiche.edu/our-region/](http://www.wiche.edu/our-region/)) to enter graduate programs at UI and pay resident tuition.

The April 5th and 6th Vandal Giving Day was a big success! The college of engineering raised record breaking \$152,239 in donations; 68 faculty and staff gave to College of Engineering funds. The Chemical and Biological Engineering faculty were challenged to donate a fund of \$1,000 that would go towards student scholarships. We ended up collectively contributing \$1,430 and the amount was matched by donors during Vandal Giving Day. This fund will provide two student scholarships for one year. The departmental student scholarships are one of the most critical resources that help many students overcome a financial hump to earn their degrees.

In total, the department was able to provide 51 scholarships for the amount of \$72,850 for the fall semester.

Our students once again took part in the WERC Environmental Design competition, winning first place for their project. They converted CO<sub>2</sub>, produced by a natural gas power plant, into two valuable products. The team also received a second-place prize for their bench scale design, which was evaluated separately. The students' success is tied closely with their dedicated mentor Dr. Matthew Bernards, who won himself the College of Engineering "Outstanding Faculty Award."

Many other departmental faculty and staff received awards for their outstanding services. Dr. Nate Schiele is one of the recipients of the Career Services' 2021-2022 "Career Impact Award." Judy Vandegrift won the "Outstanding Staff" award, and David MacPherson won the "Outstanding Technical Staff" Award from the College of Engineering.

The spring class consists of 23 students graduating with a B.S. (14 Biological Engineering; 9 Chemical Engineering), 2 M.S. (1 Biological Engineering; 1 Chemical Engineering) and 2 Ph.D. students in Biological Engineering. Congratulations to all graduates! Most of the students have already accepted a job or are transitioning to graduate school.

As always, you are encouraged to sponsor a capstone project, engage in student mentorship, support various club activities, or provide us feedback at:


[forms.office.com/r/uQ4Qp4HMZA](https://forms.office.com/r/uQ4Qp4HMZA)

Thank you!

 **University of Idaho**  
Department of Chemical and  
Biological Engineering

[uidaho.edu/engr/departments/chbe](http://uidaho.edu/engr/departments/chbe)

Email: [chembioeng@uidaho.edu](mailto:chembioeng@uidaho.edu)

 208-885-6182



## Brand New Student Lounge

Buchanan Engineering Laboratory (BEL) student lounge, renovation of which started before covid has been completed this semester for students' use. This renovation consisted of many upgrades including general clean up of the area, removing overhand piping, encapsulating asbestos containing popcorn ceiling, covering metal grate area with vinyl laminated flooring, polishing of the floor, replacing shabby doors surrounding the room, floor waxing, furnishing and providing locker units.

The next upgrade will be renovating the unit-operations

BEFORE



AFTER



lab which is directly beneath the student lounge and converging two surrounding rooms to teaching labs. Most of the funding for this upgrade came from generous donations from the Nord Foundation.

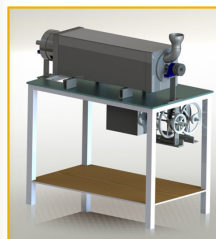
## Variety of Capstone Design Projects

Capstone design is a two semester long Fall-Spring course for both Chemical and Biological Engineering Students. ChE Capstone design is specific to the major but BE capstone design is interdisciplinary. Capstone projects provides students not only with design aspect of engineering but also help them work in an interdisciplinary team, oral and written communication, engineering ethics, safety, and environmental and sustainable aspects of design. Most of these projects have external industrial clients, given students a unique opportunity to interact with industry to solve a real-world problem. To sponsor a capstone project please visit [www.uidaho.edu/engr/programs/capstone](http://www.uidaho.edu/engr/programs/capstone). There were nine capstone projects that the departmental students were involved with.

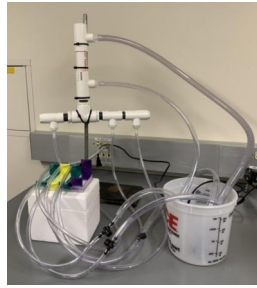
**Biodiesel Team:** Replacing petroleum diesel with biodiesel can significantly reduce greenhouse gas emissions and fossil fuel dependency. The team designed and built a continuous flow, portable biodiesel production system utilizing a liquid-phase plasma discharge reactor. The system takes vegetable oil and an alcohol, mixes them and pumps the mixture through the reactor where a high voltage current produces biodiesel. The system fits inside a suitcase for easy mobility. The project was funded from Charles and Julian Peterson Engineering Design Endowment.



**Biochar Team:** Biochar is a charcoal-like substance created by heating biomass, like woodchips, in a low-oxygen process called pyrolysis. Biochar has beneficial properties as a soil additive for retaining nutrients, absorbing contaminants, and sequester carbon for hundreds of years. The biochar team built a continuous reactor to convert biomass to biochar by moving it through a tube by means of an auger. The tube is heated by electric resistance heaters, an innovation chosen by the team which reduces the heating cost of the reactor by nearly a factor of thirty compared to using propane as the heating fuel. The project was sponsored by Stanley Solutions.



**Cell Shear Stress Team:** Stem cells have the potential to differentiate into any type of body cell. Differentiation into tendon cells results from a number of unknown factors. In his research professor Nate Schiele tests the application of shear stress to cells to produce tendon cells. This team designed and built a bioreactor to flow nutrient media over cells while controlling the shear stress exerted on the cells by the fluid media. The project was funded from Charles and Julian Peterson Engineering Design Endowment. The team tied for the “Best Booth Award” at the Engineering Expo with two other teams.



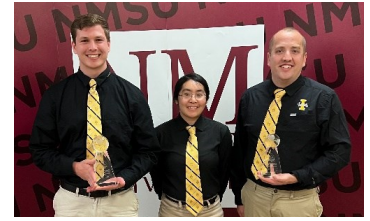
**Modular Distributed Gas-to-Liquids (GTL) Synthesis:** In this project, a modular system converting natural gas into longer-chain hydrocarbons was designed. The system converts methane and steam into carbon monoxide and hydrogen gas that is further reacted to products such as diesel fuel.

**Pressure Swing Adsorption: A Functional Apparatus and Future Teaching Tool:** Pressure swing adsorption, often abbreviated as PSA, is a common separation technique that is used to generate high-purity gas streams in industries such as manufacturing, food processing and even healthcare. Our team designed and built a PSA apparatus that will generate streams of oxygen and nitrogen for use in the chemical engineering laboratories. Further, our team completed a scale up and economic analysis of this technology for producing medical grade oxygen on-site at a medical facility.

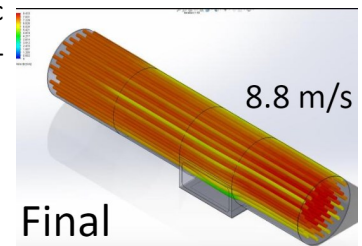
**Acid Mine Drainage Prevention at Bunker Hill Mine:** The formation of acid mine drainage at the Bunker Hill Mine, located in Kellogg, Idaho, poses a large risk to the environment. In this project, research and design of a mine cap was completed to prevent precipitation from infiltrating into the mine through the Guy Caves surface depression. An economic analysis of the construction costs was also completed to guide Bunker Hill's mitigation plan.



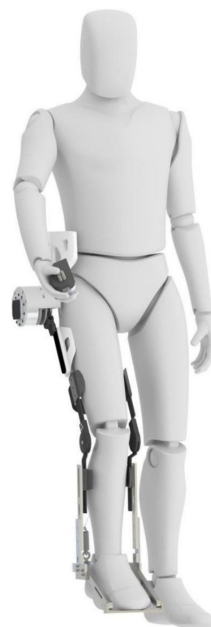
**Conversion of CO<sub>2</sub> into Value-added Product:** With the ever-increasing push to reduce carbon dioxide emissions, the ability to convert CO<sub>2</sub> into a value-added product is a better option for businesses than release. In this project, a system was designed to convert CO<sub>2</sub> in a trickle-bed reactor. The bench scale system was also scaled in an economic study for application in a natural gas power plant. The team took part in the WERC Environmental Design competition and secured 1<sup>st</sup> place for the challenge category: “Carbon Conversion for the Energy Transition”. The team also received a second-place prize for their bench scale design. The team tied for the “Best of Show Award” at the Engineering Expo with two other teams.



**Fire-Resistant Wind Tunnel:** Wildfires are a significant and growing cause of public devastation. We are designing and testing a fire-resistant wind tunnel to simulate embers dispersed through a forest fire. This wind tunnel will need to withstand extreme heat, and results from these experiments will help us better understand how wildfires spread to help save lives and property.



**Leg Exoskeleton for Multiple Sclerosis Walking Assistance:** Currently, most walking assistance devices for those with limited leg strength/mobility provide full-propulsion, which replaces the use of remaining muscle in the leg and can lead to muscle degeneration. The goal of this project is to create a device to help the user walk across flat ground, without replacing use of their own muscles. This project has the potential to improve our client's quality of life and could advance the technology of walking devices for a range of disabilities/conditions.



## Undergraduate Degrees Awarded

### Biological Engineering

Alexandra Cunningham  
 Andoni Bieter Lete  
 Brian Penney  
 Devin Sheehan  
 Jacques Curtis Vos  
 Kaitlyn Harvey  
 Kaitlyn Lindholm  
 Leah Davidson  
 Lola Bangudu  
 Matthew Kraak  
 Melissa Huchet  
 Nicholas Pancheri  
 Nikhil Nayar  
 Sonja Tollefson

### Chemical Engineering

Adam Irons  
 Adrian De Kruyf  
 Conner Wootton  
 John Sanchez  
 Kelty Shroyer  
 Matthew Pyle  
 Paula Mei  
 Peter Everett  
 Sara Murphy

## Post Graduate Degrees Awarded

Student	Degree	Major	Major Professor
Ammar Tarar	Ph.D.	BE	Ching An Peng
Craig Woodruff	Ph.D.	BE	Russell Qualls
Kymberly Bowlby	M.S.	ChE	Haiyan Zhao
Yuan Yuan	M.S.	BE	Sarah Wu

 *Congratulations Graduates!*

## Student Awards

### Outstanding Chemical Engineering Senior Student:



#### Sara Murphy

Being born in Boise, ID, Sara Murphy was raised only steps away from the Idaho State Capital. From an early age, Sara was engaged in political activism, however, it was not until her time at the University of Idaho that she developed a deep pas-

sion for the interplay between engineering and public policy. Her professors from all disciplines encouraged this passion which empowered her to earn a minor in political science in addition to her B.S. in engineering. She has worked

on several research projects during her undergraduate career with one involving bio-jet fuel and the other working to improve the performance of lead-acid batteries. In addition to her research, Sara has also worked as an energy engineer intern for the Department of Energy's Industrial Assessment Center program and served as a Legislative Research Scholar for the McClure Center for Public Policy Research. Sara has also served as the President of the Vandal Clean Energy Club and is a member of both the American Institute of Chemical Engineers, and the Society of Women Engineers. Upon graduating, Sara will be attending the University of Michigan to pursue dual M.S. degrees in chemical engineering and sustainable systems.

### Outstanding Biological Engineering Senior Student:

#### Kaitlyn Harvey

Kaitlyn grew up in the rainy city of Bellingham, WA. With her mother working as a registered nurse, she quickly developed a love for biology and a passion for helping others. Kaitlyn excelled in both math and sci-



ence, providing her with the foundation she needed to eventually pursue a degree in Biological Engineering. For a large portion of her undergraduate experience, she was involved in biomedical research seeking to better understand tendon tissue engineering, and was able to present her research at both the Idaho Conference on Undergraduate Research and the Undergraduate Research Symposium. Near the end of her college career, Kaitlyn was fortunate to be one of two undergraduate students working to complete a research project for the

NASA Student Payload Opportunity with Citizen Science (SPOCS) program. This experience allowed her to help build and test an experimental payload to evaluate the bacterial resistance of polymer coatings on the International Space Station (ISS). Kaitlyn received the unforgettable opportunity to represent the team on the live NASA pre-launch broadcast, as well as watch their project launch on-site. It was during this experience that she was able to flourish, showcasing everything she had learned during college and continuing to grow her engineering and soft skills, as well as guide her passion and future pursuits towards aerospace. Outside of research, Kaitlyn has been an active member of the Engineering Ambassadors team, as well as a tutor for the Student Athlete Success Services program.

### Significant Undergraduate Research

The department provides a plenty of hands-on educational experience and undergraduate research opportunities. Andoni Bieter Lete, majoring in Biological Engineering, is an example of a student with significant undergraduate research experience.



In the biology department, Andoni learned the fundamentals of research procedure. He analyzed biotoxins produced from yeast that offered potential

solutions to human disease. In the chemistry department, Andoni used quantitative chemical analysis to ascertain the composition and origin of unknown archeological samples. His conclusions were summarized and submitted to archeologists throughout the United States.

In the summer of 2020, Andoni worked for the Industrial Assessment Center to performed energy audits of mid-size industries to help them save energy and decrease

waste. Up until graduation, Andoni worked on recycling nutrients through hydrochar, the solid product from hydrothermal carbonization of dairy manure. Andoni will be presenting his research findings at the ASABE Annual International Meeting in Summer 2022.

### Masters of Engineering in One Year Paying Undergraduate Tuition

The University of Idaho has recently adopted the accelerated 4+1 Masters of Engineering program. The Chemical and Biological departmental faculty acted swiftly to provide an opportunity for current undergraduate students to complete a non-thesis master's degree with up to 12 credits reserved from their undergraduate work. Students who enter the accelerated 4+1 program will be eligible for a regular undergraduate tuition rate through the first year of their graduate program. The accelerated 4+1 program and the tuition benefit are limited to Idaho residents; however, current University of Idaho students classified as non-residents may be eligible for residency as they will have completed their UG degree at the University of Idaho. The program is now available for both Chemical Engineering and Biological Engineering Students.

### Faculty and Staff Awards

#### College of Engineering awards

- \* Outstanding Faculty – Dr. Matthew Bernards
- \* Outstanding Administrative Staff Award – Judy Vandegrift
- \* Outstanding Technical Staff Award – David MacPherson
- \* Outstanding Masters Student Award – Yuan Yuan

#### Career Service Award

- \* Career Impact Award—Dr. Nathan Schiele

### Feedback Links

Current student feedback from:

<https://forms.office.com/r/tFjtRF0NUz>

Alumni and friends' feedback form

<https://forms.office.com/r/uQ4Qp4HMZA>

News Share

<https://forms.office.com/r/fvVgTGrWjm>