FORESIGHT

UW COLLEGE OF ENGINEERING AND APPLIED SCIENCE Spring 2019, Volume 44, No. 2

THE ONE-STOP SHOP

THE BEST & BRIGHTEST CENTER FOR STUDENT SUCCESS



College of Engineering and Applied Science

HE WORLD NEEDS MORE

0.00

UWYO.EDU/CEAS

VATCES.

54% OF UW STUDENTS GRADUATE WITH LITTLE-TO-NO DEBT

61.3K average starting salary for our graduates

> "WE HAVE PHENOMENAL PROFESSORS THAT MAKE YOUR TIME WORTH IT. THEY HAVE A GOOD UNDERSTANDING OF WHAT STUDENTS NEED TO LEARN AND HOW THEY LEARN BEST. THEY'RE CAPABLE OF ATTACHING THE ACADEMIC CURRICULUM TO THE INDUSTRY, AND HOW YOU'D APPLY IT IN A JOB. THIS WILL BE USEFUL IN YOUR CAREER, SO THEY'LL TEACH YOU."

> > KRISTA RIESTER CIVIL ENGINEERING '19



Features

14 / The Best & Brightest

These students in the College of Engineering and Applied Science are poised to make a difference.

20 / The One-Stop Shop

A facility in the college features unique capabilities to help any UW student or researcher.

24 / Center for Student Success

The newest college center ensures students are given every opportunity to succeed.

Departments

02 / Editor's Letter 03 / Message from the Dean 04 / News & Notes 10 / Students in Action 12 / Faculty in Action 28 / Check out the EERB 30 / CEAS Highlight 32 / Alumni In Memoriam

On the Cover

Engineering student George Seiss utilizes the tools of the UW Machine Shop to work on a design project. **University of Wyoming** College of Engineering and Applied Science

Dean

Michael Pishko

Associate Dean, Academic Programs Steve Barrett

Associate Dean, College Advancement Paul Dellenback

Director, Business Operations Mēgan Barber

Departments:

Atmospheric Science Bart Geerts, Head 307-766-2261 | uwyo.edu/atsc

Chemical Engineering Vladimir Alvarado, Head 307-766-2500 | uwyo.edu/chemical

Civil and Architectural Engineering Tony Denzer, Head 307-766-2390 | uwyo.edu/civil

Computer Science Jim Caldwell, Head 307-766-5190 | uwyo.edu/cosc

Electrical and Computer Engineering John McInroy, Head 307-766-2240 | uwyo.edu/electrical

Mechanical Engineering Carl Frick, Head 307-766-2122 | uwyo.edu/mechanical

Petroleum Engineering Brian Toelle, Interim Head 307-766-6780 | uwyo.edu/petroleum

Editors Andy Chapman and Micaela Myers

Graphic Design Michelle Eberle, Emily Edgar and Scott Dassler

Photography All photos by Ted Brummond and Kyle Spradley unless otherwise noted

*Thank you to all contributing writers for creating a dynamic and diverse collection of content.

Foresight is created twice per year as a collaboration between the CEAS and UW Institutional Marketing. For additional copies, contact us at 307-766-4253.

Persons seeking admission to the University of Wyoming shall be considered without regard to race, color, religion, sex, national origin, disability, age, veteran status, sexual orientation, or political belief.

The University is committed to equal opportunity for all persons in all facets of the University's operations. All qualified applicants for employment and educational programs, benefits, and services will be considered without regard to race, color, religion, sex, national origin, disability or protected veteran status or any other characteristic protected by law and University policy.

THEY'LL LEAD THE WAY

The amount of great work that emerges from the College of Engineering and Applied Sciences is truly astounding. Groundbreaking research from renowned faculty has allowed the University of Wyoming to make its mark on the state, the nation and the world.

But the most valuable part of the CEAS are those who attend our classes and learn the concepts of engineering and applied science. The stories and features in this issue will highlight our many accomplished and talented students.

The ultimate measure of our college's success depends upon the outcomes powered by our student researchers and graduates. They're leading the charge on topics that affect Wyoming and the nation, including water resources, harnessing new energy sources, creating artificial intelligence and boosting manufacturing efforts.

In many ways, they're just like any other typical college student. They come from many different backgrounds, hailing from Wyoming, Colorado, Nigeria and Slovenia. But they've all decided to make a difference by studying in our college and our programs.

Read on, learn how these individuals are becoming the leaders we need, and appreciate how they'll shape the world.

Sincerely,

Andy Chapman Editor, *Foresight Magazine*



Read the spring issue of *UWyo Magazine*, a special edition devoted to UW students and their impact!

Subscribe today! uwyo.edu/uwyo



MESSAGE FROM DEAN MICHAEL PISHKO

Spring in Laramie is here, and I think it is a great time to reflect on the previous school year and examine where we go from here.

Commencement

The college will prepare to say goodbye to our graduating students May 18. It's always a bittersweet occasion. Our faculty have watched them grow as people over the previous years, and as a group, these individuals have made immeasurable contributions in the classroom and laboratory. We'll look forward to seeing how they effect change in the years to come.

Engineering Initiative

It's hard to believe, but we're approaching the five-year anniversary of the Engineering Initiative. In 2014, former Wyoming Gov. Matt Mead and the Wyoming State Legislature approved biennium funding of \$8 million for Phase I of the Engineering Initiative, in addition to \$18.4 million for facilities development.

Leadership from Mead, the State Legislature and the Wyoming Governor's Energy, Engineering and STEM Integration Task Force articulated a vision to propel the college to realms of excellence. This includes focusing on excellence in undergraduate education, world-class research and graduate education, productive economic development through partnerships and K-14 education in science, technology, engineering and math.

The Wyoming state government made a significant investment to propel UW to the top and deliver greater value to the people of Wyoming. I'm happy to say we're well on our way.

Engineering Education and Research Building

After nearly three years of construction, our new facility is ready. It's even better than we imagined it would be. This facility will allow UW to be on the cutting edge of research topics crucial to the state, including an expanded drilling simulator, a hydrocarbons lab and an advanced manufacturing space.

This will be a learning and research space, and is geared to encourage collaboration among faculty and students. There are so many possibilities for the facility, and we'll be ready to host classes in fall 2019.



Dean Michael Pishko



Belmont Receives NSF CAREER Award to Study Wildfire Emissions

A University of Wyoming researcher received a big boost to help her study wildfire emissions and how they change the atmosphere.

Erica Belmont, an assistant professor in UW's Department of Mechanical Engineering, hopes to shed some light on the subject through a \$525,238 Faculty Early Career Development Program (CAREER) award she will receive later this year from the National Science Foundation (NSF).

Belmont will receive the funding for her project, titled "CAREER: Bridging the Gap from Biomass Burning and Wildfires to Atmospheric Pollutants." The grant runs May 1, 2019 through April 30, 2024.

"With it, we will study the production of emissions from wildfires and work to understand how those emissions transform in the atmosphere," Belmont says. "These insights are important because such emissions can have significant impacts on climate and health, but their production and transformation are currently not well understood."

The outcomes of the research are anticipated to aid in forest management decisions and climate modeling as the products of biomass burning are better understood, she adds.

Much of the research will be conducted in Laramie, but Belmont says she anticipates traveling around the state and region to take field measurements and collaborate with colleagues at UW and other institutions.

Spreading Knowledge

As part of the NSF CAREER award, Belmont will conduct public outreach.

"I will participate in high school summer outreach programs at UW, and incorporate the subject matter and findings of our research into my teaching in these programs," she says.

The CAREER Program offers the NSF's most prestigious awards in support of junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research within the context of the mission of their organizations. Such activities should build a firm foundation for a lifetime of leadership in integrating education and research.

"I greatly appreciate the National Science Foundation and the support provided through this award," she says.

The Division of Chemical, Bioengineering, Environmental and Transport Systems within the NSF recommended Belmont for the award. Budgeted over five years, the grant funding will support graduate students to conduct the research, as well as travel costs and supplies.

Belmont's research team, called the Belmont Energy Research Group, is currently involved with ongoing research projects that focus on lowpressure flame characterization, biomass utilization, supercritical extraction and renewable crops for developing countries.

Belmont has made great progress in her research at UW, which includes the areas of combustion; solid fuels, such as coal and biomass; alternative fuels; renewable energy; and experimentation.

Wyoming Companies Empower Development of UW Process Control Program

When Genesis Alkali noticed a training gap, it turned to the University of Wyoming's College of Engineering and Applied Science (CEAS) to solve the problem.

Vice President of Manufacturing Fred von Ahrens and Vice President of Technology and Business Development Aaron Reichl seek to ensure their company has qualified employees. Genesis Alkali oversees a multi-faceted mining and production facility in Green River, Wyo. It operates the world's largest natural soda ash mine and production site.

One of the most crucial aspects of the operation involves process control. The responsibility of process control is the design of industrial control systems that oversee processing and manufacturing, while maintaining quality assurance and strict safety protocols. Efficient and effective process control is particularly important in batch and continuous processing and can make or break a company.

The demand for qualified process control employees outpaces the availability. Typically, process control is an area in which Genesis Alkali prefers to hire experienced people, but because of the shortage, the company wants to take a different approach. It is donating \$100,000 in seed funding to establish a minor in process control and a minor in instrumentation in the CEAS.

"We're stepping up to meet this challenge," Reichl says. "We like to hire people or develop internal people into the role who already have experience, but what we've found is that it's becoming very hard to hire experienced people. With that in mind, Genesis Alkali reached out to the University of Wyoming to develop a new program that would provide college graduates with a solid foundation in process control."

Genesis Alkali officials have worked with the UW Department of Chemical Engineering to initiate the program. Chemical Engineering Department Head Vladimir Alvarado and Professor David Bagley are leading the efforts, but the Department of Electrical and Computer Engineering will serve as a university partner.

"UW's Department of Chemical Engineering is working closely with industry partners to develop a minor and certificates in process control and instrumentation," Alvarado says. "This program enhances the profile of our students in areas of control, human-machine interface and modern automation trends. These skills enable students to access exciting job opportunities with industry in Wyoming and elsewhere. This educational opportunity, in cooperation with Electrical and Computer Engineering, will attract students interested in advanced technologies and computer-aided disciplines."

The first courses are scheduled to begin in fall 2019, and a Professor of Practice in chemical engineering will coordinate the program. There are two proposed educational spaces for the program, including a control simulation laboratory and a process engineering control laboratory.

"I've worked a number of years with both David Bagley and Vladimir Alvarado through the university's Chemical Engineering Industrial Advisory Board," Reichl says. "That has been such a great experience, as both individuals have such a passion and drive for excellence. I can't imagine two better leaders to create the process control program."

The program will be put in place to educate more industryready graduates with strong fundamental and practical training in process control, and it will create new educational and training opportunities to better serve the state. It will prepare UW graduates to contribute immediately, as process control is critical to many Wyoming industries.

"Our industry—and so many others—need this expertise," Reichl says. "From oil and gas production and refinement, manufacturing, food processing, chemicals, power production, pharmaceuticals, building and facility management—it all requires control and automation of equipment."

Genesis Alkali has hired more than 30 UW graduates over the last five years. The company employs about 950 people at eight processing plants and an underground mining operation that is 1,600 feet below the Earth's surface. Other industry partners to support the program include J.R. Simplot Company, Sinclair Oil and Infinity Power and Controls. CEAS alumnus Bruce Pivic owns Infinity.

> Genesis Alkali operates eight processing plants in southwest Wyoming, and has donated \$100,000 to UW to ensure it has employees trained in process control and instrumentation. (Genesis Alkali photo)



UW Cell Isolation Research Yields Promising Results

John Oakey's work at the cellular and molecular level could radically change the way cancer is treated.

Oakey, an associate professor of chemical engineering at the University of Wyoming, and his research group have developed an innovative method to isolate cells that are markers of cancer from blood samples.

The cells, known as circulating tumor cells (CTC), are present in the blood of someone with a tumor in their body. The CTCs often migrate from the original tumor site and end up in other areas of the body, potentially growing in the liver, the brain or the lymph nodes. The spread of these cells and the creation of secondary tumors is the process of metastasis, and the treatment of the affected area ends up damaging all cells, including healthy ones.

That makes isolating the CTCs an important, but extremely difficult task. A sample of 1 milliliter of blood contains billions of cells, which could contain between one and several hundred CTCs. Current research tactics can isolate the cells, but they typically are mixed with other blood cells.

"We are interested in developing a CTC measurement tool," Oakey says. "It's based on microscale processing of blood. This is the proverbial 'needle in a haystack' problem. How do you find and isolate those CTCs?"

Oakey adds that currently, cancer treatment can be likened to a "shotgun blast of medicine" to the affected area, which kills off healthy cells and cancer cells alike, and results in discomfort to patients.

Many research applications require that the cells come back alive and viable for lab cultures. Using Oakey's microfluidic device, blood is pumped in from one side into the device chambers and circulates throughout the surface.

As they tumble along the surface, certain cells stick to the microfluidic surface, and stick if they display markers of cancer.

Once the CTCs are trapped, they can be cultured and tested on an individual basis. The device can also be used to "count" the CTCs. For a person diagnosed and treated, CTC counts can indicate if treatment is working. The research can also be used diagnostically, to see what variant of a tumor may have, so therapy can be individualized.

The project was funded by the National Institutes for Health IDeA

Networks for Biomedical Research Excellence (INBRE) Program over three previous years.

"We've solved the problem of getting the cells back alive," Oakey says. "We've done it by creating the hydrogel capture surfaces. When you shine light upon it, it degrades. The CTCs stick to the gel, along with some healthy cells. We can pick off the CTCs and flush them out of the device, and end up with live cells to culture. They are at 100 percent purity."

Oakey says the next step is to move the research into a clinical setting. Once the CTCs can be grown in a lab, they can be treated with the latest chemotherapy methods to see how they react. The cells can be genomically tested to determine drug resistance, and researchers can use the method to learn about latent and aggressive cell types in an effort to determine how quickly and aggressively they need to be treated.

"The goal is to see how different kinds of cells respond to therapeutics," Oakey says.

"This research could guide cancer treatments towards individualized treatment strategies. Individualized therapy is very much the goal here." Petroleum Engineering Department Head Brian Toelle (fourth from left) (Photo courtesy Brian Toelle)



Petroleum Engineering Research Presented at Global Conference

The University of Wyoming's Brian Toelle presented study results at the American Association of Petroleum Geologists/European Association of Geoscientists and Engineers Shale Gas Evolution Symposium in Manama, Bahrain, in December 2018.

The symposium was hosted by Bahrain Minister of Oil Shaikh Mohammed Bin Khalifa Al-Khalifa and was attended by shale reservoir researchers from all over the world.

Toelle is the interim head of the Department of Petroleum Engineering. He presented results from a study conducted by his Wyoming Petroleum Systems Research Group. This study was performed by Marcin Pankau, one of Toelle's former graduate students, as part of his master's thesis. Two UW co-authors also contributed to the study, including Petroleum Engineering Assistant Professor Pejman Tahmasebi and Geology and Geophysics Adjunct Professor Ranie Lynds. The title of this study is "3-D Petroleum Systems Model of the Bighorn Basin, Wyoming."

The report included an analysis of the exploration potential of shale reservoirs in Wyoming's Bighorn Basin. Shale reservoirs have become an important resource for the United States, and Toelle's research group is focused on helping to determine the exploration potential of shale reservoirs in the state. The information and methodologies used could promote investment into the drilling of shale exploration wells in various Wyoming basins.

After his presentation, Toelle met with a number of attendees and presenters who traveled to the symposium from China. Many conference attendees were from various countries throughout the Middle East region.

Student Team Competes in CyberForce Event

Six students from the University of Wyoming traveled to Idaho to compete in the Department of Energy's CyberForce Competition, a cyber security competition hosted across several labs across the nation.

The competition took place at Idaho National Laboratory (INL) in Idaho Falls, Idaho, on Dec. 1, 2018. The regional CyberForce event hosted six schools as part of the nationwide competition. Along with UW, teams to participate at INL included Brigham Young University, Brigham Young University–Idaho, Idaho State University, LDS Business College and the University of Utah.

The UW computer science students who took part are members of the Cybersecurity Education and Research (CEDAR) and Defense Against the Dark Arts (DATDA) groups on campus, which are dedicated to researching and practicing cybersecurity tactics. Assistant Professor and CEDAR Director Mike Borowczak served as the group's adviser. The focus of the competition was to secure industrial control systems that control and monitor critical infrastructure. Using both hardware and cloud-based systems, competitors were tasked with securing a set of services provided to them to create a secure and usable work environment for a fictitious company.

Unlike many of the lab's previous competitions, which were structured as a question-and-answer game, this competition was an "attack and defend" competition in which physical systems (four raspberry pis and a solenoidcontrolled water pump) were actively being attacked by outside hackers. Student competitors were assigned as the "Blue Team" and were expected to keep systems operational for members of the "Green Team" who tested the services in the system, all while being attacked by "Red Team" hackers. According to the students

(who wished to remain anonymous due to the nature of the event and the potential threat of malicious hackers), it was an informative experience.

UW's team performed admirably before finally falling to the Red Team, finishing 39th out of 70 teams nationwide. At the end of the competition, students were able to sit down with the members of the Red Team attacking the system to gain valuable insight into how the hackers were able to penetrate the system in order to better configureand secure them in the future.

CEDAR and DATDA have several upcoming challenges and competitions, and invite any interested students to learn more.



Alumnus Sees Great Potential in Petroleum Engineering



Now retired, University of Wyoming graduate Ken Baum can look at oil and gas from a whole different perspective.

He spent more than four decades in the industry. In 2018, he finished a consulting assignment with Noble Energy in Houston as a drilling engineering adviser, and an adviser for global rigs within its supply chain group.

Baum earned his petroleum engineering degree from UW in 1978, and a master's of business administration from Tulane University in 1989. He also served as a professor of practice in the UW Department of Petroleum Engineering from 2015-16.

What is the state of the industry right now? What is the longterm outlook?

"The industry is growing again, although slowly after a brutal few years in a deep slump, which included many retirements, layoffs and downsizings," Baum says. "It had again gone into a difficult cycle, leaving many to wonder if there was a future with the industry or not."

"We have been through these difficult cycles many times and always came out stronger facing many opportunities. Long term, I think the industry will become stronger again and remain driven by the shale industry with horizontal drilling and fracking."

He adds that oil and gas production will continue to be important worldwide for generations to come. It will not be replaced by electric cars, solar power or other alternatives any time soon.

Why should students considering enrolling in a petroleum engineering program?

Baum says the petroleum industry offers engineering students a challenging and rewarding career.

"The pay for petroleum engineers typically starts out

higher than other professions, and offers the opportunity to work worldwide in every aspect of the industry," Baum adds. "The petroleum service industry can be very robust and offers great career opportunities for engineers."

What are some things about UW's petroleum engineering program that set it apart?

Baum believes UW's program has unique characteristics that set it apart on the global scale. It is moving quickly into the drilling and operational areas, with the existing WPX drilling simulator facility and expansion of that in the newly opened Engineering Education and Research Building. The focus on bringing in industry experienced "professors of practice" is also a huge positive for the department, because it brings in needed practical experience and industry connections.

"For students interested in reservoir engineering, UW can compete with anyone with its state-of-the-art work going on at the High Bay Research Facility, and it has always been known as a 'reservoir school," he says.

Can you speak to your own experience with UW and how it prepares students for success?

Baum's time as a UW student prepared him by learning about the practical aspects of the business. He points to courses in drilling and operations, and says professors were industry savvy and well connected to energy companies.

"I see the department heading back in that direction, with professors of practice and reconnecting with the industry," he says. "When I taught basic drilling a few years ago, I built the entire course around my 40 years of experience, and relayed practical realities of how every drilling concept actually worked in the real world.

"The students responded very positively to this approach and sought me out for numerous discussions about the industry and how they could best prepare for a career after college. Students want that industry connection and that has been a key part of the success preparation they receive at UW."

! NOTABLE



Two University of Wyoming faculty members were recognized by Clarivate Analytics as some of the world's most highly cited researchers in their respective fields.

Maohong Fan made the list in the field of chemical and petroleum engineering. He is a School of Energy Resources (SER) professor in chemical and petroleum engineering.

Atmospheric Science Professor Xiaohong Liu also made the list, the fifth-consecutive year he has been included.

Highly Cited Researchers 2018 represents

some of the world's most influential scientific minds from 21 scientific fields. Approximately 4,000 researchers earned this distinction by writing the greatest number of reports officially designated by Essential Science Indicators as "Highly Cited Papers" – ranking among the top 1 percent most cited for their subject fields and year of publication.



Civil Engineering Program Recognized for Value

The civil engineering program at the University of Wyoming was recognized as a "Best Value for the Money" program in an annual nationwide ranking of U.S. colleges and universities by College Factual, a data analytics and insight service. The program is ranked No. 23 out of 203 U.S. programs in the category. This places UW in the top 15 percent of all national programs.

Students Analyze Pond Foam

Two UW engineering students helped ease the minds of members of the Laramie City Council. Civil and Architectural Engineering students Celyn Rogers and Austin Yahn analyzed strange foam in Huck Finn Pond and presented their findings to the city's Environmental Advisory Committee. After citizens expressed concern about the foam in fall 2018, Rogers and Yahn tested the water and determined it was harmless.



UW's Partnerships Boost Engineers Week

Efforts of the College of Engineering and Applied Science helped the annual statewide Engineers Week program reach a record number of students. Participation in the 2019 program was at an all-time high, featuring 130 engineers and 3,636 students in 198 Wyoming classrooms. The student numbers were up more than 300 students over last year.

CRESIGHT

Students in Action

Trevor Trouchon Named WES Student of the Year

University of Wyoming senior Trevor Trouchon was named the Wyoming Engineering Society (WES) Student Engineer of the Year. He received the honor at the WES awards banquet Feb. 7.

Each year, departments in the College of Engineering and Applied Science at the University of Wyoming nominate their top graduating seniors for the WES Student Engineer of the Year honor. The WES Scholarships and Awards Committee reviewed written nomination forms and interviewed each candidate as part of the selection process.

NAME: Trevor Trouchon HOMETOWN: Gillette, Wyo. MAJOR: Computer Engineering

Why did you choose UW for your education? I chose UW for its location. It's conveniently close to my hometown, and Laramie has great access to outdoor activities. Laramie isn't too big either, yet it's a short drive from bigger cities when that's needed.

Why did you want to study engineering?

In high school, I worked extensively with microcontrollers, designing circuits and writing software. I decided this was something I wanted to do after playing with my first Arduino. I couldn't decide if I liked hardware or software more, so I chose the middle path and went with computer engineering.

What sets UW engineering apart? I'm impressed with our faculty and our access to resources.

Do you participate in any extracurricular activities? I'm a part of International Electronics and Electrical Engineers. I've also worked at a part-time software development internship for the last three years.

What are your post-graduation plans?

I don't currently have any set plans for after I graduate. I've been working an internship for the past 2.5 years, and I'll have an opportunity to go on full-time with that company. I'm also applying to grad school and entertaining an entrepreneurial path. Over the next few months, I'll make my decision on which path I want to take. Right now, I'm just trying to put myself in the best position I can in order to make that decision.

Petroleum Engineering Student Develops Innovative Border Technology



Luis Salinas has always displayed a creative side, and he recently patented a product that could save the lives of police dogs at the United States-Mexico border.

Salinas hails from McAllen, Texas, and will graduate with a degree in petroleum engineering in spring 2020. He and his friend, Edward Maxwell,

have developed a device that can change how border traffic is regulated.

"I grew up in a border town. Every day, people are trying to move drugs through the port of entry in cars. I thought of a solution that hopefully helps officers and canines," Salinas says. "We created a device that will scan cars and trucks remotely. It will isolate each car's smell individually in maybe 12 seconds. You can get a car scanned completely by sending the odor to a canine, which will now be in an air-conditioned room.

"The dogs will no longer be zig-zagging between the lanes in 110 degrees or more. The main problem is that (using the dogs outside), you cannot scan every single car because of the time."

Salinas followed a non-traditional academic path, first

enrolling at the Marion Military School in Alabama and then pursuing his passion for medicine at the Catholic University of Cordoba in Argentina. After much soul-searching, he decided to pursue a career in a different scientific field engineering. Throughout his academic and personal journeys, he has developed diverse intellectual interests, ranging from artificial intelligence to healthcare innovation and entrepreneurship.

He enjoys research and has worked for the chemical engineering, petroleum engineering and petrophysics departments at UW.

He and Maxwell wanted to address concerns about how heat exhaustion affects military working dogs and police canines. Salinas says in 2016, 11 police dogs died due to heat exhaustion. When temperatures exceed 86 degrees Fahrenheit, 15 minutes is considered the upper limit of a work period, followed by rest periods of at least 40 minutes. Their new device allows the dogs and handlers to stay indoors, protected from the heat, to minimize risk.

"Innovating and trying to help people—creating something so I can help others—that's my passion," he says. "My freshman year, I started working in the petroleum engineering department doing research. Now I'm working on petrophysics. I'm working on another project with artificial intelligence, that hopefully I can patent before graduation, that will help the petroleum industry."

UW Technology Aids In First-Ever Blockchain Beef Shipment

Blockchain technology developed at the University of Wyoming could change the way food is shipped and tracked across the globe.

UW computer science student Kip DeCastro of Casper developed a blockchain code to track a December 2018 shipment of Wyoming beef to Taiwan. Blockchain is a system in which a record of transactions is maintained across a network of linked computers, allowing for safe and secure data transmission. DeCastro and Philip Schlump of BeefChain collaborated on the code used to track the beef.

BeefChain, a Wyoming-based company, helps the state's ranchers command more value from their beef by proving that their products are free range and fairly farmed, while also giving consumers assurance that the products are safe. Rob Jennings, BeefChain's founder and chief executive officer, says it was the first shipment of beef tracked on blockchain from the United States to Asia.

"The University of Wyoming was integral in making this trial shipment a success," Jennings says. "As a combined effort of the Department of Computer Science, and the Colleges of Agriculture and Business, this project highlighted the strengths of each department and their faculty and graduates. We look forward to working with the university as BeefChain continues to grow." The beef was raised at Murraymere Farms in Powell, Wyo. It was placed in tagged cases with RFID labels and sent to a five-star dining establishment in Taipei, Taiwan. The labels featured a unique digital identifier that enabled the cases of beef to be tracked along the entire supply chain, from plant processing, export, import and to the restaurant.

The unique achievement can be attributed to the work of UW's Department of Computer Science, in conjunction with BeefChain, the Wyoming Business Council and Avery Dennison, a global company specializing in adhesive technologies and packaging materials. It provided the radiofrequency identification (RFID) labels.



FORESIGHT — Faculty in Action



Grant Funding Yields Promising Results for ECE Researcher

There has been significant progress on machine-learning research being conducted at the University of Wyoming in the year since it was funded.

UW Assistant Professor Domen Novak and his research team are using a \$447,889 National Science Foundation grant, awarded in 2017 and running through 2020, to examine how machine learning can be used to recognize human workload and stress from physiological responses. UW Psychology Professor Sean McCrea and his team also are involved in the project, which is titled, "A Kinder, Gentler Technology: Enhancing Human-Machine Symbiosis Using Adaptive, Personalized Affect-Aware Systems."

In the project, human participants are asked to perform different activities at different difficulty levels. Sensors affixed to participants provide realtime physiological measurements such as heart rate, and machine learning techniques are then used to recognize the participants' level of workload. Based on this information, the computer can adjust task difficulty or modify content as necessary in order to ensure a more positive experience for the participant.

Novak says the early research results indicate usefulness in several applications, but it's necessary to extract more data and determine the best way to use it.

"If we can incorporate pre-existing user characteristics – say someone is already neurotic or someone else has a relaxed personality to begin with – how do you recognize how the machine adapts to that?" Novak says.

This research is part of the broader area of affective computing, which is the study and development of systems and devices that can recognize, interpret, process and simulate human affects.

"What we're seeing is that personality characteristics do matter, and results do indicate that we can better tailor tasks to the user than previous methods," Novak says. "It's paving the path for widespread use of physiological-input machine learning."

Previously, Novak was awarded separate grant funding to improve driver attention spans with the goal of reducing motor vehicle fatalities. In collaboration with Associate Professor Mohamed Ahmed of the Department of Civil and Architectural Engineering, Novak conducted a study in which test subjects "drove" in UW's Driving Simulator while outfitted with physiological sensors with various distractions, such as texting.

Novak's research at UW includes human-robot interaction with an emphasis in rehabilitation robotics. He is interested in the information that advanced robots can obtain about human performance, intentions and emotional states using sensors such as heart rate, electromyography, electroencephalography and eyetracking technology.

Engineering Faculty Member Focuses on Entrepreneurship

Peter Scott has met many people over the years who have a great idea for a product that can effectively fill a need in the marketplace.

However, transforming thoughts into a full-fledged business is a common stumbling block for hopeful entrepreneurs. Scott joined the University of Wyoming ranks to help turn those ideas into reality.

He began as the entrepreneur in residence for the College of Engineering and Applied Science in October 2018. He is tasked with assisting students, faculty and prospective entrepreneurs around the state in the intricate process of starting businesses. In conjunction with the launch of the Institute of Innovation and Entrepreneurship (IIE), Scott is part of a cluster hire focused on entrepreneurship.

"I like creating things—it's an intellectual challenge," Scott says. "It's about trying to create a company that doesn't exist, perhaps in a market that doesn't exist. It's really neat to look at something like a business or product that simply wasn't there six months ago."

Wyoming's wide-open frontiers are home to outside thinkers hungry for a challenge. They share a spirit of adventure, restless curiosity and wonder. The world needs more cowboys, and UW's IIE calls on innovators from throughout the state as it works to instill entrepreneurial thinking to empower the leaders of tomorrow. Adding needed programs and curriculum that draw together all UW colleges, business services and entrepreneurship competitions, the IIE serves as the university's front door for the state's entrepreneurs.

Originally from Michigan, Scott brings more than 30 years of experience in industry and academia. He has advised more than 25 technology startups worth more than \$10 million in investment funding in topics such as strategy, marketing, sales and finance. The industries in which the companies have been involved include solar power, wind turbines, fuel injection, engine controls and consumer products.

Most recently, he was at the University of Colorado, where he taught entrepreneurship concepts to students pursing master's of business administration degrees. He began his teaching career as a professor of entrepreneurship at Syracuse University.



UW Associate Professor Impresses at Entrepreneurship Competition



Katie Li-Oakey knew her coal conversion technology was solid, but getting positive feedback from some of the top venture capitalists in a national competition provided more validation.

Li-Oakey, an associate professor in chemical engineering at the University of Wyoming, and her team were among a handful of those chosen to present at a prestigious entrepreneurship competition in fall 2018. Her startup company, TLS Materials LLC, was among 20 semifinal entries for the 2018-19 Department of Energy Chain Reaction Innovations competition. The competition featured 122 total entries.

Her pitch took place Jan. 10 at the Argonne National Laboratory (ANL) outside of Chicago, the leading national laboratory for energy storage materials and devices. Participants were tasked with a 10-minute presentation on their technology, followed by 10 minutes of question-and-answer with the panelists. The panel was composed of venture capitalists, industry specialists and scientists from ANL.

"I was honored to pitch our technology to this group of seasoned investors, industry leaders and prominent scientists in the field," she says.

Li-Oakey's team has developed supercapacitors, devices for energy storage and release, fabricated from coal using a zero-waste process. Li-Oakey's research uses the solid portions to create elastic and high-strength carbon fiber.

"We directly convert coal to carbon fiber using a low-energy process," Li-Oakey says.

"This is about finding new uses for coal. We're trying to use coal as a feedstock for value-added products, versus just burning it."

THE BEST & BRIGHTEST

Standouts from the College of Engineering and Applied Science are ready to make a difference. There's nothing easy about being a student in the College of Engineering and Applied Science at the University of Wyoming. The curriculum challenges even the brightest pupil, and the workload necessitates hours of studying, reading and researching. While every student enrolled in the college has earned his or her academic stripes, here are some examples of students who have gone above and beyond. They have displayed leadership qualities and are positioned to be change agents after leaving UW.



RACHEL EDIE Atmospheric Science

Rachel Edie is a graduate student in the Department of Atmospheric Science. She began at UW five years ago, and chose the school because of Atmospheric Science Assistant Professor Shane Murphy's research group and the School of Energy Resources' Air Quality Center of Excellence. Edie is active in outreach and mentoring programs to empower undergraduate women. She also is the president and cofounder of the Graduate Student Network for the Wyoming Science Communication Initiative.

"Graduate school has been full of challenges, including rigorous coursework, time-intensive research and fieldwork, and finding time to have hobbies and relationships outside of work," says Edie, who grew up in Colorado Springs, Colo.

"It took me a couple of years to find a ratio that worked for me, but I have really enjoyed growing as a scientist, while strengthening graduate student representation and community here at UW through the Graduate Student Network."

Her research focuses on measuring emissions and how they impact humans. She utilizes the department's mobile laboratory van to measure emissions from upstream oil and gas operations in Wyoming. These emissions matter to air quality because they can react in the atmosphere to make things like ozone or small particles, both of which are detrimental to human health and regulated by the Environmental Protection Agency.

She plans to continue researching energy development and how to minimize air quality and climate impacts from the industry. The research could link measurements to models, which means people could benefit from improved knowledge of emission sources.

"Air pollution doesn't stop at the border, and I've been lucky to study how these emissions differ in Utah, Colorado, New Mexico, Texas and Arkansas," Edie says. "Seeing firsthand how many people are exposed to poor air quality brought home how approximately 8 million people die annually from air pollution, according to the World Health Organization. I thought by studying the problem, putting my effort in this area of research, maybe I could improve people's lives in a measurable way."

WILL SCHUTZ Energy Systems Engineering

A senior from Rapid City, S.D., Will Schutz studies energy systems engineering and was the department nominee for the Wyoming Engineering Society Student Engineer of the Year. He lauded the CEAS for providing a personal touch to his education and learning from professors who give individual attention to students.

"Although the workload is intense at times, it is satisfying to comprehend a subject and complete a problem," Schutz says. "My educational experience has made me more excited to apply the technical knowledge gained each day studying energy systems engineering. The faculty have been very helpful by encouraging me to apply to programs and internships to further my education beyond the classroom."

One such experience included a brief internship at the National Renewable Energy Lab (NREL). He was on the campus for three days and toured the Energy Systems Integration Facility, Solar Energy Research Facility and the National Wind Technology Center. He attended lectures relating to the latest developments in wind-turbine blade manufacturing, photo-voltaic material and biofuel processing.

Schutz also is involved with a senior design project

involving a micro-wind turbine generator. He and the design team are producing a build manual for a small wind turbine that will charge a 12-volt automobile battery. A prototype wind turbine generator has been built to validate the build manual and characterize expected power outputs at various wind speeds. The micro-wind turbine generator utilizes materials that are readily accessible, so a low-cost product can be fabricated.

"This design could be used by residents of under-developed countries to charge 12-volt automobile batteries, which would then be used to supply their household electricity demand of roughly 200 watt-hours per day," he says.

Schutz is involved outside of the classroom, serving as the secretary of Spikeball Club at UW, and he is a member of Tau Beta Pi.

"I chose UW for my educational path because it offered a degree that suited my specific interests, energy systems engineering, and it was able to provide an education that I could feel proud of without extreme debt after school," he says. "The Laramie community and surrounding area was an ideal atmosphere for my college experience."





VIRGINIA ZAMBRANO

Petroleum Engineering

Virginia Rivas Zambrano earned a degree in petroleum engineering in 2018. She wasted no time and enrolled in the master's degree program in mechanical engineering shortly thereafter. She originally came to UW from Venezuela after seeking a quality engineering program in the U.S.

"I graduated from UW with a petroleum engineering degree last fall and jumped into my master's program right away," she says. "UW has become my home away from home. The UW community has made me feel incredibly welcome. I transitioned from the petroleum engineering department into the mechanical engineering department, and it really just felt natural because of the readiness of the faculty and staff in helping me make that transition as smooth as possible.

"The mechanical graduate program is flexible and has accommodated my research interests, while encouraging me to get the most out of my master's degree. I am truly honored to be part of such wonderful institution and learn from such brilliant professionals."

Zambrano says she chose mechanical engineering to do something meaningful. From a young age, she was drawn to mechanical components and enjoyed taking things apart around the house.

"I realized how much I loved learning about it in school and that by earning a mechanical engineering degree, I could contribute to science and technology advancements that will have an impact in our future," she says.

She plans to make a difference by contributing to developing alternative energy solutions that help preserve the environment, and raise the standards in the technological and mechanical field, especially in terms of safety and efficiency. Zambrano also has experienced the challenges of mobility constraints due to a sport-related injury.

"My goal is to focus on developing a more accessible world in which simple tasks, such as getting around in a building, are made possible or easier for people with such challenges," Zambrano says.

"I hope that by working in a male-dominated field, I can inspire young girls to pursue their dreams and believe that they can achieve all their goals and dreams regardless of gender, nationality or background."



"

UW was a clear choice for me, due to its scholarship programs, school reputation and the Laramie lifestyle.

TYLER KINNON

Petroleum Engineering

After growing up surrounded by people in the oil and gas industry, Tyler Kinnon knew he wanted to pursue a petroleum engineering degree. The senior from Calgary, Canada, attended the Southern Alberta Institute of Technology (SAIT) for two years and received an associate's degree. He then had to decide where to go to finish up.

"I chose UW because of the transfer options they offered to myself and many other students from SAIT," he says. "Although there are other schools that offer these transfer credits, UW was a clear choice for me, due to its scholarship programs, school reputation and the Laramie lifestyle.

"I have been a student at UW for two years now, and my expectations have been blown away. If a student wants to get involved and get the most out of their education, there are endless possibilities to do so. The thing that really stuck out to me, and I believe encompasses UW, is the amount of pride the alumni have for the school."

"

Kinnon adds he wanted to become a petroleum engineer because he wanted to develop a cleaner, safer and more sustainable industry.

He is a recipient of the Randy Eresman Engineering Family Endowment, calling it an "amazing scholarship opportunity" that has allowed him to focus on school and be a part of recognized student organizations. He serves as the vice president of the UW Society of Petroleum Engineers.

"I would encourage other students to attend UW, as this university really does take pride in the students and young professionals it develops," Kinnon says. "UW has prepared me for my career in the technical, professional and social aspects that a young professional needs to be successful."

ANNA ROBERTSON

Atmospheric Science

It's been five years since Anna Robertson arrived at UW. After earning a bachelor's degree in atmospheric sciences from South Dakota School of Mines and Technology in 2013 and a master's degree in atmospheric science from UW in 2016, she now is pursuing her Ph.D.

Growing up in Ham Lake, Minn., she was fascinated by storms and their structure, and much to her parents' chagrin, would run outside anytime a large storm rolled in to observe it as closely as possible. When it came time to choose a degree, she wanted to learn more about the processes driving the storms.

"I've really enjoyed my graduate experience over the last five years," Robertson says. "The people in my department, from fellow graduate students to professors to the engineering staff, make the difficult graduate work well worth it. I've also had the opportunity to participate in numerous field campaigns during my work here, with both research and industry groups, which have been invaluable in my progress toward becoming a professional in my field."

Her research is focused on air quality and atmospheric chemistry. She analyzes methane and volatile organic compounds from oil and natural gas production using the UW Atmospheric Science Mobile Research Laboratory. She hopes to work in environmental consulting or air quality monitoring and forecasting.

"I was impressed by the Department of Atmospheric Science's history and unique research tools here at UW, and I fell in love with Laramie on my first visit," she says.



THE ENGINEERING BUILDING CONTAINS A VALUABLE CAMPUS RESOURCE

The second

UW YO ME ĺ







CEAS student David Tobin washes a steel plate prior to cutting on a water-jet machine.

There is a world of creation and innovation on the ground floor of the University of Wyoming Engineering Building.

Tucked away at the bottom of a pitched hallway, Room L65 contains some of the most advanced equipment and capabilities available in the region. This is the home of the UW Machine Shop, which provides technical consulting and a wide variety of design and fabrication services to the UW community.

While it is located in the Engineering Building, it is a resource available to any UW student, staff, faculty or researcher and is the only facility of its kind on the UW campus.

"We've done things for nearly every department on campus, like the College of Business, the Department of Zoology and the College of Arts and Sciences," Shop Manager Mike Schilt says. "We've done things for the UW Physical Plant and UW Athletics. We've done just about anything that anyone has needed help with."

The facility helps fulfill the mission of UW's Office of Research and Economic Development. The UW Machine Shop will take on projects from campus that necessitate design consulting, machining, welding, sheetmetal fabrication, scientific instrument repair and system design.

The shop traditionally has assisted undergraduate students, graduate

researchers and faculty with projects related to the science, technology, engineering and math fields. It has been a valuable resource for seniordesign projects for engineering students for many years.

The UW Machine Shop also has worked with university-affiliated partners, such as Manufacturing-Works and the Wyoming Technology Business Center.

Schilt says the most effective way to utilize the space is to discuss the project with shop personnel prior to submitting an official job order form. The shop staff will review details and contact the individuals for more details. More information about the UW Machine Shop can be found at uwyo.edu/ceas/shop/.

Plans are under way to install new equipment in the shop space in the new Engineering Education and Research Building. The main operation will stay in the existing Engineering Building, but additional equipment will offer more options for researchers.

UW's research capabilities will only grow, thanks to the capabilities of this unique facility.

"There haven't been too many projects we haven't been able to take care of," Schilt says.



UW MACHINE SHOP CAPABILITIES

Precision CNC milling and turning Conventional machining Tube bending Sheet metal fabrication Embedded controls Data acquisition Custom software Welding Mechanical design Mechanical and electrical troubleshooting Hydraulics and pneumatic systems Equipment repair 3-D Printing



ROMER

A group of mechanical engineering students use the coordinate-measuring device to verify the shape of the nosecone mold used for the NASAfunded microgravity vehicle.



The newest college center ensures students are given every opportunity to succeed.



Ann Jones never intended to say the name incorrectly.

As discussions went on about the new student-focused facility in the University of Wyoming College of Engineering and Applied Science (CEAS), Jones inadvertently referred to it several times as the Center for Student Success. It was originally to be named the Center for Student Services.

"It wasn't intentional, but it just kept slipping out. It made sense," says Jones, who is the UW assistant director of career services. "We talked about it as a group and decided to use the word 'success' instead of 'services."

Thus, the Susan McCormack Center for Student Success was established in 2016. Its namesake is remembered as one of the most impactful staff members in college history.

The establishment of the center was part of a campus wide effort to

coordinate services for students in each college. The center houses a group of employees dedicated to all aspects of the CEAS educational mission, including K-12 outreach, recruiting, retention, diversity and career services.

"The center is about student services personnel who work with our emerging professionals to assist them in finding their way through their academic career," Jones says. "What all of us do here is move the student forward on an individual basis."

The center is a one-stop shop for CEAS students. The areas of focus include professional advising for courses, career services, outreach opportunities and recruiting.

"When I'm speaking with a group of students, a question I ask is, 'How many of you have come to the University of Wyoming to earn a degree to better your career options?' Ninety-nine percent of the students raise their hands," Jones says. "As an emerging professional coming to UW, I believe most would say that is why they're here. "Generally speaking, I believe students who major in engineering and applied science can see a picture of what they may be doing in the world-of-work and this picture can help pinpoint career options."

Career Services

Jones began working at UW in the late 1980s in the Career Services office. At that time she was the recruiting coordinator and all companies coming to campus to interview students used phone calling and fax machines to make all arrangements. She recalls that one year, she set up 297 individual interview schedules, in which an employer could talk with multiple students per schedule. Now, thanks to technology, companies can set up interview visits through a convenient online system.

Once the college was in a position to redesign its career services offering,

Jones came to the center on a full-time basis and has been able to increase the visibility of this part of the center. Students are not required to utilize programs from the career services unit. As such, career services works closely with the academic advising component of the Center for Student Success. This is because all UW students are required to participate in that process, so it made sense to put career services in close proximity to encourage participation.

Jones strives to advance career development initiatives. Having worked in the career services profession for several years, she increases student and employer professional engagement opportunities, hosts career development speakers and coaches students on career development processes. She also works with Wyoming alumni and companies to host UW students for Student Career Treks.

Jacy Busboom, a sophomore in chemical engineering, has interacted with the Career Services office throughout her time in the college.

"I had Ann revise my resume, and she

was very helpful," she says. "I have also gone on one of the Career Treks in San Francisco. That was an amazing trip, where I got to meet many successful engineering entrepreneurs who gave some great advice."

Jones offers advice to students about a variety of topics but doesn't limit it to resumes or job searches.

"Often students haven't interviewed for career-related positions, so it's important to learn about the process. Doing so can help them feel more confident when the time arrives," she says. "A commonly asked interview question, which generally invokes anxiety from candidates, is, 'Where do you see yourself in five years?' Students assume the interviewer expects them to have a precise and laid-out plan, which is not the case.

"Rather, interviewers seek insight into candidates' desires for career development, increased responsibility, and leadership skills. When preparing for interviews, students should learn how to provide an appropriate answer, even when they can't know specifically know what the next five years will



bring. Working with students, I want them to know it's OK not to be 100 percent sure of their longterm career goals, because in reality, career paths are not linear due to gaining new interests, opportunities, and life events. Teaching students techniques and strategies of resume and cover letter writing, interviewing, and looking at the big picture-it's all part of the careercoaching process."

Student Advising

Laurie Bonini is the manager of the CEAS Student Advising Center, and was involved in the planning process for creating the center. The university assembled a committee to review advising across campus, and each college could implement recommendations as necessary. The CEAS adopted a professional-advising model to span the full term of a student's academic career.

"We wanted consistency, in which all students got the same information and the same resources, regardless of the student's involvement in the college," Bonini says.

With the system now in place, all students must participate in activities at the beginning of the semester, such as viewing an academic integrity or extracurricular opportunities video. Under the previous advising system, faculty provided guidance, but due to varying workload or availability, some students were not able to receive a full advising experience. The new advising center in the CEAS changes all that. Bonini believes it is a benefit to students to have all services, advising and otherwise, in one central location.

"We have the same goals, but we're each focused on a different part of the process," she says.

Bonini says advising takes place all year. In the spring, advising begins for the fall semester and each adviser has 8-10 daily appointments for about four weeks. The advisers follow up with students who need to have forms reviewed and signed, create study plans, and provide retention plans for students who are struggling in their program. The professional advising model helps students understand course sequencing and prerequisite structures. Some courses are offered only in the spring or fall, or students must take prerequisite courses to progress in their program.

"Our advisors have to know those restrictions and share them with our students so they aren't surprised," Bonini says. "It's not always readily apparent, but the professional advisers can help the student be very strategic in their graduation plans."

Bonini has been on campus for nearly 20 years, working previously in Academic Affairs, with the university studies and freshman interest group programs, and the College of Agriculture and Natural Resources. Now, she and the other CEAS advisers work with residence hall engineering floors, review the university catalog to ensure consistency with student documents, help with college events

Steve Barrett

Jeff Anderson

Laurie Bonini

Kenya Johnson

Teddi Freedman

Ann Jones

Len Lutz

including commencement and convocation, plan summer orientation, and form college power groups. Bonini has a vision to transform advising into an intentional and holistic activity.

"It's not just saying to the student, 'Yes, you're in the right classes. You're on your way," she says. "It's actually about bringing them in and having conversations and helping them find the resources to make the most of their academic careers at UW."

It's In The Name

Why name the center after Susan McCormack? She served as Bonini's mentor and when she retired, Bonini took over.

"I learned so much from her," Bonini says. "She was so student-focused. It amazed me. Someone would say a student's name, and she knew their backstory. They knew her. She had that beautiful relationship with students."

McCormack came to the college in 1988 from UW's Department of Physics and Astronomy. During her 26 years of service to the college, McCormack's roles included updating the student databases, advising engineering freshmen, high school recruitment, involvement in freshmen summer orientation, chief proctor of the Fundamentals of Engineering exam, scholarship coordinator, commencement coordinator, and Engineering Summer Program coordinator. She earned a Distinguished Service Award from the college in 2014 and retired from her position the same year.

"I'm not the only person who ever threw my heart and soul into this college for the kids," McCormack says. "You don't name things after people like me, just a staff person."

In 2005, CEAS alumnus Wayman Wing and his wife endowed a scholarship in McCormack's name, citing her "dedication, enormous energy and efficient manner." Notable alumni donated to the fund, including Harold and Bonnie Jane Kester, Harold McCaskey, Albert "Boots" Nelson and others.



Center for Student Success WHO WE ARE

Associate Dean/Professor
Assistant Academic Professional Lecturer
CEAS Student Advising Manager
CEAS Student Recruiting Coordinator
Associate Director, Career Services
Academic Professional Lecturer, Career Services
K-14 Outreach Project Coordinator, Senior



ENGINEERING EDUCATION AND **RESEARCH BUILDING**

The vision to create one of the top research and education facilities in the nation has been realized for the College of Engineering and Applied Science. The Engineering Education and Research Building (EERB) was completed in February 2019.

After groundbreaking in October 2016, the approximately 100,000-square-foot EERB was the most ambitious construction project in the university's history at a cost of \$105 million. Despite being a large-scale project with many variables, the facility was delivered on budget and on time, according to the original plans.

A group of state lawmakers and UW Board of Trustees members toured the facility in February.

The four-story EERB features reconfigurable research laboratories, active-learning classrooms, an active-learning wet laboratory, a drilling and completions simulation laboratory, an advanced manufacturing laboratory, student project spaces, a student innovation center, a student entrepreneurship center, informal collaboration spaces and meeting rooms.

The facility is flexible, with space that can be reprogrammed without major renovation. It is built for collaboration, with space designed to foster student interaction and to support collaborative research teams. It fosters innovation, with space that supports creative thinking and student entrepreneurship.



The EERB allows UW to be a leader in advancing research in critical areas including artificial intelligence, manufacturing, drilling and completions and produced water. 2

MAKING A REAL IMPACT

Makerspace coordinator Tyler Kerr recognized for his work with youth

Tyler Kerr (center) guides a trio of Wyoming students through a tutorial in the UW Coe Library Student Innovation Center.

> As a child, Tyler Kerr was fascinated with learning how technology and gadgets worked. Now as a young professional, he is being recognized for his efforts to share that passion with others.

> Kerr, the makerspace coordinator at the University of Wyoming Coe Library Student Innovation Center (SIC), recently was named to the "20 Under 40" list by the Laramie Young Professionals and the Laramie Boomerang.

Born and raised outside Boston, he received a degree in geology from Franklin & Marshall College in Lancaster, Pa., in 2011, followed by a master's degree in geology and paleontology from UW in 2017. For the last two years, he has overseen the makerspace, a central campus hub for students and community members interested in creative, collaborative and innovative projects in the areas of STEAM: science, technology, engineering, art and math.

"For as long as I can remember, I've wanted to be a paleontologist, but also had a fascination with gadgets, technology and a knack for creative design work," he says. "That mixture of science, technology and outreach ultimately led me to the position of makerspace coordinator."

Previously, he was the outreach coordinator, educator and content creator for UW's Geological Museum and

Calendar of Events

MAY

May 3: Wyoming Track and Field hosts 7220 Invite

May 10: Last day of spring semester classes

May 8-11: Wyoming Track and Field at Mountain West Championships

May 13-17: Finals week

May 18: Spring commencement

May 23-25: Wyoming Track and Field at NCAA West Preliminary

May 27: Memorial Day holiday

JUNE

June 5-8: Wyoming Track and Field at NCAA Championships

June 16-22: Engineering Summer Program

JULY

July 4: Independence Day holiday

July 8-12: Engineering Summer Program for Teachers

July 15-19: Engineering Summer Program for Teachers

AUGUST Aug. 31: Cowboy Football hosts Missouri

SEPTEMBER

Sept. 2: Labor Day holidaySept. 4: First day of fall semester classesSept. 14: Cowboy Football hosts IdahoSept. 28: Cowboy Football hosts UNLV

The latest events and information: **uwyo.edu/calendar**

UW Cowboys and Cowgirls: gowyo.com

Fine arts: uwyo.edu/finearts

worked in Coe Library's digital collections department to scan and digitize the university's fossil collections.

"At the SIC, I get the best of all three worlds. I'm able to teach people how to use incredible technologies, I get to show makers of all ages the wonderfully diverse multidisciplinary applications of a makerspace, and I get to see creative STEAM projects come to life," Kerr adds.

According to the organizations, the "20 under 40" awards are for community members younger than age 40 who "connect with Laramie on a deep level, going beyond professional and personal achievement" and also those "committed to philanthropy, volunteerism, stewardship and a positive future for the community."

Kerr says STEAM subjects are the cornerstones of hands-on experiential learning. He believes a diverse background in these subjects can help to foster effective critical thinking, science literacy, creativity and innovation. He adds that a well-rounded STEAM education can equip youngsters of any skill level or experience with the knowledge and tools to tackle any number of tough problems.

"There's something very powerful about developing those creative, hands-on problem-solving skills early in life," Kerr says.

Both UW and the College of Engineering and Applied Science (CEAS) seek to provide outreach opportunities to a wide audience. This includes hosting tours and activities at the Geological Museum, Shell 3-D Visualization Center, Biodiversity Institute or SIC for high school students, UW students or local community groups. Project-based learning opportunities include the Engineering Summer Program, the Native American Summer Institute, the Summer High School Institute and the Wyoming Latina Youth Conference.

The campus will continue to expand its outreach offerings. Along with the Coe Library location and the CEAS Shop, the newly opened Engineering Education and Research Building will feature an advanced makerspace.

"The outreach opportunities at the university are wide and varied, but share a single uniting factor," Kerr says. "Each one provides an opportunity for participants to have a more in-depth learning experience. These structured programs can help students and community members learn to effectively work through ideas, draw conclusions, collaborate and discover creative solutions to the challenges they're trying to solve." Since our last issue, we regret to announce the passing of the following alumni. Our greatest sympathy is extended to the families of these valued friends.

Edmund Appleby BSME '43 – Pittsburgh, Pa.

William Bieg BSCE '54 – Rocklin, Calif.

Doran Boston BSAR '68 – Casper, Wyo.

Richard Cozzens BSCE '57 – Moab, Utah

Kenneth Endsley BSEE '59, MS '61 – Laramie, Wyo. **Frank Hadsell** BS '51 – Golden, Colo.

Samuel Hannas BSCE '61 – Littleon, Colo.

Robert Hovick BS '64 – San Diego, Calif.

Robert Kriz BSME '67 – Las Vegas, Nev.

William Phillips BSEE '54 – San Jose, Calif.

Paul Rechard BSCE '48, MS '49 – Laramie, Wyo. **Ronnie Rickard** BS '61 – Cody, Wyo.

Robert Sandison BSME '63 – Casper, Wyo.

Francis Stump BSEE '67 – Titusville, Fla.

Archibald Tehan BSPE '53 – Longview, Texas

Charles Wolz BSCE '58 – Casper, Wyo.



UNIVERSITY			The second
OF WYOMING			
		AT A	
		2	
/ POTCA!	14 TALADAA	TTHE STALCE	1886

Name:								
Address:								
City:				State:	Zip:			
Phone N	umber:							
Email:								
				Update you	r information online at www.uwyo.edu/updateinfo			
MY GIFT	IS:							
1 \$125	□\$250	□\$500	∎ \$1,000	∎ \$2,500	□ Other:			
MY GIFT IS FOR:								
 College of Engineering and Applied Science (CEAS) Engineering Scholarship Fund Atmospheric Science Chemical Engineering Civil and Architectural Engineering Computer Science 					ectrical and Computer Engineering echanical Engineering etroleum Engineering usan McCormack Center for Student Success ther (please specify)			
WAYS TO	O GIVE:							

ONLINE: www.uwyo.edu/giveonline

CALL: (307) 766-6300 or (888) 831-7795

MAIL: Fill out and return mail with your gift to the University of Wyoming Foundation, 222 South 22nd Street, Laramie, WY 82070. Make checks payable to the University of Wyoming Foundation.



N19EN

UNIVERSITY OF WYOMING

College of Engineering and Applied Science Dept. 3295 1000 E. University Avenue Laramie, WY 82071-2000

THE WORLD NEEDS MORE FEARLESS INDEPENDENCE.

66 UW was a clear choice for me due to its scholarship programs, school reputation and the Laramie lifestyle. If a student wants to get involved and get the most out of their education, there are endless possibilities to do so. 99

TYLER KINNON

Petroleum Engineering '19

VISIT UWYO.EDU/CEAS FOR MORE INFORMATION