FORESIGHT

UW COLLEGE OF ENGINEERING AND APPLIED SCIENCE
Spring 2018, Volume 43, No. 2

The way forward:
THE CEAS STRATEGIC PLAN

SPANNING THE STATE

COLLEGE OF
ENGINEERING &
APPLIED SCIENCE

UNIVERSITY OF WYOMING

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"I'm convinced you get just as good of an education here as you would at any Ivy League school. Shell hires from all over. I was paired with interns from MIT, Harvard and Stanford, and I felt I was just as competitive and just as knowledgeable from my schooling here as they were. I think that speaks to how the university develops you. I'm sold."

- Tylynn Smith,
Petroleum Engineering '17
Drilling Engineer, Royal Dutch Shell

WHAT CAN A DEGREE FROM UW DO FOR YOU?

The College of Engineering and Applied Science is a nationally recognized institution of academic excellence and world-class research. Rewarding and dynamic careers await individuals who graduate from one of our areas of study. Find opportunities to learn alongside industry professionals and renowned faculty by developing real-world projects.

54% of UW students graduate with **little to no debt.**

$60K average **starting salary** for our graduates

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On the cover: The College of Engineering and Applied Science on the campus of the University of Wyoming. The college is positioned for growth and innovation, thanks to a new strategic plan.

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*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 CEAS and UW Institutional Marketing. For additional copies, contact CEAS at 307-766-4253.

Planning for Our Future

Both the University of Wyoming and the College of Engineering and Applied Science (CEAS) play very critical roles within this great state.

As the only four-year university, the institution and its respective colleges have had a tremendous effect on the state's workforce and policy decisions. The leaders at the state and university level have a great relationship, and Wyoming's residents will continue to see the commitment of UW and the CEAS intends to secure a bright future. The latest strategic plan from the CEAS will ensure our state will have all the talented young workforce members it needs.

In January, the college announced a comprehensive and detailed framework to move forward as an organization. Some of the goals include the establishment of a premier academic culture, fostering innovative growth, engagement in productive economic development and becoming a best-practices organization in the next five years. The move falls in line with the university's overall plan to set goals for improvement.

The strategic plan was assembled with faculty and student input and effectively reflects critical institutional values. The comprehensive effort to elevate the CEAS in academics, growth and innovation, and outreach will add untold value to the state of Wyoming.

It's a role the CEAS and its staff, faculty, students and alumni are well prepared to take on.

Sincerely,

Andy Chapman
Editor, *Foresight Magazine*

Message from Dean Michael Pishko

When I was hired in 2015, I knew that the college had a strong foundation. Even amid our many achievements over the three years since, it was always my goal to elevate us to the next level. That's why we're implementing a new strategic plan, which you can read more about in this issue (*Pages 12-21*). It aligns with our overall university strategic plan, "Breaking Through: 2017-2022," and our themes reflect that collaboration.

Strategic planning is a valuable and necessary step to ensure we have the best possible future for our students and our college. This process took time. It was a necessary, and at times, enlightening, exercise that revealed where the college had strengths and areas to focus upon. Our strengths include our dedicated and knowledgeable faculty, enthusiastic and helpful staff and the impressive academic ability of our students.

But this wasn't just an exercise to pat ourselves on the back and reinforce the notion that everything is perfect. Critical self-examination is the key to identify areas that need attention, and I feel as though we've done that. Ultimately, we recognize that our product isn't our buildings, endowments or research—although those are important. Rather, focusing on helping our people (faculty, staff and students) is the best thing we can do for the college.


Dean Michael Pishko

We're in a fortunate position, as we can look to what we already have: a talented base of undergraduate and graduate students. They represent the very best of who we are, and highlighting their achievements and allowing opportunities for growth are paramount to our mission. That's a huge part of the strategic plan.

Along with the establishment of the CEAS Dean's Leadership Council in 2017, a team that provides vision and helps accomplish overall goals for education and outreach for the college, this plan helps us focus on the upcoming priorities and long-term goals.

Of course, achieving all these lofty dreams simply won't happen without great relationships with our alumni base. I encourage all our great graduates to get involved, and I welcome suggestions and feedback.

The Engineering Education and Research Building (EERB), scheduled for completion in spring 2019, has made substantial progress. Construction manager GE Johnson currently is installing stone veneer; while exterior and interior metal stud framing, and drywall; mechanical/electrical/plumbing rough-ins; and roofing are all underway. (Photo courtesy GE Johnson)

NEWS & NOTES

UW and Drilling Systems Collaborate On Innovative Facility

The University of Wyoming's College of Engineering and Applied Science (CEAS) will become one of the most technologically advanced institutions in the world, thanks to an agreement with Drilling Systems, one of the world's top simulation companies. In September 2017, it was announced that the university will partner with Drilling Systems to construct the Drilling and Completions Simulation Laboratory. This new lab will be featured in the Engineering Education and Research Building (EERB), planned for completion in 2019.

As a world-leading technology company, Drilling Systems will provide the university with exclusive access to emerging technologies and the ability to influence the development of future products and services that may benefit both parties. In return, UW provides insight and thought leadership across a range of identified programs currently residing within the university structure.

"This is an exciting development for our university and state, and all UW students and faculty," CEAS Dean Michael Pishko says. "It illustrates the commitment we have to making our college a destination for top-flight education and research. The Department of Petroleum Engineering at UW is positioned strongly to be a preeminent program on the global stage."

While the facility won't be fully completed until 2019, the center's equipment is being assembled and will be housed in a research facility in Houston, Texas, which provides opportunity for faculty to train and learn about the hardware and software. In addition, the UW Shell 3-D Visualization Laboratory will be utilized to introduce new visualization techniques and computer and theoretical modeling, which includes the enhancement of downhole modeling as it relates to oil and gas.

UW will continue to use its current drilling simulator facility, located in the Energy Innovation Center. That equipment will then be moved to the new lab space, and new features to be added will include a dual cyber chair drilling and well control simulator, simulators for wireline and coiled tubing, along with a workspace formatted to house large classes. An instructor at a central command center can control all the units. The center will allow the department to create a master's and Ph.D. program in drilling and completions, which would complement what it does now. Currently, other institutions like Texas A&M, Colorado School of Mines, University of North Dakota, Louisiana State University and the University of Oklahoma have similar technology in place, but when complete, UW's facility will stand alone against any in the world.

"We're taking the biggest step to make a supercenter," says Doug Cuthbertson, a professor of practice in the Department of Petroleum Engineering who oversees the drilling simulator. "This may only be rivaled by one such facility in the world. Students who get to use this will be more prepared than their counterparts."

Drilling Systems has assembled the UW Drilling and Completions Simulation Laboratory in Houston for training purposes. (Drilling Systems photo)

UW Researcher Leads Study of First Quantifiable Observation of Cloud Seeding

By UW Institutional Communications

A University of Wyoming researcher contributed to a paper that demonstrated, for the first time, direct observation of cloud seeding—from the growth of the ice crystals through the processes that occur in the clouds to the eventual fallout of the ice crystals that become snow—and how the impacts could be quantified.

The research, dubbed SNOWIE (Seeded and Natural Orographic Wintertime Clouds—the Idaho Experiment), took place in 2017 near the Payette Basin in Idaho.

"No one has ever had a full comprehensive set of observations of what really happens after you seed the cloud," says Jeff French, an assistant professor in UW's Department of Atmospheric Science. "There have only been hypotheses. There has never been a set of observations from one campaign that shows all the steps that occur in cloud seeding."

French credits modern technology, citing the use of ground-based radar, radar on UW's King Air research aircraft and multiple passes of the mountain range near Boise with making the detailed cloud-seeding observations happen.

French is the lead author of a paper, titled "Precipitation Formation from Orographic Cloud Seeding," which appears in the Proceedings of the National Academy of Sciences (PNAS), one of the world's most prestigious multidisciplinary scientific journals. Other contributors to the paper were from the University of Colorado-Boulder, University of Illinois at Urbana-Champaign, the National Center for Atmospheric Research (NCAR) and Idaho Power Co.

"Ultimately, water managers and state and federal agencies can make the decision whether cloud seeding is a viable option for them in terms of adding additional water to their supplies in addition to snowpack in the mountains," French says.

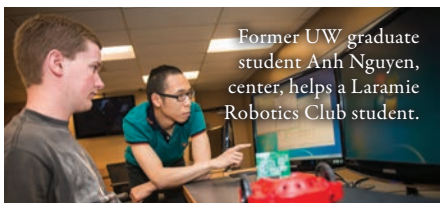
Top Science Video Features UW Research

The work of researchers at the University of Wyoming was featured in a year-end review of content produced by a prestigious international journal.

In 2017, the video team for the journal Science created nearly 180 videos on various topics. The most-viewed entry for the entire year accompanied a special package on artificial intelligence and featured Science staff writer Paul Voosen. The basis for the video, "AI detectives are cracking open the black box of deep learning," came largely from the work of a team of researchers, two of whom were associated with UW. They were UW Computer Science Associate Professor Jeff Clune and graduate student Anh Nguyen, who now is an assistant professor at Auburn University.

Science's video explores information from a video entitled "Deep Visualization Toolbox" and a paper, "Understanding neural networks through deep visualization," both of which included contributions Clune and Nguyen, along with Cornell University's Jason Yosinski and Hod Lipson and Cal Tech's Tom Fuchs.

The Science video explains how neural networks are widely used in many industries, including voice-recognition technology, autonomous cars and genetic sequencing. The concept can be explained by a network of neurons connected with one another loosely inspired by our brains. While this technology is powerful, there are



Former UW graduate student Anh Nguyen, center, helps a Laramie Robotics Club student.

limitations, including the fact that it can be difficult to decipher how they work. That's where the Deep Visualization Toolbox comes in, as it can isolate individual neurons and discover how they interact with data to shed light on how these neural networks do the things they do.

"I am delighted that the journal Science is covering this important research," Clune says. "Artificial intelligence, and in particular deep neural networks, will lead to dramatic changes in every economic sector, scientific field, and in many cultural areas."

NEWS & NOTES

Annual Tau Beta Pi Award Ceremony Recognizes UW Students and Faculty

The Wyoming Alpha chapter of Tau Beta Pi, the national engineering honor society, has released its award recipients for 2018. The awards were presented at the annual TBP Awards Banquet on April 13 at the Marian H. Rochelle Gateway Center. Tau Beta Pi is the only engineering honor society representing the entire engineering profession.

2018 Tau Beta Pi winners

Outstanding Freshmen: Mariah Baechle, Joshua Blaney, Aurora Bowden, Garrett Burrows, Jacy Busboom, Ryan Durnan, Brett Gilman, Andrew Halverson, Sophia Helmkamp, Cort Ingalls, Trevor Johnson, Ian Kelly, John Lenzi, Kevin Marshall, Jessica Nagie, Bailey Norman, Vinaya Palecanda, Joseph Reinicke, Colter Robinette, Nicholas Robinson, Taylor Romshek, Mariah Taylor, Josh Tepera, Bradley Vandervoort, Fletcher Wadsworth, Kevin Walker
Outstanding Sophomore: Connor Coughenour
Outstanding Junior: Jackson Rambough
Outstanding Member: Logan Guidry
Joint Engineering Council Outstanding Senior: Brenna Doherty
Wyoming Engineering Society Student Engineer of the Year: Brenna Doherty
Outstanding Undergraduate Teaching Award: Joseph Holles
Wyoming Eminent Engineer: Jay Puckett
Alumnus Eminent Engineer: Carolyn Hardy Olsen
Samuel D. Hakes Outstanding Graduate Research and Teaching Award: Xiaohong Liu
TBP Outstanding Staff Award: Ann Jones
CEAS Outstanding Staff Award: Cindy Wood

Award winners at the TBP Banquet with certificates of recognition

UW Engineering Hosts Summer Camp For Educators

The future of computer science in the Cowboy State will receive a huge boost this summer when teachers from across the state experience a hands-on educational camp at the University of Wyoming.

The UW Department of Computer Science, in partnership with the UW College of Education, will present the "RAMPED2: COWPOKES-IoT" program, thanks to a $300,000 grant from the Wyoming Department of Education. Hosted by the College of Engineering and Applied Science (CEAS), the two-part camp takes place June 25-29 and July 16-21 and features 25 teachers from Wyoming and surrounding states.

The grant will cover a stipend and housing costs for teachers, and the program is open to educators from elementary, junior high and high schools. The funding also will support four department faculty and two graduate and two undergraduate students for the duration of the program. Along with the CEAS, the program will feature UW faculty from physics and astronomy and education.

CEAS students, in collaboration with education faculty, will develop the program curriculum and teaching tools. The camp will introduce attendees to tiny programmable computers called "micro:bits" and online modules, which require minimal equipment. RAMPED2 is a cross-disciplinary program, including students from other areas of engineering, and will expose the attending teachers to circuit development, design and computing elements.

The teachers selected to attend will gain a solid foundation in important areas like coding and data mining, which they can subsequently pass on to their students.

[NOTABLE]

Society of Women Engineers Hosts Youth Outreach Event

The student chapter of an educational service organization will host a conference on the campus of the University of Wyoming in the fall.

The second annual Womengineering Conference will be hosted by the UW chapter of the Society of Women Engineers (SWE). The daylong conference will be hosted Sept. 8 at the UW Michael B. Enzi STEM Facility. Girls entering the sixth through eighth grades are encouraged to apply.

The event will feature live workshops administered by faculty from the College of Engineering and Applied Science, highlighting areas of engineering. Attendees can learn more about STEM (science, technology, engineering and math) fields, and will get a chance to see educational spaces like the Shell 3-D Visualization Laboratory and labs in the Engineering Building. Members of SWE chapter will chaperone the group throughout the day.

There is no registration fee, and meals and T-shirts will be provided. For questions, contact the UW SWE chapter.

Founded in 1950, SWE's mission is to empower women to achieve full potential in careers as engineers and leaders, expand the image of the engineering profession as a positive force in improving the quality of life, and demonstrate the value of diversity.


Ryan Kobbe

For the fourth-consecutive year, Xiaohong Liu has made Clarivade Analytics' (formerly Thomas Reuters) list as one of the world's most highly cited researchers in the field of geosciences. Liu, a UW professor in the Department of Atmospheric Science and the Wyoming Excellence Chair in Climate Science, was listed in the prestigious Clarivade Analytics' Highly Cited Researchers 2017.

Members of the University of Wyoming's senior honor society recently honored their "Top Profs" at the 38th annual Top Prof Night. Members of the Cap and Gown Chapter of Mortar Board selected professors who have positively influenced their lives at UW. Mortar Board is the premier national honor society recognizing college seniors for outstanding achievement in scholarship, leadership and service.

Listed are UW Mortar Board students, along with their Top Profs and the professors' disciplines:

- Alexander Brown; Joseph Holles, chemical engineering.
- Marcus Rieker; Thomas Bailey, computer science.
- James Francis; Kevin Kilty, mechanical engineering.
- Rebecca Steinkraus; Jerry Hamann, electrical and computer engineering.
- Michael Trbovich; David Bell, chemical engineering.

Dwight Lee Bates has a passion for inspiring young people to learn about math and science. His work in that area earned him a national honor recently.

Bates, who graduated from the University of Wyoming in 1966 with degrees in mechanical and aeronautical engineering, was chosen as a Science Channel Science Superhero. He uses his industry knowledge to educate elementary classrooms in the subjects of science, technology, engineering and math (STEM) in Ellensburg, Wash. His work earned him a nod as a "Science Superhero" for the month of December from the Science Channel. He was featured four times a day throughout December on the television channel in a 30-second promotional spot and on its website.

Civil and Architectural Engineering Associate Academic Professional Lecturer Ryan Kobbe received the John P. Ellbogen Meritorious Classroom Teaching Award.

One student nomination said Kobbe was very demanding, but he made sure students walked away with a greater understanding of engineering. Words like passion, commitment and success were common in the nominations.

Kobbe joins recent CEAS honorees including Paul Dellenback (2017), Cam Wright (2012) and Steve Barrett (2004).

students in action

Chemical Engineering Provides Opportunities for Standout Student

Emily Lynch had her heart set on studying chemical engineering, and that determination brought her 1,700 miles west to the University of Wyoming.

Originally from Saint Leonard, Md., she made her way to the Cowboy State in 2015 to pursue the challenging major.

"When I was looking for colleges, I soon realized I had to go out of state, since there was only one college in Maryland that offered chemical engineering as a major and a marching band," she says. "I have some family in Colorado, and they mentioned UW had a great engineering program. I ended up visiting during my Thanksgiving break, and really liked the atmosphere and weather–there's no humidity."

Lynch, who is a junior, certainly has settled in at the College of Engineering and Applied Science (CEAS). She was a founding member and is the executive vice president of the Phi Sigma Rho colony, a social sorority for women in engineering and engineering technology. She's involved with the student chapter Society of Women Engineers and is the president of UW's American Institute of Chemical Engineers group. She also has a key role in Associate Professor Patrick Johnson's Materials Research Group.

The pursuit of an engineering education wasn't always at the top of her mind, though.

"I have a strong interest in aircraft, due to visiting the local Naval Air Station while growing up as a kid," Lynch says. "Up until about my sophomore year of high school, I wanted to be a pilot in the Navy. After taking chemistry courses, I decided to study chemical engineering and materials engineering."

Chemical engineering student Emily Lynch adjusts equipment in the advanced energy materials lab.

Her excellent work in the field landed her an opportunity to participate in the National Science Foundation's "Research Experiences for Undergraduates" program in the summer of 2017. She worked on a metamaterial project with University of California San Diego Assistant Professor Boubacar Kanté.

"For the summer, I worked on two projects: fabrication of contacts for a LIDAR (light detection and ranging) system, and fabrication of metasurfaces for solar concentrators," she says. "My lab was basically a clean room for most of the summer, where I dressed in a white overall garment, a hood, boots and two pairs of gloves. I also worked on photolithography, a type of printing on micro and nanoscales. Overall, the experience was unforgettable."

Lynch can lean on her unique experience and strong technical background from the CEAS to springboard into a rewarding career.

"For my career, I hope to work in the aeronautical and aerospace industry on aircraft materials and design," she says. "My plan is to intern with NAVAIR, Boeing or another aeronautical company, and then work for that company after graduation. I would eventually like to go to graduate school for materials science and engineering at the University of Michigan or University of California-Santa Barbara."

The lengthy trip across the nation for her education has proven to be very beneficial, Lynch says.

"UW has many opportunities for everyone to get involved," she says. "You can travel to new cities for conferences, network with students and professionals and leave your own mark on the university."

Electrical Engineering Standout Earns Prestigious Scholarship

Unlike some college students, David Mohler knows exactly what he'll be doing when he graduates from the University of Wyoming.

Mohler, a graduate student in electrical and computer engineering at UW, recently was accepted into the Science, Mathematics and Research for Transformation (SMART) Scholarship for Service Program.

The scholarship allows the Department of Defense to recruit the next generation of science and technology leaders. SMART funds the total cost of full-time tuition at UW, and provides a yearly stipend. Mohler expects to graduate in spring 2019.

"Once I have completed my degree, I will transfer out of the SMART program into full-time employment for two years through the Department of the Navy as a civilian scientist," says Mohler, who grew up in Evanston, Wyo.

UW engineering Hall of Fame member Tom Lockhart offered Mohler an internship opportunity in Dayton, Ohio, at Wright Patterson Air Force Base. The director and the chief scientist of the facility told him he would be an excellent candidate for the SMART scholarship.

"The scholarship works in such a way that they pay for my graduate degree without any interruption to a standard academic year," Mohler says. "In the fall and spring semesters, I attend classes and perform research like normal. In the summers between academic years,


David Mohler

I am required to serve an internship with the facility at which I will work following graduation."

In 2017, only 343 scholarships were given and the award rate for reviewed applications was just 14 percent, according to statistics from the National Defense Education Program.

"The SMART scholarship award is very selective, but I suspect David's combination of impressive technical expertise with superb communication skills is probably what put him over the top," UW advisor Cameron Wright says.

Computer Science Conference Provides Perspective For Student


Lisa Stafford (Photo courtesy Lisa Stafford)

The Department of Computer Science at the University of Wyoming is committed to providing students with valuable educational experiences. Several got an opportunity to see industry firsthand in February, as Professor of Practice Mike Borowczak and 18 students from the department to the four-day Developer Week Conference in Oakland, Calif. The students who attended formed the bulk of a new course in the department, "Rock The Blockchain." The curriculum involves creating a proof of concept voting system in less than a semester.

Support and funding for the trip came via a generous grant provided by Engineering Dean Michael Pishko and Department Head Jim Caldwell.

Lisa Stafford, an undeclared graduate student who plans to apply to the department, offered her perspective on the conference trip. She is a non-traditional student and a 35-year-old mother of three.

What was your overall impression of the conference?

It was amazing to see the different world that we call "Silicon Valley." It is a much more frenetic way of life there. People in that world switch jobs every 18-24 months, and go "all in" to their jobs with high risk-to-reward ratios. There are definitely certain aspects of their lifestyle that I think we could incorporate here in Wyoming to help us grow, while still retaining what we love about our state.

What do you think you gained from the experience?

Seeing such a different way of living solidified my love for Wyoming that much more, but it also made me realize how big the world is, and how much we have to think outside of our home state when considering the needs of the world. We are at an interesting time in Wyoming. We need to grow our technology sector to diversify the state economy. Machine learning and blockchain are two really strong areas of technological growth, but we need the minds to innovate the technology.

What was the most valuable part of the week as it relates to your education?

There were so many great talks at the conference. They covered many applicable topics, including Internet of Things, blockchain and machine learning. Seeing these technologies and their real-life applications was valuable. We also had the opportunity to meet with Punit Soni, a UW engineering alumnus who founded healthtech startup Robin. He has gone on a wild ride since graduating from UW, including working at Google and several startups. He's a very smart guy and knows how to hustle.

faculty in action

Wyoming Oil and Gas is Focus of New Summer Course

Wyoming's stature among energy-producing states in the U.S. is a lofty one, and a new course within the University of Wyoming's Summer High School Institute (HSI) will help students understand why that is important.

Department of Petroleum Engineering Associate Lecturer Tawfik Elshehabi will present "Wyoming Energy 4 You" during the summer session of HSI, which takes place June 10-30. Since 1985, Wyoming's rising junior students have had the opportunity to have their first taste of college life while attending the program. HSI offers courses in the science fields, as well as the humanities, and UW will host 97 scholars for the summer program.

Elshehabi, who began as an instructor at UW in fall 2017, recently taught a course called "Fundamentals of Petroleum Engineering" to students in the department. The curriculum covers all facets of oil and gas exploration, production and completion, using resources like the Shell 3-D Visualization Laboratory and the WPX Drilling Simulator Teaching Laboratory. The feedback from students was very positive, so he had the idea to introduce the class concepts to high school students. It represents the first time petroleum engineering curriculum has been a significant part of HSI.

"The state has many energy resources, including coal, wind and solar, but this class will focus on how Wyoming has some of the most accessible and abundant energy in the world in its oil and gas fields," Elshehabi says. "The potential of Wyoming and its students will be tapped, using some of the most advanced teaching tools available."

Much of Elshehabi's experience comes from his time teaching at West Virginia University. He has experience working with student groups in various competitions for organizations like the Society of Petroleum Engineers and American Association of Drilling Engineers.

The HSI course will introduce the history of Wyoming oil and natural gas, where it started and where it is going. Topics of oil and gas generation, exploration, drilling, production and processing will be introduced, and will feature hands-on activities such as measuring reservoir rock properties, testing drilling fluids properties and drilling a well on a full-sized drilling rig simulator. It also will include a field trip to the HollyFrontier Refinery in Cheyenne.

UW's Summer High School Institute course "Wyoming Energy 4 You" will help students learn more about petroleum engineering, using the WPX Drilling Simulator Teaching Lab.

UW Researcher Part of Winning Innovation Pitch to NFL

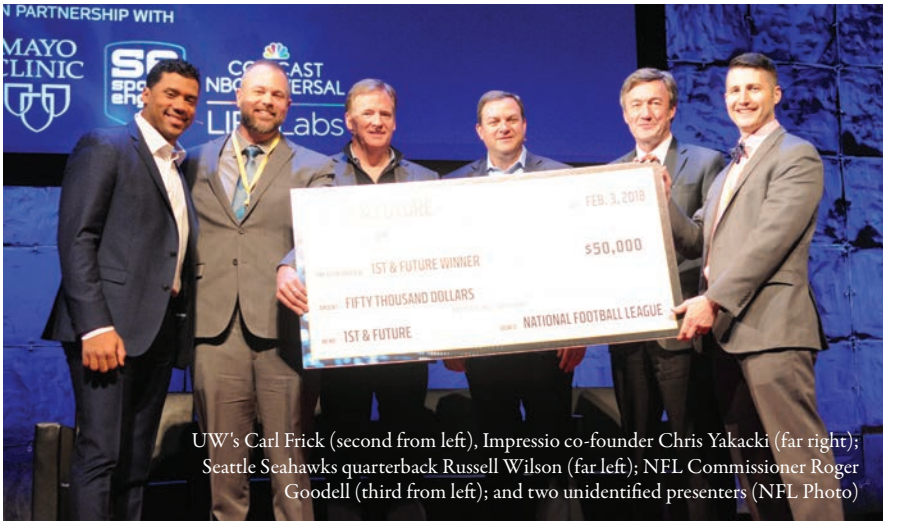
Carl Frick enjoys the game of football, and his research could play a role in ensuring the longevity of the sport.

Frick, the department head of mechanical engineering at the University of Wyoming, is among the founders of Impressio, a start-up company that aims to redefine energy dissipation in helmets to help prevent concussions and chronic traumatic encephalopathy (CTE). Along with company co-founder Chris Yakacki, a professor at the University of Colorado Denver, Frick has spent the last four years creating materials which could be used as helmet padding to absorb force created during game play.

Frick and Yakacki impressed a panel of medical experts and venture capitalists at "1st and Future," a startup competition. The presentation took place in Minneapolis during Super Bowl week Jan. 29-Feb. 4, and the competition called for companies to pitch solutions for safety issues facing the game. Impressio won for its submission in the category of "Advancements in Protective Equipment." It has developed liquid-crystal elastomers (LCEs) that can be put in helmet padding to absorb energy from hits. More than 100 sports-related startups applied to participate, and nine finalists were chosen to make stage presentations.

According to statistics, players in the National Football League suffered 281 concussions this season. Thanks to a heightened awareness of brain injuries, the league is looking for solutions to boost player safety. Improving the material in the game's most vital piece of protection equipment is the focus of Impressio's research.

"I have experience designing biomedical devices from novel materials as a researcher at Abbott Vascular prior to joining UW," Frick says. "Actually, this is the thread that ties all our founding members of Impressio together. We're not all academics, but we all have experience in designing biomedical devices from scratch. In this regard, we all have experience translating basic research to product lines.



UW's Carl Frick (second from left), Impressio co-founder Chris Yakacki (far right); Seattle Seahawks quarterback Russell Wilson (far left); NFL Commissioner Roger Goodell (third from left); and two unidentified presenters (NFL Photo)

"That being said, none of us have ever been as excited about the potential of a material as we are about liquid-crystalline elastomers," he adds. "Football helmets will hopefully be just step one. Looking toward winter sports, I can't help but picture our foams working very well because we can tailor them to being energy absorbing both at body temperature like regular helmets and at freezing temperatures. For the future, protective equipment for other sports and for military applications all seem like natural fits."

Frick says the company has received competitive funding in excess of $300,000, which will be used for proof-of-concept testing using established helmet designs. Frick and Yakacki have been supported by grants from the National Science Foundation and the U.S. Army Research Office, among others. The next step includes persuading helmet makers to test Impressio's technology.

"We can now take a commercially available helmet, rip out the foam padding, add in our own LCE foam of the exact same size, shape and weight, then test at an independent laboratory at Virginia Tech to National Operating Committee on Standards for Athletic Equipment standards," Frick says. "This will allow us to compare apples to apples, and show proof of concept that our material is better at absorbing impact energy. To be clear, we're not proposing an after-market product, but rather, we want to partner with helmet manufacturers to use our foam instead of what they are currently using."

Frick has been a UW faculty member since 2008. His research involves integration of materials science, bioengineering, and mechanical engineering to characterize new materials for use in emerging technologies. Some of his current projects focus on exploring the mechanical behavior of materials, with specific interests in metallic and polymer biomaterials, shape-memory materials and nanometer-scale materials.

"There's so much support and encouragement at UW, and with the recent success of our faculty and students, more of this innovation is sure to follow," Frick says.

THE WAY *forward*

CEAS BEGINS TO IMPLEMENT STRATEGIC PLAN

Left: A photo from Prexy's Pasture of the College of Engineering and Applied Science.
Right: Rebecca Steinkraus studies molecular biology and electrical engineering at UW.

By Andy Chapman

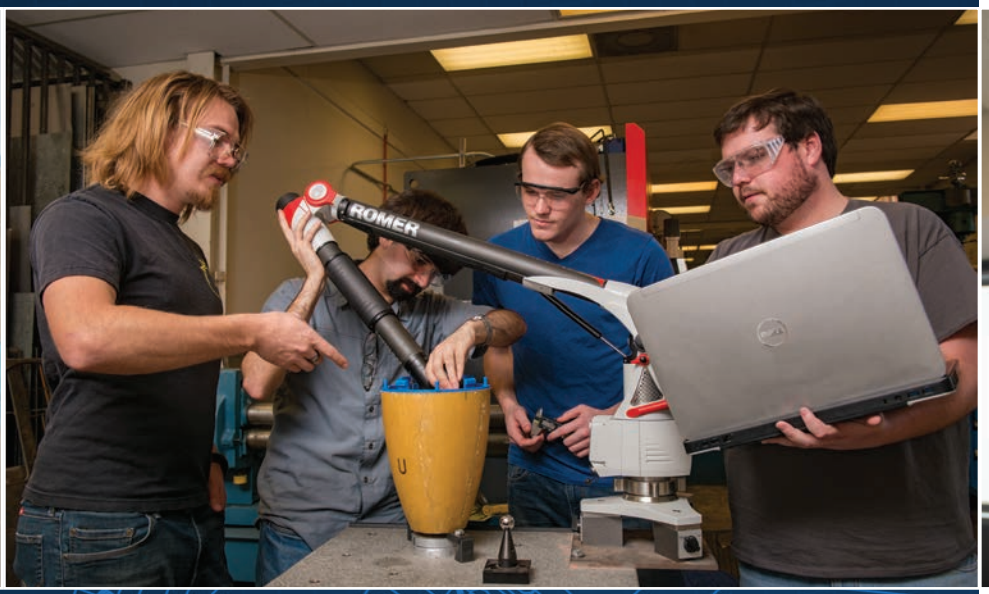
The College of Engineering and Applied Science at the University of Wyoming unveiled its five-year strategic plan in December 2017.

The College of Engineering and Applied Science (CEAS) was established to help fulfill the University of Wyoming's core land-grant mission: to serve Wyoming through outstanding undergraduate education, research in areas of economic importance to the state and outreach to stakeholders across the state. The Tier-1 Engineering Initiative, established by the Wyoming Legislature in 2012, represents a major reinvestment in engineering and computer science, and is a recognition of the importance of these jobs to Wyoming's economy. The newest strategic plan represents the next phase of the Tier-1 vision and operationalizes the initiative. In executing this plan, the college will attract, retain and develop world-class human capital (faculty, staff, students), will produce high-value, economically relevant research, and will be recognized internationally for innovation in education and research.

The CEAS serves the citizens of Wyoming through engineering and technology-oriented educational and research programs, yielding graduates and technologies that significantly impact Wyoming's economic growth and diversification. The CEAS does this through commitment to student success, community and industry engagement and translational interdisciplinary research.

The CEAS will be recognized in Wyoming and internationally as a leader in education, stakeholder engagement, and the application of knowledge to the benefit of our economy and our citizens.

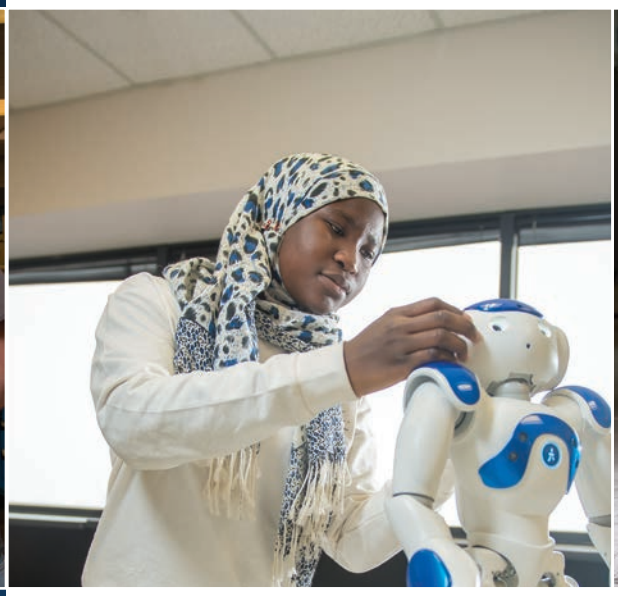
Left: Graduate student Rachel Edie poses for a photo with the Department of Atmospheric Science's Mobile Research Laboratory. The mobile lab is used by UW students and researchers to monitor atmospheric changes at sites across the country.
Right: The UW Machine Shop, located in the Engineering Building, provides technical consulting and a wide variety of design and fabrication services to the UW community, including students, faculty, staff and associated entities. CEAS students Kevin Poyer, George Seiss, Ryan Poyer and Samuel Martin use a coordinate-measuring machine to make precision measurements inside the nose-cone of their NASA-sponsored zero-gravity vehicle.



Values

1. Focus on student success.
2. Foster collaboration.
3. Be collegial and respectful to all.
4. Teaching and research are activities that reinforce and enhance each other.
5. Committed to diversity, equity, and inclusion.
6. We are honored to serve Wyoming.

Left: Electrical and computer engineering student Aisha Balogun works with NAO, a humanoid robot that can be programmed to do certain tasks. **Right:** Associate Professor of Civil and Architectural Engineering Jennifer Tanner Eisenhauer (right) supervises the Advanced Materials class in the High Bay Research Facility.

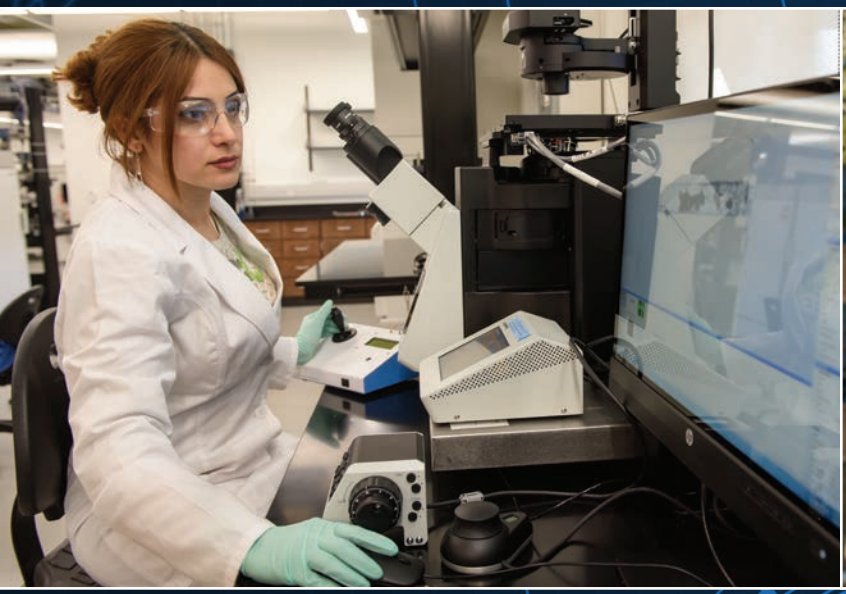


STRATEGIC *themes*

1. Establishing a premier academic culture
2. Fostering innovative growth
3. Engaging in productive economic development
4. Becoming a best-practices organization

The college has developed a strategy map to document primary strategic goals and will use the Balanced Scorecard, developed by the Harvard Business School (Kaplan & Norton, Harvard Business Review, 1996), as the performance management tool. Focus areas for each theme area are described together with the initiatives that will launch the strategic plan implementation phase. Once these initiatives are completed, new or follow-on initiatives will be added to the plan.

Left: Petroleum engineering Ph.D. candidate Gina Javanbakht performs optical microscopy research at the High Bay Research Facility.
Right: Alex Brown, a chemical engineering major from Canmore, Alberta, Canada, poses in front of the Engineering Building.



Premier ACADEMIC CULTURE

National Recognition of Programs

- Develop and track appropriate metrics for each initiative focused on stakeholders: alumni, students, faculty, staff.

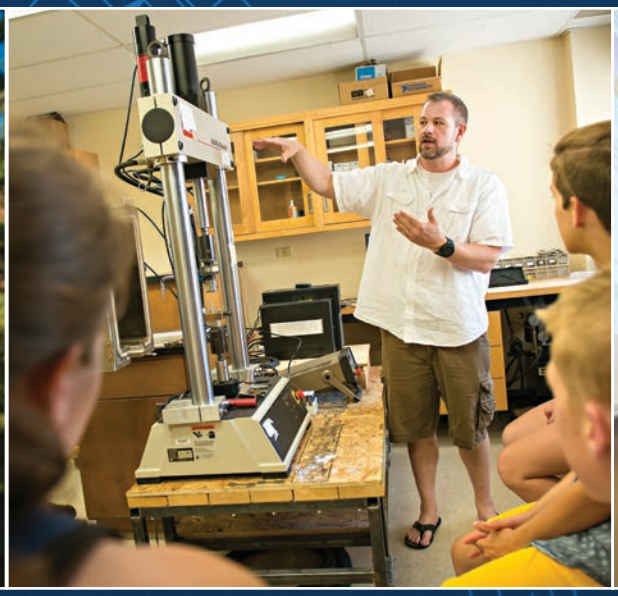
Invest in High Impact Practices

- Develop a repertoire of disruptive engineering and applied sciences specific first-year seminars.
- Provide spectrum of accessible extracurricular experiences for all undergraduate students. Initial focus on undergraduate research, internships, co-op, and study aboard opportunities, aiming for 80 percent student participation rate in a research, internship, co-op, or study abroad experience by 2021.
- Develop interdisciplinary education programs cutting across departments, units, and programs both inside and outside the college that fulfills market demand. Initial focus: Computer Engineering Technology, Construction Management.
- Provide matching funds for National Science Foundation Research Experiences for Undergraduates awards.

A Unique Community of Scholars

- Develop admission standards and education materials for major declaration. Admission standards are tied to summer bridge enrollment, not a gateway to the major.
- Develop and implement service learning activities to increase participation in programs prior to graduation.

Left: Mechanical Engineering Department Head Carl Frick shows Engineering Summer Program students how to test the strength of objects by stretching the materials until failure. **Right:** Civil and Architectural Engineering Assistant Academic Professional Lecturer Ryan Kobbe explains a concept in a classroom full of students.



Innovative GROWTH

Transformational Partnerships

- Develop models for industry-university engagement and identify 1-2 partnerships to immediately pursue.
- Develop and provide industry training and certification programs, focus will be for online certificate programs in drilling and cybersecurity.

Expand College Fundraising Efforts

- Establish a culture of stewardship.
    - Timeline: Provide annual development training to all department heads.

Control Our Financial Future

- Develop and offer a portfolio of professional development courses, including online courses in areas such as petroleum engineering, civil engineering and computer science.

Pipelines for Enrollment Growth

- Increase engagement with two-year institutions, including articulation agreements with the Southern Alberta Institute of Technology (SAIT) in mechanical engineering and architectural engineering.

Left: Chemical engineering graduate student Audra DeStefano (right) and Assistant Professor Katie Li examine membrane technology in the Advanced Energy Materials lab.
Right: Petroleum Engineering Department Head Brian Toelle (right) and Mannan Qazi discuss a topic in Tight Gas Sands/Coal Bed Methane class.

Productive ECONOMIC DEVELOPMENT

Pipelines from Science to Technology

- Develop a one-stop shop website for industry engagement highlighting college capabilities and technologies.
- Form and manage a Senior Design Consortium that recruits business memberships and in return provides college engineering support.

Interdisciplinary Centers of Research Excellence

- Institute a program of industrial post-graduate fellowships, supported by industry with matching from the engineering initiative.
- Develop high-impact research centers of excellence that have sufficient resources for long-duration success using a "research road map."

Invest in Faculty

- Increase opportunities for faculty development programs in research and economic development and develop new programs.
- Provide seed funding to promote new research centers of excellence with economic development potential.

Incentivize and Reward Faculty Engagement

- Revise college tenure and promotion guidelines to reward economic development activity.
- Develop opportunities for faculty supplemental income.

Left: Cybersecurity Education And Research Center Director Mike Borowczak helps Danny Radosevich in a cybersecurity class.
Right: Wyoming Gov. Matt Mead, former Wyoming Sen. Phil Nicholas and UW Board of Trustees member Kermit Brown watch as graduate student Joost Huizinga programs a robotic arm.

A Best-Practices ORGANIZATION

Become a High-Functioning Organization

- Implement skip-level meetings and strategic rounding to improve internal communication, team building and morale.

Invest in People

- Establish Performance Improvement Plans as part of the annual review process.
- Develop a Reward and Recognition Program.

Organize for Success

- Training and mentoring workshops for faculty and departmental leadership, utilizing on-campus and off-campus leadership training opportunities for faculty and staff.
- Develop a Research Success Center.

Develop a Research and Data Infrastructure

- Implement facilities, personnel and equipment usage audit and plan using external consultant to develop an infrastructure master plan, reorganize staff as needed and fill any gaps in student/faculty support identified.
- Develop and implement processes and resources to support response to large, interdisciplinary research and cross collaboration opportunities.

Innovation ON THE HORIZON

Left: Mechanical Engineering Professor and H. T. Person Chair Dennis Coon discusses trends with student Jeremiah Vaskis.
Right: Engineering students Pourya Nikoueeyan, Matthew Faryna and Emily Beagle meet with Christine Langley, chief operating officer of the Wyoming Technology Business Center and assistant director, David Bohling.

UW To Foster Economic Growth, Diversification with New Institute

By UW Institutional Communications

The University of Wyoming will step up its efforts to enhance and diversify the state's economy, with the creation of a new Institute of Innovation and Entrepreneurship (IIE).

The UW Board of Trustees voted in March to authorize establishment of the institute, which will foster entrepreneurship among UW students, faculty and staff, and across the state, in a university-wide effort.

"The IIE will draw upon key strengths of the university and develop additional capacity for UW to serve as a powerful and systematic economic engine for the state," Vice President for Research and Economic Development Ed Synakowski says. "The institute will support inventors, innovators and entrepreneurs along the entire pathway from idea to successful commercialization."

Plans for the institute, which is part of "Breaking Through: 2017-2022," the university's new strategic plan, were developed by College of Engineering and Applied Science Dean Michael Pishko and College of Business Interim Dean David Chicoine. It connects with Gov. Matt Mead's ENDOW initiative, which aims to diversify Wyoming's economy.

UW President Laurie Nichols has committed startup funding from her strategic initiative fund to support the launch of the IIE this year. That involves the creation of faculty and professor of practice positions in entrepreneurship, as well as an entrepreneur in residence, for which recruitment is underway. A budget will be proposed for the 2018-19 fiscal year, and a location for the institute will be established on campus this summer.

The strategic plan calls for enhanced entrepreneurship programming across campus; more public-private partnerships; excellence in research; best-of-class technology transfer and commercialization; more royalty-generating licenses for existing and startup companies; new technologies and innovations derived from faculty research; and more university-based startup companies.

While UW's Office of Research and Economic Development is strengthening its technology-transfer capabilities, the IIE creates an organization, with governance and leadership, to focus the university's efforts on entrepreneurship. Its governing board is composed of academic deans and the vice president for research and economic development, illustrating the university-wide approach.

The IIE will facilitate infusion of entrepreneurship principles in academic courses across campus; support the strengthening of the entrepreneurship major; create an entrepreneurship minor available to all majors; provide informal training activities on and off campus; and support a possible new master's degree in technology management through the College of Business and the College of Engineering and Applied Science.

"Most important will be embedding and integrating, in a systematic, faculty-led manner, principles of entrepreneurship in courses offered by departments across the university, similar to the way writing is infused throughout the curriculum," Chicoine and Pishko say.

Faculty members from across campus will be recruited to become faculty of the IIE, in a manner similar to UW's Honors College. They will integrate innovation and entrepreneurship into their faculty responsibilities within their disciplines and department responsibilities.

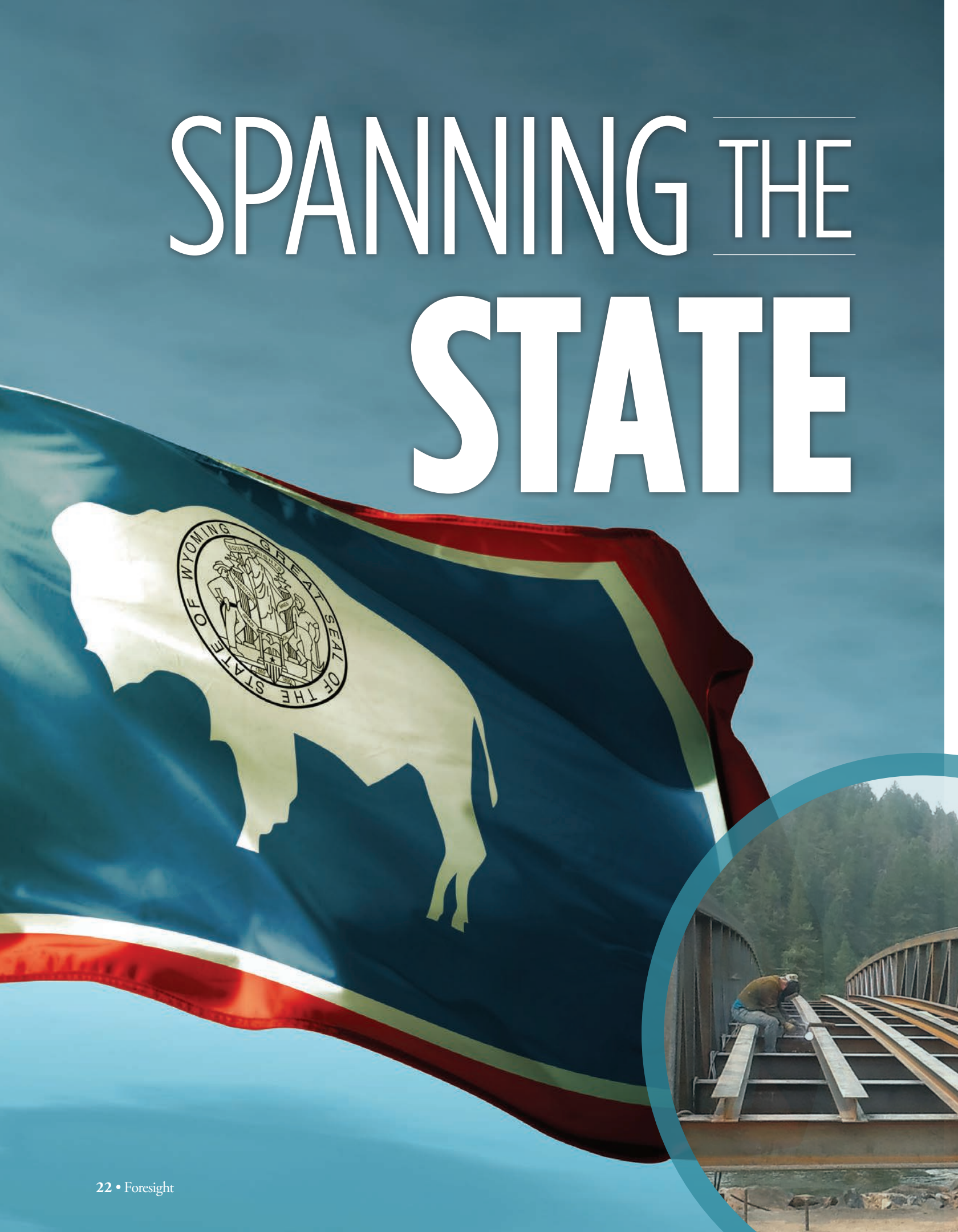
Among other things, the IIE will include a "Business Creation Factory," led by a professor of practice. It will assess innovations and their business potential, moving projects admitted to the factory through a three-stage process of new venture creation.

"In this phased process, the concept is de-risked and increases the likelihood of creating startup companies that can attract private, early-stage capital and are high-quality, real investment opportunities that show strong promise of growing into successful enterprises," Chicoine and Pishko say.

Candidates for the Business Creation Factory could come from faculty inventions; from student and faculty business plan competitions; from new centers of innovation on campus; as well as from entrepreneurs across Wyoming.

"Once operational, the Business Creation Factory will be a living laboratory supporting research on the process of business creation and the efficient, effective commercialization of innovations as an economic development and diversification strategy," Synakowski says. "Overall, the IIE will enable the university to fulfill its unique mission to create a more prosperous future for Wyoming, its people, its communities, and its business and industry."

SPANNING THE STATE



UW CIVIL AND ARCHITECTURAL ENGINEERING ASSISTS WYOMING RESIDENT WITH MAJOR PROJECT

By Andy Chapman

When it comes to building bridges in western Wyoming, there aren't many who can stack up to Wayne Baker. His resume includes more than 100 bridges over the span of 58 years.

When the owner of one of the world's largest sporting goods stores needed a bridge, he came to Baker. Johnny Morris, the founder of Bass Pro Shops, purchased property in 2013 near Afton, Wyo., but some of the land wasn't accessible due to the flow of the Salt River and Flat Creek.

Baker constructed a 100-foot bridge, rated for 10-ton loads with a 10-foot roadway. He successfully tested it by parking a backhoe and tractor, weighing a combined 14 tons, on it in the yard before putting it over the river. While high water levels forced it to sit in the yard until the flooding subsided, Morris was pleased with the final product.

"He said, 'That's so great that we need to have another to access another part of the farm,'" Baker says.

The next bridge needed to have a 12-foot roadway and be rated for 40 tons on a 110-foot span. The 93-year-old builder, who does a majority of the design fabrication and construction himself, started making plans. But the project gave him pause, as he'd never tackled a project of this magnitude in a site-truss design before.

Left: Wayne Baker welds a support beam on a bridge over the Salt River in Wyoming's Star Valley region.
Right: An aerial shot of one of Wayne Baker's recent bridge projects. (Photos courtesy Wayne Baker)

BASS PRO

GOT ITS START IN 1971 WHEN FOUNDER JOHNNY MORRIS BEGAN SELLING HIGH-QUALITY FISHING TACKLE IN HIS DAD'S LIQUOR STORE IN SPRINGFIELD. MORRIS DEVELOPED A FOLLOWING IN THE REGION AND CREATED THE BASS PRO CATALOG IN 1974. MORRIS ALSO INTRODUCED THE BASS TRACKER FISHING BOAT IN 1978 THAT WAS DESIGNED SPECIFICALLY FOR FISHERMEN.

A component to one of Baker's bridges is hauled to its location in Star Valley. (Photo courtesy Wayne Baker)

"I'm not an engineer. My third-grade education didn't prepare me for that," Baker says with a laugh.

Luckily, he was able to tap into a state resource just a few hours away. Baker's grandson, Eric Pantuso, attends the University of Wyoming and studies electrical engineering. He helped Baker reach out to the UW Department of Civil and Architectural Engineering to ask for assistance.

"They grabbed on right away and invited me over to Laramie to take a look at what I had designed," Baker says. "It turned out that I wasn't actually that far off. There were two or three small changes that would improve the safety margin."

Professor Michael Barker reviewed the designs, and Dillon Joens, an architectural engineering student, provided renderings and a fly-over view of the project.

"He does an excellent job," Barker says of Baker's bridge building. "His craftsmanship and fabrication skills are very good."

Joens was able to work on a real engineering project as an undergraduate and came away with experience in seeing how a bridge goes from design to construction.

"My role in the bridge project was to aid Professor Barker by creating a model and rendering of the bridge Wayne engineered," says Joens, who now works as a designer for JR Butler, a curtain wall manufacturer and installer in Colorado. "This allowed me to hone my modeling and design skills and also use the design software for simple engineering calculations."

The safety component of such a large-scale project was paramount. Because of Barker's expertise in bridges, he was able to examine the preliminary designs and analyze them. His feedback helped increase structural efficiency and included optimizing member sizes, reconfiguration of the bridge to make better use of materials and reduce costs, and stiffening the bridge to improve stability.

"Through that analysis, we found out he could reduce the size of the members and we could reconfigure it to make it more efficient," Barker says. "He took that information, built it, and it's up. He was very close, and it would've been sound without our input, but now the bridge is much better."

Barker so admired Baker's acumen and design work that he has used his plans in curriculum for a senior capstone course and invited him to visit classes to relate his entrepreneurial experience.

"Having Wayne come to class was great, and I hope to have him back," Barker says. "It's good for our students to see and talk to people who make a difference and can present important viewpoints. Honestly, he's an engineer—he just doesn't have the formal training."

Baker's education largely came from his experience in industry. After he "kicked a teacher in the shins in third grade and ran," he was in and out of school until the eighth grade. He started high school, but he was involved in an auto accident and had a lengthy rehabilitation period and missed school

for a significant time. When he returned, the administration said he would be forced to repeat the grade. The very next day, he headed for California to work with his brothers in construction with the intention of returning to school the next fall. He left Star Valley on Dec. 5, 1941, and made it to Oakland on Dec. 6. On Dec. 7, Pearl Harbor was bombed and the U.S. was embroiled in World War II. Baker never made it back to school.

He started working in a shipyard at the age of 17. Because he was training women to cut steel, he wasn't allowed to join the military until his draft number came up. That's where he gained a strong background in welding and cutting.

Years later, he owned a machinery supply business in Price, Utah, and started building things with steel. He designed various things like coal-processing facilities, and purchased coal companies for the raw materials and distribution networks. He sold machinery all over the nation and even furnished the equipment for Mexico City's subsurface transportation system.

Baker's ambition was sky high, and he started a coal mine from the ground up in Price. But he didn't have the money to bring it online, so he looked for an investor. He found a partner in Art Linkletter, a famed television producer and host of "Kids Say The Darndest Things." After being a successful business owner for years, he sold his companies and moved back home to Star Valley. But his retirement didn't last long, as a week later a building in town burned down and Baker volunteered to rebuild. He hasn't stopped working since.

"As soon as I finish one project, I've got two or three waiting," he says.

Morris has played a part in keeping Baker busy. The first bridge project was 50 feet long and 14 feet wide, and needed to be done immediately. The success of that led to 14 more projects between Morris and Baker. The latter tells a story of an area on Morris' property that features three bridges. At one point, someone asked why the area couldn't be accessed by building just one or two bridges. Morris replied: "I like Wayne's bridges."

Thanks to the efforts of the UW Department of Civil and Architectural Engineering and Baker's handiwork, the latest bridge was completed Oct. 7, 2017. The cooperation between the university and Baker made for a good partnership, and he appreciated the efforts made by UW on his behalf.

"It's just as easy to do it right as it is to do it wrong," Baker says. "In fact, it's easier to do it right so you don't have to do it over again. I was glad to have the college involved. But it turned out I wasn't too far off."

STATEWIDE ENGAGEMENT IS CRITICAL TO THE SUCCESS OF THE COLLEGE OF ENGINEERING AND APPLIED SCIENCE AT THE UNIVERSITY OF WYOMING.

It is a pillar of UW's new strategic plan, Breaking Through: 2017-2022, and UW's Engagement Task Force was launched in August 2017 to develop a plan for strengthening UW's mission as a land-grant university and to collaborate with constituents and partners to improve and enhance the health and well-being of the state's communities and environments.

This task force hopes to cultivate a community of learning energized by collaborative work among students, faculty, staff and external partners, which is committed to active outreach and clear communication with communities. Tony Denzer, the head of the Department of Civil and Architectural Engineering, is a task force member.

"State engagement and meeting the needs of Wyoming's residents should be one of our major functions. It's all about relationships," Barker says.

Left: A trackhoe sets a support for a bridge fabricated by Baker. **Top:** Baker ensures all his bridges meet a high standard for quality and safety. (Photos courtesy Wayne Baker)

alumni in action

Spotlight: Energy Systems Engineering

CEAS Graduate Working To Promote Sustainable Structures

Maybe it's because he grew up in Alaska or attended college in Wyoming, but Chris Cronick has always had an appreciation for natural beauty and the environment. The quest to protect and preserve those places is part of the reason he enrolled in the College of Engineering and Applied Science at the University of Wyoming.

"As an avid outdoorsman, I have an inherent respect for our environment and the protection thereof," he says. "As a result, I believe in responsible energy use and am passionate about applying what I have learned, and learning more, in regards to renewable energy, energy efficiency and conservation."

A UW education allowed Cronick to build a career in energy consulting and sustainable design on both the residential and commercial level. Originally from Anchorage, he was familiar with the university because his mother and grandmother are proud alumnae. He took advantage of the Children of UW Alumni financial award, which made attending the school even more cost-effective.

"The improvements to campus and money coming into the school made the decision easy," he says. "I believe UW offers unique opportunities that you don't get at larger universities."

One of the opportunities to which Cronick refers include the formation of the Energy Systems Engineering program, which was launched in 2009.

A graduate of Energy Systems Engineering at UW, Chris Cronick now installs solar panels in Alaska. (Photo courtesy Chris Cronick)

One of the most unique programs in the nation, the specialized curriculum appealed to him as soon as he heard of it.

"I was originally enrolled in the architectural engineering program but changed to the ESE program as soon as it was offered," Cronick says. "It emphasized renewable energy, my true career interest, and offered a pathway to advance my knowledge and education beyond many people in the industry."

Cronick was an active member of the engineering undergraduate community. He was on the Joint Engineering Council, the president and co-founder of the Energy Systems Club, a nominated council member for the UW Engineering Fund for Enrichment and a nominee for the JEC's outstanding senior of the year. After graduating in 2011, he found employment immediately.

He worked as an environmental engineer for the Department of Environmental Conservation (DEC), Division of Air Quality for the state of Alaska and gained a broad range of knowledge relating to technical writing, analyzing various energy conversion processes and ensuring air quality regulations were being met on a state and federal level. Later on, he joined Sustainably Built in Boulder, Colo., as a certified Home Energy Rating System and Energy Star rater. He interacted with architects, general contractors, and various sub-contractors to ensure residences meet minimum compliance requirements while driving the client to the next level for energy-efficient design.

He now works as a crew lead for Arctic Solar Ventures performing solar installations in Alaska. He also owns a business, Frontier Energy Advising, and performs energy modeling and mechanical design for residential homes. His goal is to lead clients towards a net-zero energy structure while enhancing comfort and safety within the home.

"The ESE program helped me to decipher how to break down a problem and come at it from various angles," Cronick says. "It provided the backbone and resources necessary for solving issues related to energy use, and conservation in areas utilizing knowledge of engineering, law, the environment and economics."

Architectural Engineering Graduate Embarks On Exciting Career Path

Yara Thomas has always had a connection with the University of Wyoming, and it led to a life-changing opportunity this summer. Originally from Jackson, Wyo., Thomas took summer trips to Laramie area to be near her grandmother, and her family spent time at a homestead near Arlington. She attended Lewis & Clark College in Portland, Ore., as a freshman. After a year, however, she had a change of heart and headed back to her home state.

"I chose to transfer to UW because of the incredible value for your education," says Thomas, who graduated with a degree in architectural engineering in 2017.

"In my opinion, the best thing about engineering at UW is the incredible support that I received from the professors," she says. "Because UW is still relatively small compared to other institutions, individuals with ambition and work ethic have almost unlimited opportunity to shine. Hard work is recognized and appreciated."

Her hard work led to a chance to work for an up-and-coming company in California shortly after she graduated. Thomas now is an energy systems engineer in San Francisco with Plenty, after she was recruited by Nate Storey, a UW graduate and the company's co-founder and chief science officer. Plenty is a leading field-scale vertical farming company.

"I was acquainted with the company this summer when Nate Storey reached out to me after hearing about my thesis research on sustainable greenhouse design," Thomas says. "At Plenty, I work on the mechanical engineering team. I have been designing our unique air distribution system and aiding contracted engineers on heating, ventilation and air conditioning equipment. Additionally, I build and coordinate models to represent energy flows through our system. These models will help to identify areas in which we can reduce our energy consumption and help to optimize our system."


Yara Thomas (Photo courtesy Yara Thomas)

Thomas didn't necessarily envision working in her current industry while she was studying at UW. But she definitely is embracing the chance to make a real difference for people and use her engineering degree to its full extent.

"I have found engineering to be one of the most reliable paths toward a job and rewarding carrier," she says.

Engineering Alumna Makes Impact On People's Health

Even as an unpaid intern, Taylor Wollert was passionate about healthy, sustainable and easily accessible food for people around the world.

Now a full-time employee at a hydroponics company in Wyoming, she's able to ensure that food can be produced. She relies on a strong technical background thanks to an energy systems engineering (ESE) degree from the University of Wyoming. Wollert now is a mechanical design engineer for Plenty Unlimited. She started with Laramie-based Bright Agrotech, which merged with Plenty in 2017.

"My role started out as an unpaid intern with Bright Agrotech in July 2016, which then transitioned to a part-time paid position within a few months, and now I am employed full time as one of many mechanical design engineers for Plenty," she says. "I couldn't have planned a better start to my career."

Wollert, who grew up in Lingle, Wyo., gained extensive knowledge of mechanical engineering studies in areas such as thermodynamics, fluid dynamics and transport phenomena, and an understanding of broader systems studies including environmental law and policy and approaches to problem solving, and covers areas such as global environmental politics, nuclear engineering and plants and civilization.

"I was drawn to energy systems engineering because of its unique and diverse course requirements," Wollert added. "I knew that this major would be a great challenge, as part of the mechanical engineering program, but I also understood the benefits that would come from earning this degree."

Plenty manufactures vertical farming equipment. As a mechanical design engineer, Wollert works with a team to design new systems and optimize current technologies. The company's technology helps reduce waste and can improve food quality and health for people around the world. With this focus, Wollert and Plenty can improve the quality and affordability of food, which makes it easier for people to maintain healthy lifestyles.


Taylor Wollert (Photo courtesy Taylor Wollert)

Wollert she says the most valuable skill she developed was the ability to learn, think critically and work in a team.

"For all those prospective students out there, I'd say go for ESE as your major," she says. "You can go for a degree in mechanical engineering, environmental systems, or politics; or you could stick with energy systems engineering and learn aspects of all three of those degrees."

alumni in memoriam

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.

Mr. George Harokopis
BSCE '49 – Laramie, Wyo.

Mr. Monte Johnson
BS '78 – Laramie, Wyo.

Mr. Kerry Libberton
BSME '94 – Arvada, Colo.

Mrs. Eleanor Livingston
BSEE '67, MS '69 – Boulder, Colo.

Mr. Thomas Lockhart
BSEE '57 – Casper, Wyo.

Mr. Samuel McBride
BSCE '73 – San Diego, Calif.

Mr. Edgar Neaves
BSME '59 – St. Petersburg, Fla.

Mr. Dale Pierantoni
BSEE '64 – Laporte, Minn.

Mr. William Stapp
BSCE '58 – Penn Valley, Calif.

Mr. Russell Thompson
BSEE '65, MS '67 – Cheyenne, Wyo.

Mr. Leland True
BSCE '43 – Boise, Idaho

Mr. George Wentz
BS '62 – McKinney, Texas

Mr. Michael Wreschner
BS '83, MS '85 –Chandler, Ariz.

I/we would like to make my/our gift to the College of Engineering and Applied Science:

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Thank you for your continued support!

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- Post and search resumes and jobs
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Get connected to WyoAlumni today: wyoalumni.uwyo.edu.

Please call (307) 766-7000 or e-mail wyoalumn@uwyo.edu if you have questions.

Briley James (right) and Jacy Bushboom share a laugh while putting on personal protective equipment in an engineering lab in the 2016 Engineering Summer Program. They, along with 34 other students, learned about engineering and computer science concepts while participating in hands-on activities in advanced labs.

ENGINEERING OUTREACH ACTIVITIES RAMP UP

Teddi Freedman

Teddi Freedman has been busy in recent weeks, bringing engineering and computer science to Wyoming teachers and students.

Freedman, who is a University of Wyoming College of Engineering and Applied Science (CEAS) project coordinator, organizes and administers outreach efforts for the college. Among her job responsibilities is to connect with educators and students from kindergarten through high school to introduce science, engineering, technology and math (STEM) concepts and encourage participation in engineering and computer science activities. Her efforts will ensure Wyoming has the next generation of problem solvers in the workforce.

Some of the recent CEAS outreach activities included Architecture Week (April 8-14), hosted by Wyoming members of the American Institute of Architects, including CEAS civil and architectural engineering alumnae Jera Schlotthauer. Architectural engineers from around the state visited fourth-grade classrooms to talk about the field and host hands-on activities.

The CEAS partnered with the UW Art Museum for a STEM and the Arts event, to find common ground between artists and engineers and how they think and create. The workshop utilized the UW Ann Simpson Artmobile and traveled to third- and fourth-grade classes in Gillette and Wright.

The UW student chapter of American Society of Civil Engineers and Associate Academic Professional Lecturer Ryan Kobbe hosted Archimedes Principle classroom workshops at Laramie Junior High School. The workshop was named for the concepts of Archimedes, a famous Greek mathematician, physicist and engineer, who developed a model for fluid displacement that is still used today.

Freedman attended a workshop in Douglas schools for science and engineering and connecting the scientific method and engineering design process.

She attended the SkillsUSA competition in Casper to judge the engineering contest and be part of the resource fair with her outreach team.

OTHER ACTIVITIES INCLUDE:

- **April 30 –** The CEAS Female Mentor Program had its year-end celebration for all mentors and mentees, and discussed ways to grow the program even further. "The program is primed to grow and continue into next year," Freedman says.
- **May 3 –** The CEAS Outreach Ambassador program hosted its 2017-18 celebration. Each of the 10 students in the program logged more than 60 hours of outreach, and as a group, engaged more than 4,000 students.
- **May 15 –** UW hosted the Women in STEM Conference. It featured a panel with STEM graduate students, including Rachel Edie (atmospheric science) and Emily Beagle (mechanical engineering) to discuss ways to engage young girls in science and engineering.
- **May 22 and May 29 –** The UW Student Innovation Center and Biodiversity Center will host Cheyenne's Prairie Wind Elementary School third-grade students for daylong STEM programming.
- **June 10-16 –** UW hosts the Native American Summer Institute, and the CEAS and Student Innovation Center will have specific engineering-related programming.
- **June 17-23 –** The annual Engineering Summer Program will take place this summer. The unique program, now in its 31st year, gives high school students from across the country the opportunity to experience the world of engineering with hands-on activities.

UW CALENDAR OF EVENTS

MAY

May 4: Last day of spring 2018 classes

May 4: Cowboy and Cowgirl track hosts 7220 Invite

May 7-11: Finals week

May 9-12: Cowboy and Cowgirl track at Mountain West Outdoor Championships

May 12: Spring commencement

May 14: UW summer hours begin

May 21: Summer courses begin

May 24-26: Cowboy and Cowgirl track at NCAA West Preliminary Round

May 28: Memorial Day holiday

May 31: UW Orientation sessions begin

JUNE/JULY

June 6-9: Cowboy and Cowgirl track at NCAA Championship

June 17-23: Engineering Summer Program

June 25-29: RAMPED2: COWPOKES-IoT Camp Session I

June 29: UW Orientation sessions end

July 2-6: COWPOKES-CS: Cybercamp Of Wyoming camp (Riverton)

July 4: Independence Day holiday

July 9-13: ESP4T Workshop Session I

July 16-20: ESP4T Workshop Session II

July 16-20: COWPOKES-CS: Cybercamp Of Wyoming camp (Laramie)

July 16-21: RAMPED2: COWPOKES-IoT Camp Session II

AUGUST

Aug. 10: Last day of summer courses

Aug. 25: Cowboy football at New Mexico State

Aug. 29: First day of fall classes

SEPTEMBER

Sept. 1: Cowboy football vs. Washington State

Sept. 3: Labor Day holiday

Sept. 8: Cowboy football at Missouri

WyoCal

For the latest events and information, visit **uwyo.edu/calendar**

UW Cowboys and Cowgirls: **gowyo.com**

Fine arts: **uwyo.edu/finearts**

TAU BETA PI *Banquet*

TBP Outstanding Member Logan Guidry

2018 Wyoming Eminent Engineer Jay Puckett


The TBP Banquet recognized CEAS students for achievements throughout the year.


Table setting for TBP Banquet

An annual tradition in the College of Engineering and Applied Science, the Wyoming Alpha chapter of Tau Beta Pi banquet was hosted April 13. The ceremony took place at the Marian H. Rochelle Gateway Center.

Along with a reception and awards ceremony, students enjoyed a dinner at the TBP Banquet.

Banquet attendees enjoy the reception prior to dinner.

2018 Alumnus Eminent Engineer Carolyn Hardy Olsen

The annual banquet is always well attended and includes students, faculty, staff and notable alumni.

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College of Engineering and Applied Science
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Laramie, WY 82071-2000

"What's been amazing about UW is that as soon as I walked in the door and met my advisers, they were incredibly supportive and gave me so many opportunities.

I DON'T THINK YOU COULD FIND THIS EVERYWHERE."

-Cena Miller
Electrical Engineering
Master's Student