"You don’t get the quality of instructors and the education with that personal interaction anywhere else but UW. You get the same quality of education, but a lot more of the personal experience."

Shane Wilson, Civil Engineering ’16

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90% of our graduates have jobs or enroll in graduate programs within six months of receiving their degrees.

89% of our graduates earn starting salaries greater than $50,000 annually.

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.

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University of Wyoming
College of Engineering and Applied Science

Dean
Michael Pishko
Associate Dean, Academic Programs
Steve Barrett
Associate Dean for Advancement
Paul Dellenback
Director, Business Operations
Megan Barber

Departments:
Atmospheric Science
Thomas Parish, Head
307-766-3245
uwyo.edu/atmos

Chemical Engineering
Dennis Goon, Interim 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/computer

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
Hertanto Adidharma, Head
307-766-2500
uwyo.edu/petroleum

Editors
Andy Chapman and Micaela Myers

Graphic Designer
Jessica Perry

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

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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.

CEAS Students, Faculty Show Selflessness

It’s easy to talk about making a difference or making changes on a global level. But the students and staff of the College of Engineering and Applied Science do more than talk about it.

In the following pages, you’ll learn more about one student’s quest to bring economic diversity to an island nation. One professor knew he had more to give after retiring from industry, so now he teaches. Other instructors serve communities in the state through sustainable building practices and safe roadway construction.

To me, these stories are examples of the character of this college. These people prove you don’t have to be rich to make a difference in the lives of the people around you. Whether they donate money, time or knowledge, the CEAS staff, faculty and students make lives better throughout Wyoming with their breakthroughs.

And that’s the crux of giving back. The representatives of our college get so much out of their service. They develop and grow as people, gain new perspective, make social connections, use their education to make a real impact and serve as leaders.

As a land-grant institution, UW provides a foundation to this practical approach to helping people. It offers a full spectrum of educational opportunities and endeavors to make the world a better place.

So take an example from the fine folks in this issue, and explore ways to change the world around you in a positive way.

Sincerely,

Andy Chapman
Editor, Foresight Magazine

Message from Dean Michael Pishko

It’s been a year since I took the post as Dean of the College of Engineering and Applied Science, and I’m pleased to report that great progress has been made in several areas of importance to the state of Wyoming.

First, we’ve made strides in the Tier-1 Engineering Initiative and the goals of improving the undergraduate experience, improving K-14 STEM programs and collaborations with public schools and community colleges. We’re doing research in support of our land-grant mission, which means research benefitting Wyoming in areas like oil and gas, coal conversion, wind and water. We’re working closely with industry stakeholders in the state so we can ensure we meet their needs and drive economic development.

Things are moving quickly in the process of designing and planning for the new Engineering Education and Research Building. That building has new spaces to promote student innovation and entrepreneurship, and collaborative research that benefits the state. At a cost of more than $100 million, it will be the largest construction project in the university’s history. Groundbreaking is expected in late 2016 and construction should be completed in summer 2019.

I look forward to improving in these areas much more in 2016, and can’t wait to see what the future holds for our college and all the talented people who make it possible.

If you’d like to be a part of advancing the CEAS in its mission, contact Craig Russow (crussow@uwyo.edu) of the UW Foundation to see how you can contribute financially.

Stay tuned for the May issue of UWyo Magazine with a special section devoted to international endeavors at UW!

Subscribe today!

uwyo.edu/uwyomagazine

Spring 2016 • 3
UW Seeks To Become Cyber Security Hub

To battle one of the most prevalent issues facing the nation today, Wyoming Gov. Matt Mead requested state funding in January 2016 to develop a program at the University of Wyoming to become a center of excellence in cyber defense.

Corporations like Home Depot, Ebay, Sony, Target and even the U.S. government have been compromised through data breaches, due to hackers. Without trained individuals who continually learn and hone dynamic methods, Wyoming’s infrastructure, agencies, businesses and citizens are at risk.

According to the Wyoming Cybersecurity Education Initiative, proposed curriculum in the College of Engineering and Applied Science’s Department of Computer Science would educate graduates to defend against such attacks and “provide meaningful and sustainable impact to Wyoming’s technology sector through cybersecurity and information assurance higher-education programs.”

Gov. Mead drafted a letter to the state Legislature in January 2016 in support of an initiative through the Wyoming Department of Enterprise Technology Services (ETS) for UW to obtain certification as a National Center of Academic Excellence (CAE) in information assurance and cyber defense. The certification is administered by the Department of Homeland Security and the National Security Agency.

Richard Imbrogno of the ETS outlined the program in a business case proposal.

“Today’s cyber threat environment is dangerous and continuously changing,” Imbrogno writes. “Without formally trained and appropriately credentialed individuals who continually learn and hone new anti-attack and dynamic methodologies, Wyoming’s infrastructure, agencies, businesses and citizens are at risk and are at a major disadvantage.”

Department of Computer Science head Jim Caldwell met with the head of the program at the NSA at the Global Tech Summit in Jackson, Wyo., in September. The program will need two faculty members with expertise in cyber-security to get the certification, with a research certification to be established down the road.

The business plan includes a two-year budget which will be included in the Governor’s Office budget. Some of the funds are to support a new faculty member at Laramie County Community College and a person who will help coordinate statewide efforts to market the program to students, and to transfer the LCCC program to other community colleges.

Society of Women Engineers Provides Support, Resources

Typically, when Ann Gibbons walks into one of her engineering courses at the University of Wyoming, she’s one of only a few females in the class.

Females account for 18 percent of enrollment in the College of Engineering and Applied Science. That places UW among the national averages, with statistics putting female enrollment at undergraduate and graduate levels between 18 and 24 percent in colleges across the country.

That’s where the UW chapter of Society of Women Engineers (SWE) can have an effect. According to the organization, the purpose of SWE is to encourage 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.

And statistics do show an increase in females in engineering, improving from 15 percent female enrollment in the CEAS in 2010-11. “When you walk into a class and there are only a few females, it’s nice to know that there is a network for them in the college,” says Gibbons, the UW chapter president of SWE. “It’s about support and helping, and doing the best we can to get them into the workforce.”

Katie Hopfensperger has spent three years as a member, and now serves as the vice president of SWE at UW. “It’s all about empowering women in the field because we’re underrepresented,” she says. “There’s a support system for us in industry to give us confidence.”

The organization is a valuable resource for engineering females at UW who might feel out of place. The SWE chapter in Laramie hosts resume and interviewing workshops, industry panels and other outreach events. Attendance and membership have varied over the last few years, but Gibbons points to the first meeting of the 2015-16 academic year, when 60 people attended. “It’s been a struggle and we’ve had some ups and downs,” Gibbons says. “This is the year we’re trying to gain a foothold, so we’re trying really hard to get the members to come together so we can build up.”

Both Gibbons and Hopfensperger became SWE members at the urging of older students who were involved. It’s that kind of engagement that will ensure the organization remain effective at UW. SWE members were involved in Engineers Week Girls Day in February, along with outreach events like working with Big Brothers, Big Sisters in Laramie.

“Hopefully the connections make members realize they’ll have a network that can help them throughout their college career,” Gibbons says.
The kick-off event for Martin Luther King Jr. Days of Dialogue (MLKDOD) was deemed a success, after nearly 80 people joined the discussion Feb. 1 about challenges faced by underrepresented groups in the fields of science, technology, engineering and mathematics at the University of Wyoming.

Hosted in the Wyoming Union, the event, "A Troublesome Hypothesis: The Myth of Diversity in STEM," was part of UW’s 15th annual MLKDOD. Dean Michael Pishko, from the College of Engineering and Applied Science, provided opening remarks, followed by breakout discussion sessions.

“I enjoyed it because I believe it brought the issue of diversity to light for the people who attended,” she says. “Being someone who is not white and being a first-generation college student, it is hard and you feel like you’re on your own. If you don’t feel like you belong somewhere, how are you supposed to stay there, learn and grow?”

The shared stories, documented by event facilitators, will be used to help develop an action plan and clear set of objectives to effect change at an institutional level. Through this annual week of programming, UW celebrates the continuing impact of Dr. Martin Luther King Jr.’s life and ideals. The MLKDOD tradition centered on “untold stories of unheard voices,” the theme of this year’s MLKDOD.

“Toward diversity is a must. There’s no way the United States can remain competitive and continue its preeminence in science and technology without diversity. We have to engage our entire population. Diversity is something that greatly improves the workplace, improves creativity and changes the dynamics on how people interact,”

Christina Mendora, a master’s student in statistics, was one of many who shared their stories within the breakout discussion sessions.

Nearly 80 people joined in to discuss diversity issues in STEM fields Feb. 1 at UW.

Students at UW’s College of Engineering and Applied Science have received multiple awards. The group received the following awards in 2015 from the national office:

• Certificate of Commendation (given to Kobbe for outstanding work and dedication to the UW student chapter).

The UW team took part in the 2015 ASCE Student Conference (outstanding chapter of ASCE, exemplary community service),

The 2016 David and Jade Walsh Graduate Excellence Fellowship recipient is Emily Beagle of Sheridan, Wyo. Beagle is a mechanical engineering Ph.D. candidate. Litt will receive a $10,000 fellowship to support his dissertation project focused on internationally oriented topics related to energy security and international security, international environment, natural resources or natural development.

Litt’s project, titled “Eutrophication and Hydrochemical Runoff Characterization and Modeling Across Multiple Land Covers in Panama,” evaluates how Panama Canal operations, which depend entirely on secure freshwater supplies to its reservoirs, are sensitive to land management decisions. Beagle’s Nicholson Award from The Center for Global Studies-School of Energy Resources will support a $10,000 graduate fellowship for coursework, research and career goals focused on developing human resources and the know-how required to solve critical energy and natural resource challenges faced by society.


Nearly 80 people joined in to discuss diversity issues in STEM fields Feb. 1 at UW.

The kick-off event for Martin Luther King Jr. Days of Dialogue (MLKDOD) was deemed a success,
UW Contingent Selected For Prestigious Engineering Competition

By Andy Chapman

The hard work of a group of engineering students was rewarded recently, as it was announced that a University of Wyoming team was selected to participate in a national rover design and demonstration competition. For the first time in the event’s history, a UW team was invited to participate in the 2016 RASC-AL Exploration Robo-Ops Competition, sponsored by NASA and the National Institute of Aerospace. The 2016 event will be hosted May 24-26 at NASA’s Johnson Space Center in Houston, Texas.

The team consists of UW engineering students including Robert Ressler, Burlington, VT; James Lamb, Mountain View, Wyo.; Caleb McCormick, Lewellen, Nib.; Brian Moore, Littleton, Colo.; Matthew Love, Laramie, Wyo.; Kent Scarcinc, Lander, Wyo.; Richard Yang, Laramie, Wyo.; Sean O’Leary, St. Charles, Mo.; Reda Al Momen, Dammam, Saudi Arabia; Arron Harms, Evergreen, Colo.; Ross Petrutia, Boise, Idaho; Gowthaman Prabhu, Tamil Nadu, India; Mohammed Beschah, Al-Hassa, Saudi Arabia; and Nassar Alawami, AlQatif City, Saudi Arabia. Faculty involved in the project include Ruben Gamboa, professor of computer science and project faculty advisor; Kevin Kilty, associate lecturer of mechanical engineering; and David Whitman, professor of electrical and computer engineering.

Team organizers also pointed to the work of the team that embarked on the project in 2014, which includes Carter Schultz, Joshua Bailey, Thomas Bilodeau and Kyle Cox, all of whom studied mechanical engineering. “The seniors involved in this project last year did quite a good job on chassis selection and proposal generation,” Kilty says. “They deserve some credit for this as well.”

The UW rover beat out two incumbent teams with an innovative chassis and suspension design that mimics the mechanics of movement of a saltwater shrimp. The seven-wheeled rover will be the first submission with an odd number of wheels in event history. Event judges took notice of the unique nature of the rover’s power architecture.

In an event billed as “obstacle course meets scavenger hunt,” students are tasked to form a multi-disciplinary squad to build a planetary rover prototype that can perform competitive tasks in field tests. Qualifying teams receive a $10,000 award to facilitate full participation, including expenses for rover development, materials, testing equipment, hardware and software.

By Andy Chapman

If everything goes to plan, folks soon may be able to get some exercise and charge up electronics at the same time.

The University of Wyoming College of Engineering and Applied Science student team of Alex Howell (Morriil, Nib.), Daylene Roitsch (Colorado Springs, Colo.) and Tyler Waller (Lingle, Wyo.) have designed a device that converts the mechanical energy from a stationary bicycle to electrical energy used to power everyday electronic devices.

According to the group’s project proposal, “The purpose of this bicycle powered charging system is to power a single, removable 12-volt storage battery pack with capabilities to distribute charge to various devices at once.” The system will consist of a bicycle provided by the user, a specified trainer designed in order to reduce frictional resistance to the power output, a chain system to connect the bicycle to the charging system, a generator, a storage system and a computer display to inform the user of the status of the user’s workout and the storage system.

The group found several challenges during the project, including the initial idea to use a mobile bicycle to power the devices. “Looking further into this method, it was realized that a charger attached to a moving bicycle would have to be small and lightweight to avoid hindering the rider,” the design team wrote, adding this had already been addressed by a commercial charger.

After it was determined a stationary bicycle was the best option, the group found a charger could be any size necessary to produce the voltage desired without significantly increasing the pedaling load for the user. The design team then determined the most effective way to harness the mechanical energy from the bike by the trainer. Use of the wheel was avoided as that would complicate the installation for the user and the tire would have to be removed from the wheel in order to implement the use of a belt.

By Andy Chapman

Kaidi Sun feels right at home in Laramie, Wyo.

She’s grown comfortable with the small-town atmosphere, the mountain setting and the easy pace of the town. It’s hard to believe that just a few years ago, she was studying and living in one of the world’s most populated cities.

Sun currently is in her second year of a Ph.D. program in chemical engineering at the University of Wyoming. She finished her bachelor’s and master’s degree in chemical engineering at China University of Mining and Technology in Beijing.

Current population estimates put Beijing’s population at around 20 million people. But something about UW intrigued her, and after contacting Marhong Fan, a professor of chemical and petroleum engineering, she arrived in Laramie in August 2014.

“I’m very curious about new things. I thought to look outside and see what was going on in another part of the world,” she says.

Now in a town of roughly 31,000, she has found a place to excel. Under Fan’s direction, Sun studies the plausibility of using natural gas as an alternative to petroleum.

Natural gas is a very abundant fossil fuel and is widely distributed around the world. According to industry projections, current reserves of natural gas are significantly more expansive than those of petroleum. Natural gas seems to be the most promising alternative to replace oil and produce both liquid fuels and other value-added chemicals.

Methane molecules are very stable, so catalysts are necessary to produce reactions and create energy. They need to be readily available and inexpensive for use in industry. “UW is a good place to come and study, and Dr. Fan’s group is very good,” she says. “Each professor is very helpful and likely to answer my questions. That’s why I chose the University of Wyoming for graduate school.”

So far, she and the other members of Fan’s group have made breakthroughs, but many challenges remain. Fan credits hard work as a reason the group will be successful.

“They have made significant progress in their research projects, and I am proud of Kaidi and all the other members of this research group,” Fan says. “Without their keen and highly appreciated intellect, what we have achieved to date in this group would not have been possible.”

Pedal To Power Thanks To CEAS Student Design Team

By Andy Chapman

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The group found several challenges during the project, including the initial idea to use a mobile bicycle to power the devices.
By UW Institutional Communications

University of Wyoming researchers have received a $600,000 grant from the U.S. Department of Energy (DOE) to develop a way to recover rare earth elements from the ash of Wyoming’s Powder River Basin coal. Led by Maohong Fan, a UW School of Energy Resources (SER) professor in the College of Engineering and Applied Science’s Chemical and Petroleum Engineering departments, UW’s project will receive funding from DOE’s National Energy Technology Laboratory to support the recovery of rare earth elements from coal and coal byproducts.

“The overall objective of the new DOE project is to create a pollution-free and cost-effective technology for recovering high-value rare earth elements from coal and coal ash,” Fan says. “We want to make coal a very valuable resource for engineering a variety of much more treasured carbon, hydrogen, metal-based and other products.”

Rare earth elements are a series of chemical elements found in Earth’s crust. Due to their unique chemical properties, they have become essential components of many technologies spanning a range of applications including electronics, computer and communication systems, transportation, health care and national defense. The demand and cost of rare earth elements have grown significantly over recent years, stimulating an emphasis on economically feasible approaches for their recovery. The potential to recover rare earth elements from coal is significant for Wyoming, the nation’s No. 1 coal producer.

“UW is a leading institution in the U.S. in converting coal to highly marketable and near-zero-carbon-footprint materials due to the state’s strong support and the efforts of our faculty and students,” SER Director Mark Northam says.

UW’s project aims to design, develop and test a three-step, bench-scale extraction process that will use carbon dioxide and ferric chloride under supercritical conditions to recover rare earth elements from Powder River Basin post-combustion coal ash.

“This research is a great example of research envisioned in Wyoming’s Tier-1 Engineering Initiative,” says Michael Pshko, dean of the College of Engineering and Applied Science. “Our researchers are among the world’s leaders in developing new technologies that will benefit Wyoming’s economy and provide solutions to some of the world’s biggest challenges.”

By UW Institutional Communications

Maohong Fan analyzes data in his advanced coal lab.
Chris Rumple, a graduate student in mechanical engineering, will work on a project to establish hydroelectric dams in rural Indonesian villages.
A Ph.D. candidate in the Mechanical Engineering Department at the University of Wyoming, he has decided to put his knowledge to work, even if it means delaying his college education for a while. As part of a Fulbright Program grant, Rumple arrived in Indonesia in January 2016 to help villages develop sustainable power sources. Because Indonesia’s government hopes to develop new sources of energy production, Rumple will travel to rural settings in Java and Sulawesi. He will help install and improve micro-hydropower dams over small streams, which power local industry like coffee production. The objective of this project is to facilitate development by way of economic empowerment.

And all it took was learning the Bahasa Indonesia language, planning to be abroad for a full year and traveling 9,290 miles – the distance from Laramie, Wyo., to Jakarta, the nation’s capital.

Originally from Harrisburg, Pa., he graduated from Pennsylvania State University with undergraduate and master’s degrees in aerospace engineering, with an emphasis in wind energy. He wanted to become a pilot as a young man, but those plans were derailed when he was diagnosed with Type-1 diabetes. He shifted his focus, and discovered an interest in the motion of fluids in both wind and water energy. But after earning his master’s degree, he wasn’t sure where he wanted to do this.

“You could work for a big company on some wind-energy project and the result of that would help people, but I wouldn’t see and feel it,” Rumple says. “I wanted a little bit more than that. I looked into industry, but I didn’t like the atmosphere. I wanted to make memories, not just make money.” And that’s what brought him to UW. Jonathan Naughton, professor of mechanical engineering and director of the Wind Energy Research Center, invited him to visit in January 2015, and Rumple came to campus in June 2015.

“What attracted me to UW is it is very similar to Penn State, and Jonathan Naughton had a great reputation with the professors with whom I had worked,” Rumple says. “I said, ‘What can I do for you?’ He flipped it around and said, ‘No, what can I do for you?’ He looks for students who are both self-starters and can also work within a team setting. I liked that philosophy.”

That team concept was not lost on Rumple. An avid rugby player, Rumple also coaches for the UW club team. His tenacity on the pitch...
Rumple studies language at the Center for Southeast Asian Studies Indonesia with instructor Melisa Fransiska. (Photo courtesy of Chris Rumple)

also helped him earn his Fulbright grant. He had submitted proposals to the group twice in prior years, only to be rejected. The third time, however, was the charm as he was named a Fulbright Scholar in 2015.

“The overall goal of my Fulbright is to develop relationships between UW and the Agriculture Institute of Bogor (IPB) in Indonesia,” he says, adding he hopes one day to bring students from Indonesia to UW and vice versa. Additionally, he’ll serve as a liaison for UW’s chapter of Engineers Without Borders.

Rumple will mentor a team of students from IPB on methods of design, project management and team dynamics. He’ll work with them to help communicate with the village. The entire process takes about six months, during which the team will introduce the concept to the villagers and build the dam. Turbine designs in these contexts can be inefficient, so Rumple will be on hand to innovate prior designs that can be produced in an economically efficient manner while publishing these innovations.

“We live in a global world,” Naughton says. “When the Paris climate summit talks about Indonesian islands being threatened by rising waters, it can seem pretty remote to someone living in Wyoming. By spending time in Indonesia, Chris will develop a knowledge of that part of the world that is hard to come by unless you live there.

“While there, Chris will work on the development of renewable energy projects. Although the challenges can be quite different in different parts of the world, the efforts to diversify energy sources are not so different than what we are trying to do here in the U.S. Chris will spend part of his time looking for areas where collaborations between groups here at UW and IPB may be beneficial to both groups.”

Rumple believes successful application of this project could serve energy systems in the U.S. in the quest for innovation.

“Getting it to work over there will help push us over here to try new ideas,” Rumple says. “The strength of the Fulbright program is not in its ability to award grants. Its strength comes from your ability to reach for higher. It opens the door to young, hopeful minds who are trying to make a difference.”

In Rumple’s world, every day is an opportunity to make a difference. It’s rare to see him without a smile on his face, walking briskly to class or to do research.

“Chris is incredibly enthusiastic about his work,” Naughton says. “When he has a project to do, he runs at it with all his energy. As a result, he is very effective at getting things done.”

That’s evident with his research on turbulence at the UW Wind Energy Research Center. He helped produce a device called an active grid, finishing the final design in less than six months. This grid will be used to tailor turbulence so that realistic experiments can be carried out in a wind tunnel setting.

“When operational, the active grid will give us unique capability in our wind tunnel,” Naughton says. “The active grid will allow us to add turbulence to the wind tunnel flow so that we can mimic systems under conditions that are similar to those found in the real world. For instance, we will look at wakes like those behind wind turbines in the presence of turbulence like that in the wind. Similarly, we can test airfoils in flows with different types of turbulence to see how they respond.”

For now, the active grid will be built while Rumple is overseas. It will be waiting for him when he returns from Indonesia, and he’ll no doubt be a little more experienced and worldly.

“The challenge of it is going to give a really good experience to become a world-class collaborator,” he says. “I’m of the opinion that I’m not important—it’s what I do that’s important.”

The FULBRIGHT PROGRAM

The Fulbright Program is the flagship international educational exchange program sponsored by the U.S. government and is designed to increase mutual understanding between the people of the United States and the people of other countries.

ENGINERS Without Borders

Rumple will serve as the UW liaison for EWB, and his work in Indonesia aligns with the philosophy of the chapter’s goals.

• UW is one of more than 300 student chapters of EWB-USA.
• Membership is open to all UW students, not just those in the College of Engineering and Applied Science.
• The chapter’s mission is to “help disadvantaged communities improve their quality of life through implementation of environmentally and economically sustainable engineering projects, while developing internationally responsible engineering students.”
• Participating students pay dues and fees totaling about $25 per year; other costs are covered by fundraising activities.
• Rumple has worked with UW’s Zach Witters, a senior in chemical engineering and a member of the EWB chapter at UW. They are pursuing funding opportunities for Witters to go to IPB for the summer and fall to conduct research to make biodiesel from the oil from the jatropha seed.
NOT DONE LEARNING

A professor of practice shares his knowledge but also gains an education.
Despite retiring from industry in 2014, Bill Bellamy knew he still wanted to contribute to the profession.

So instead of spending his days relaxing at home with family, fishing or golf, he decided to stay in the game. Bellamy now serves as a professor of practice in the College of Engineering and Applied Science, the first to be appointed to such a post in the college. He joined UW’s faculty ranks in 2013.

Before that, he was the senior vice president at CH2M Hill, finishing his 30th year in 2014 when he retired. CH2M is an environmental and engineering consulting service, which allowed Bellamy to work on every continent except for Antarctica. In his younger years, he served in the Army, worked at Texaco, lived in Saudi Arabia and worked for Aramco. Suffice it to say, he knows the ins and outs of municipal and industrial global environmental systems.

With all that knowledge, it felt right to share with the next generation of engineers, so he tried his hand at teaching.

“Instead of teaching a course about theory, I give my students a problem, split them into teams and it’s up to them to figure it out.”

In classes like the first semester Introduction to Engineering, he tasks his students with finding solutions to issues like drought in California.

“They came up with solution sets, even as freshmen, to solve the problem,” Bellamy says. “It gave them an idea of how to work in teams, present solutions, writing and research in a real-world environment. These are the things that are important in engineering. I’m not asking them to do anything they won’t do professionally.”

He believes UW is on the forefront of promoting innovation in the college’s programs such as the VISTA initiative in Civil Engineering, adding Wyoming is close to, if not leading the way in the area.

“Students would spend two years in a course of study but never see engineering,” he says. “They didn’t understand how all the theories applied. These courses take what you’re learning along the way and start applying it.”

That sort of instruction helps complement what the academic faculty provide.

“Professors of practice like Bill help bring in industry expertise in everyday activities at the college,” Dean Michael Pishko of the College of Engineering and Applied Science says. “They want to give back to the university. They give back through teaching courses that have heavy industry relevance versus just theory. They help bring in industry knowledge in what actually happens in the real world.”

The notion of passing on applicable, real-world knowledge has spurred Bellamy to compile short instructional videos to replace traditional lectures, and use class time for movement and hands-on application. He, along with Department Head of Chemical Engineering Dennis Coon, will cover subjects like economics, problem solving and other core needs to students.

“Most people think they know about problem solving, but my guess is very few people truly understand how they make a decision,” Bellamy says. “Our approach is using analytical techniques based on rational modeling.”

Coming from outside academia has allowed him to teach in a different manner, which could benefit students in the long term.

“The university benefits from being able to teach in those applied areas,” Bellamy says. “Having practiced it for 30 years, I’ve got a good feel for what goes into it.”

For me, it keeps me active and learning new subjects... I’ve always believed in lifelong learning.
Civil and Architectural Engineering Lecturer Jon Gardzelewski and his team have developed a series of zero-energy home plans that are becoming available to the public. The homes are designed to be more energy efficient and able to withstand the elements of Wyoming weather. Here, Gardzelewski inspects a homeowner construction in Laramie.

Civil Engineering Professor Khaled Ksaibati, right, and civil engineering student Kristen Debler conducting gradation testing on aggregate from a gravel road in Teton County for a study.

Two groups in the University of Wyoming’s College of Engineering and Applied Science have made it a mission to improve two key areas: housing and roadways.

They are headed up by CEAS faculty with a passion for improving lives in the state of Wyoming.
By Micaela Myers,
UWyo Magazine Editor

Zero-Energy Housing
Folks looking for a break on energy costs have several options at their disposal, but a smart move would be to enlist the assistance of BERG—UW’s Building Energy Research Group and Jon Gardzelaewski. According to the Solar Energy Industries Association, the U.S. solar industry grew 34 percent in 2014. But Gardzelaewski, an assistant lecturer in the Department of Civil and Architectural Engineering, believes solar panels often are just an afterthought in the design of efficient homes.

“We’ve seen so many examples of solar or net-zero houses where someone has taken a house that wasn’t really designed to fit the site or the climate, and then they throw on solar panels and call it a ‘green’ house,” says Gardzelaewski, who heads up the group. “Being architects and having a really serious appreciation for aesthetics, we are out to prove that if you’re considering solar panels and making your home a showcase, zero-energy house, the home should celebrate that.”

Energy savings are no small factor in determining sites of buildings and overall costs. “We’d been approached by people around the state to look at ways they could save energy in their buildings,” he says. “That was a serious motivation for forming this group—we could tackle big projects, be organized and make our contribution.”

The group also wants to produce a catalog of Net-Zero Energy Homes for Wyoming.

“The goal is to create home designs that can meet just about every need that we think people in Wyoming will have,” he says. “Our goal is to give the designs away, and then people can modify them to fit their lot and meet their needs.”

“We developed a few models and started presenting them to builders, real estate people, solar people—everyone in the industry—to get feedback. The designs are continually being revised to really try to get a perfect set of home plans for people in Wyoming that are going to be zero-energy, that are going to be affordable and that are architecturally competitive.”

Gardzelaewski says Coloado homes with “green” features have added value, and this will come to fruition when homes are designed with these aspects in mind. Gardzelaewski and his colleagues want to help Wyoming residents and builders with projects on a regular basis and hope to strengthen outreach going forward.

“Offentimes through class or independent projects, we’ll set up a student with someone who has approached us,” he says. “They’ll work with the person and give them lots of design options. We teach our students how to use computer modeling and building information modeling, so people can get a really good visualization and understanding of a design.”

Soon, Wyoming could be part of the efficient home and building market.

“For people who have building needs, we are really excited to talk to them,” Gardzelaewski says. “We’ll never compete with local professionals, but we recognize we can help with a lot of this detailed simulation work that local professionals just aren’t doing yet. We’re hoping to make stronger connections with the design teams in the state too.”

Getting There Safely
Residents of Wyoming know the state’s geography necessitates driving long distances. But nowadays, you’re likely to encounter more safe and efficient roadways, bridges and work zones, thanks to the Wyoming Technology Transfer Center, which is sponsored by the Federal Highway Administration in cooperation with UW, the Wyoming Department of Transportation (WYDOT), and Wyoming cities and counties.

The center, which has existed for more than 20 years, is housed within UW’s College of Engineering and Applied Science and Khaled Kuibati is the group’s director. He believes that partnerships are key to the center’s success.

“The main objective of the center is to do technology transfer for the transportation community in the state.”

“The main objective of the center is to do technology transfer for the transportation community in the state,” says Kuibati, who is a professor of civil and architectural engineering. “We do lots of trainings around the state, and attendees include people from consulting agencies, contractors, WYDOT personnel, as well as road and bridge departments from cities, towns and counties. We want to make sure that our partners in the state are aware of the latest technology and that we help them through the implementation of that technology.”

Gregg Fredrick, WYDOT chief engineer for engineering and planning, says research, studies and training continue to be effectively implemented in many of the local transportation agencies across the state.

“This synergy, fostered by Professor Kuibati, has a positive effect on the safety of the local roadways,” Fredrick says. “It provides local agencies access to highway technology and engineering knowledge that assists in the maintenance of their transportation infrastructure and enhances the local agencies’ expertise.”

Several Wyoming counties have used the center to learn about dust control on county dirt roads, sign reflectivity compliance, speed limits, certifications and asset management for paved roads. But improving safety is one of the Wyoming Technology Transfer Center’s main goals.

“WYDOT has contracted with the center to assist counties in evaluating the safety of the county roadways, to develop a strategy to correct the safety deficiencies at high-risk locations, and to assure that the project proposals meet the federal and state requirements for federal funding,” Fredrick says. “Cost-effective improvements are selected and funded, and these often consist of installing curve warning signs, guardrail, passing lane shoulders, roadside delineation and others.”

One study the center has underway with the Wyoming Transportation Safety Coalition and WYDOT involves looking at trucks crashes in recent years on some of the state’s main highways, including I-80, I-25, I-90, WY-59, US-30 and US-26.

“We are also looking at the citations the Wyoming Highway Patrol issues on those highly traveled roadways,” Kuibati says. “We are trying to correlate citations to crashes. The objective would be to help the Wyoming Highway Patrol in identifying hot spots on our highway system where additional enforcement might help in reducing crashes. It’s very well known that safety. We’re helping with the three Es: engineering, enforcement and education.”

Another example of the center’s work to improve safety involves speed limit standards. Several years ago, there were no standards for setting speed limits on local roads. Additionally, the center recently studied the state’s paved county roads and helped develop a management system in cooperation with Wyoming counties, the Wyoming County Commissioners Association, WYDOT and the Federal Highway Administration.

“We have about 2,400 miles of county roads,” Kuibati says. “Some were built well over 40 years ago, and we never really allocated the proper resources to maintain them and upgrade them to the appropriate level. Such a management system will be extremely beneficial in establishing funding needs for local paved roads so that they can service the driving public as well as industrial or energy traffic.”

- Jon Gardzelaewski, CEAS lecturer
By Andy Chapman

Volunteering in the local community has become easier, thanks to the work of a University of Wyoming graduate.

Brad Kovach developed www.ServiceSpark.org as a way for residents of Albany County to log on and see what efforts are being undertaken by community organizers and find opportunities to volunteer.

Kovach came to Laramie in 2011 to pursue a degree at the College of Engineering and Applied Science. He also began volunteering at the United Way of Albany County at that time. Originally from Afton, Wyo., he came to UW after receiving an associate’s degree in 2010 in computer information systems at Western Wyoming Community College in Rock Springs, Wyo.

In 2014, he earned his bachelor’s degree in computer science and computer information systems at the University of Wyoming. W e continue to work on ServiceSpark, which has evolved tremendously. W e’re creating products we want to use. We get excited about it. I’m always amazed that our product gets into people’s hands and they absolutely love it.

Along with his wife and two children, Reed lives in Silicon Valley in Cupertino, Calif.

I knew all these places by name because I had seen the press releases. To drive around and see where the products I use are made, there’s a bit of an ‘awe’ factor,” he says. “But I’ve never felt in any way that I was disadvantaged for having come from Wyoming. It’s a badge of honor I went through school and graduated without any student debt. I have co-workers with six figures of student debt because they went to a ‘prestigious’ university.”

Reed helped create prestige for the college. Because UW didn’t offer a computer engineering degree at the time, the transcripts for his degree in electrical engineering with computer science were used as blueprints to create the new program.

By Andy Chapman

Just months after beginning his post-college career, Colter Reed found himself without much direction in his life. Despite graduating with honors from the College of Engineering and Applied Science at the University of Wyoming in 2000, Reed had no job offers or internships lined up after graduation. As a last resort, he moved to Colorado Springs and secured a part-time working for MCI WorldCom. But the company laid off about 250 developers as it descended into bankruptcy.

“There were developers with 20 years of experience who were taking significant pay cuts just to find another position, so for someone who was nine months out of college, it was not a good position to be in,” he says.

After the job disappeared, he looked for ways to stay relevant in the industry. He began volunteering on an open-source project for an instant messaging app. After the founder approached him about taking it over, he was leading an international group of developers.

His professional journey took him back to the place he had grown up, and for two years, he worked in Rock Springs, Wyo., as a web administrator. In 2006, a friend persuaded him to take another job—as a software engineer with Apple.

“I couldn’t say yes fast enough,” Reed says. “We’re creating products we want to use. We get excited about it. I’m always amazed that our product gets into people’s hands and they absolutely love it.”

By Andy Chapman

When times are tough, Hank Swartout finds solutions.

The price of oil has ebbed and flowed over the years, but the companies that get through the rough patches find ways to make it work. Swartout, a University of Wyoming graduate in petroleum engineering in 1977, devised a plan to get the most out of his company in an economic downturn.

In the late 1980s and early 1990s, the demand for Canadian drilling was drying up. But Swartout led Precision Drilling on an acquisition charge, buying up assets when others were retreating. According to MNP’s Oilfield Service News, “Under the leadership of the soon-to-be legendary Hank Swartout, Precision went on an acquisition and consolidation binge not likely ever to be duplicated.”

“Obtaining my petroleum engineering degree from the University of Wyoming has had a great impact on my professional career,” Swartout says. “It provided me with a solid foundation of knowledge, communication and problem-solving skills. It also helped me gain a greater world view that empowered me to stay competitive in the oil and gas industry with strategic decision making and risk taking. I gained greater confidence from my education to pursue my career and take the risks that I did, which in turn helped me become a strong leader in the industry and proud of my accomplishments.”

Under the direction of Swartout, Precision acquired nine drilling companies from 1987-2005, becoming the largest drilling contractor in Canada’s history in the process. It also invested in several oilfield services, or OFS companies, which provided a vast and diversified portfolio and enabled it to consolidate businesses to stay financially solvent. Swartout’s aggressive moves were the avenue by which Precision reduced costs and also became a bank of sorts, assuming debts of the companies it acquired and subsequently paying off lenders.

“What the OFS market needs today is another Hank Swartout,” Oilfield Service News says, going on to state “that mold is surely broken” and “the Canadian oilpatch can only ever create and support one guy like Humble Hank.”

By Andy Chapman

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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. Michael H. Backsen  
MS ’68 – Buena Vista, Colo.

Mr. David N. Barclay  
BSEE ’71 – Longmont, Colo.

Dr. Donald L. Bender  
BSCE ’53 – Spokane, Wash.

Mr. Jon M. Bergstrom  
BSEE ’66 – Tehachapi, Calif.

Mr. Duane J. Fehringer  
BSCE ’72 – Avon, Colo.

Mr. Samuel T. Hirasawa  
BSME ’53 – Torrance, Calif.

Mr. James A. Leppink  
BSPE ’57 – Fairview, N.C.

Mr. Kenneth C. Miller  
BSCE ’54 – Zion, Ill.

Mr. Richard B. Phillips  
BSEE ’52 – Galesburg, Ill.

Mr. Franklin D. Shultz  
BSPE ’61 – Powell, Wyo.

Mr. Scott H. Taggart  
BSEE ’49 – Madrid, Spain

Maj. John M. Vice  
BSEE ’68 – Columbus, N.C.

Col. Henry S. Nakabayashi  
BSME ’42, MS ’43 – Palo Alto, Calif.

Mr. Benjamin L. Ward  
BSMI ’04 – Casper, Wyo.
Connecting With Wyoming’s Youth

By Andy Chapman

While appealing to young people about science, technology, engineering and mathematics is no easy task, Teddi Hofmann is always up for the challenge. She serves as the K-14 outreach coordinator for the College of Engineering and Applied Science. The position was created in 2015, but candidates needed certain qualifications to even be considered. “We needed someone dynamic and energetic to help us connect with students at all levels, whether we’re talking about grade-, middle- or high-school students,” CEAS Dean Michael Pishko says. “That means developing connections with teachers, with parents and with the students themselves. That’s Teddi’s role, and she does a fantastic job of bringing in those groups into the engineering fold and helping us communicate the value of these industries, so it’s important we create a workforce who wants to live and work in Wyoming. Our mission at the college should be to produce these students and help the pipeline. We want to see many more Wyoming students go into engineering.”

That’s where Hofmann hopes her efforts are paying off. The strengths of the college have allowed her to take off in her new role as K-14 outreach coordinator. “I receive amazing support from my supervisors, Steve Barrett and Dean Pishko, as well as from Sarah Ramsey-Walters from the School of Energy Resources and the amazing WYSTEM group on campus. I’ve come on board with a lot of existing programs and have been immediately brought into the loop and given responsibilities,” Hofmann says. “The staff and faculty here at UW trust my abilities and are very encouraging. If I have a new idea, I’m often able to run with it.”

Barrett has seen her expand the reach of the CEAS. “She brings a wealth of related education and experience to the position,” he says. “She hit the ground running and has developed and coordinated a number of outreach events for the college.”

Pishko stresses the K-14 outreach is “not a one-step process” pointing to elementary school activities as the foundation, continuing through high school with programs like the annual Engineering Summer Program (ESP) at UW. “The impact of bringing in high school juniors and having them spend a week here in the summer for ESP would not be as great as if you continually engaged them from grade school through high school,” he says. “It builds up a momentum for them to see what programs I could support while identifying other areas of need.”

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The programs in place are geared toward getting students as young as kindergarten to engage in activities that will help them see their potential. “Engineering is very hands-on, and at the very core, requires kids to use their problem-solving skills,” she says. “I think kids often times just need to be provided with the opportunity to realize their potential as an engineer so that they can start saying ‘Yes’ to things versus ‘I’m not good at that.’ It’s about opening that door, so if there is an interest, they can pursue it.”
**Why Engineering at UW?**

- **$55,000**
  Average starting salary for engineering graduates

- **$5,475**
  Average amount of scholarship dollars per engineering student

- **91%**
  Percentage of classes taught by engineering professors

- **54%**
  Percentage of UW students who graduate debt free

**What Can I Study?**

- **Engineering**
  - Architectural
  - Bioengineering
  - Chemical
  - Civil
  - Computer
  - Electrical
  - Energy Systems
  - Mechanical
  - Petroleum

- **Applied Science**
  - Atmospheric
  - Computer

**Employers of Our Graduates**

- Apple
- Arch Coal
- Baker Hughes, Inc.
- Bechtel Marine Propulsion Corporation
- Black Hills Corporation
- BP
- Cloud Peak Energy Resources LLC
- ConocoPhillips
- EchoStar Corporation
- EMT Technologies, Inc.
- Encana
- FMC Corporation
- Google
- Halliburton
- Hewlett Packard (HP)
- Level 3 Communications
- Marathon Oil
- Monsanto
- Puget Sound Naval Shipyard & IMF
- Siemens
- Solvay Chemicals
- Trihydro Corporation
- Union Wireless
- WLC Engineering, Surveying & Planning

**UWYO Facts & Stats**

- **1800** Undergrads
- **250** Grad Students

**Supporting Student Success**

- Free Tau Beta Pi Tutoring
- Free STEP Tutoring
- Freshman Power Groups
- Engineering Dorm Fliers
- Dedicated Career Services Staff
- FE Exam Sessions

**Spring 2015 Graduates Came From 25 Different Countries**

- **20:1** Student-to-faculty ratio in College of Engineering

**Average GPA of Incoming Engineering Freshman at UW**

- **3.63 GPA**

**Average Class Size for Engineering Courses at UW**

- **25**

**Average GPA of Our Graduates**

- **3.63 GPA**

**Sample**

**Colleges of Engineering & Applied Science**

- One of Outdoor Magazine’s Top 15 Outdoor Adventure Colleges
- Centrally located
  - 2 hrs from Denver
  - 20 min to Vedauwoo Recreation Area
  - 35 min to ski at Snowy Range
  - 15 min to cross country ski
- Over 30 professional and technical societies for engineering students to join
  - Plus 250+ campus student organizations & clubs

**Special Programs**

- Free Tau Beta Pi Tutoring
- Free STEP Tutoring
- Freshman Power Groups
- Engineering Dorm Fliers
- Dedicated Career Services Staff
- FE Exam Sessions
The level of rigor that the professors expect of you is very high, but they are always fair. The amount you know is always reflected in your grade. But you have to earn it.

– Bryce Fiore, Architectural Engineering ’16