

# FORESIGHT

UW COLLEGE OF ENGINEERING AND APPLIED SCIENCE

SPRING 2015, Volume 40, No. 2



## COLLABORATION --- FOR THE GREATER GOOD

New Leadership • Finding Wealth in the Wind





“The two things that have caused me to be successful are the work ethic and values that go with the state of Wyoming and the education I got there.”

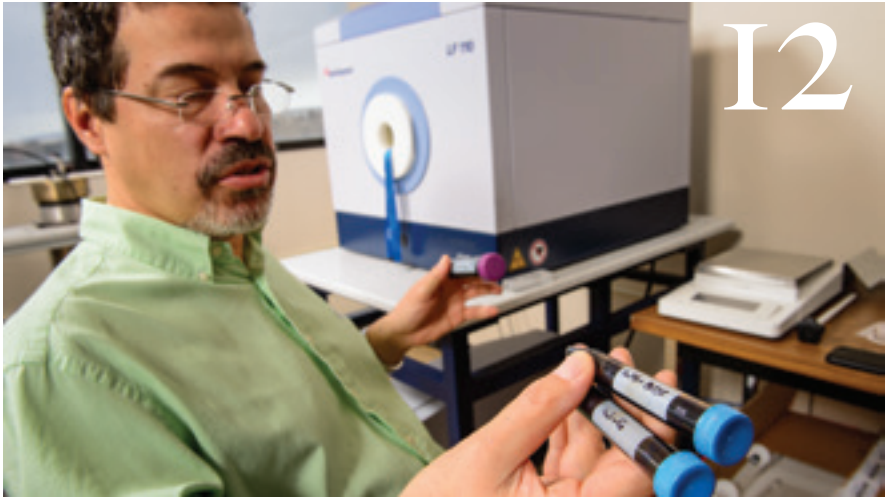
Greg Hill, President, Hess Corporation

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- Find out why **89%** of our graduates earn starting salaries greater than **\$50,000** annually.



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On the cover: Michael Pishko asumed duties as dean of the University of Wyoming College of Engineering and Applied Science in March 2015.



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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.

## Adding Pieces to the Puzzle

You might notice some new faces roaming the halls of the Engineering Building in the coming weeks.


The University of Wyoming College of Engineering and Applied Science upped its national profile with the addition of Michael Pishko as its new dean. He took over duties in March 2015 and brought with him years of experience as an engineer, a professor and an administrator. Prior to UW, he served as the director of the National Center for Therapeutics Manufacturing at Texas A&M. He’s an impressive leader, and his vision will lead the college to unprecedented heights.

There are also two new members of the engineering team. I, along with graphic designer Patrick Owen, make up the marketing team responsible for promoting the great events and people associated with the CEAS. I came to the campus side in January 2015 from UW Athletics, where I served as a sports information director for four years. Patrick was a two-year veteran of institutional marketing before moving to his current role designing publications for engineering.

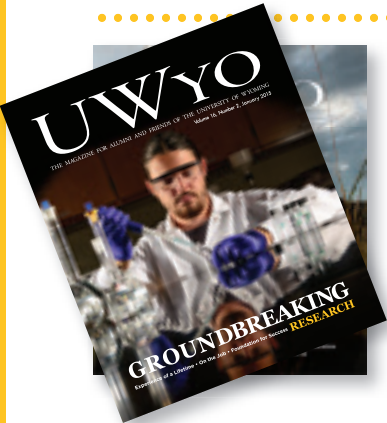
I’ve met several members of the college’s staff and faculty, and look forward to meeting many more in the coming months. And things are moving fast. Facilities like the Michael B. Enzi STEM Facility will open their doors soon, and projects like the High Bay Research Facility have begun to progress. The Tier-1 Engineering Initiative is taking shape before our very eyes, and the future has never been brighter.

There’s exciting things going on in the CEAS, and we can’t wait to share those experiences with the people who truly care about the direction of the college.

Sincerely,



Andy Chapman  
Editor, *Foresight Magazine*



Stay tuned for the May issue of *UWyo Magazine* with a special section devoted to student excellence!

Subscribe today!  
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## Introducing the New Dean



Michael Pishko, an accomplished chemical engineer and experienced administrator at Texas A&M University, stepped into his role as dean of the University of Wyoming’s College of Engineering and Applied Science in March 2015.

Pishko, a professor of chemical engineering and biomedical engineering, served as director of the National Center for Therapeutics Manufacturing at Texas A&M since 2009. He also served as head of that university’s Department of Chemical Engineering for five years from 2007 to 2011.

“We have a duty to the state of Wyoming to fill the goals of the Tier-1 Initiative—to the citizens of Wyoming and the industries that employ them,” Pishko says. “That’s something we need to spend more time on, engaging in innovative research programs that directly benefit the state and finding ways of getting value-added products out of resources besides just energy. There are lots of things that can be done to create new economies in Wyoming.”

His experience at Texas A&M included leading workforce development and education programs

for the Texas A&M Center for Innovation in Advanced Development and Manufacturing. His role with the National Center for Therapeutics Manufacturing included work on academic, workforce training and K–12 outreach initiatives.

Pishko also has worked extensively with private industry and himself holds numerous patents in the field of biomedical engineering.

Before going to Texas A&M, Pishko was on the chemical engineering faculty of Pennsylvania State University. He received his Ph.D. (1992) from the University of Texas at Austin, and his master’s (1987) and bachelor’s (1986) degrees from the University of Missouri-Columbia, all in chemical engineering.

“We’re delighted to have someone of Dr. Pishko’s profile and background assume this important leadership position at UW,” UW President Dick McGinity says.

## Q&A

**What was it about UW that drew you to this position?** “Tier-1. It represents an enormous investment in engineering education, research and outreach in the state. It has the potential to create a world-class engineering school in all aspects. It’s an incredible opportunity to have a huge impact. That’s why I’m here.”

**What are some of your initial goals?**

“The top priority is to re-establish the petroleum program and get it up to full strength. We need to hire faculty and professors of practice to bring our program back up to national prominence.

“Second, but no less important, is to get our engineering building built. We want it designed in a way that breaks the mold from traditional academic buildings where you have the silos in which people don’t interact. The overarching theme behind this is collaboration. We want spaces where students collaborate with each other, faculty or with industry. We took a look at a lot of top research and education facilities around the country to inspire us to design a world-class space for doing great work.

“The third priority is to create new student learning experiences. That includes enhancing our internship programs for students to go out and work in industry, whether it’s in Wyoming or across the world. This is an increasingly global environment. It helps to get students exposed to that new environment and we’ll create those kinds of programs where they can spend time abroad so that they’re much better prepared.”

**What’s a fun fact about you?**

“I was the only person who tried out for choir in grade school but didn’t make it. I don’t have the pipes.”

**Favorite thing about UW?**

“I love the town and love the university. People here are incredibly friendly and welcoming. There’s a great deal of pride in UW. You see that, whether you talk to grads here or across the nation. It’s amazing to think how successful a lot of them have been. People outside of Wyoming don’t know about UW, but it’s an incredible place and I’m very glad to be a part of it.”



# NEWS & NOTES

## Student Team Wins National Award For Wastewater Design

A University of Wyoming team won the wastewater design category and finished third overall in the Water Environment Federation's (WEF) recent student design competition in New Orleans.

UW won last spring's regional competition in Denver to move on to the national conference.

The team's winning project was "Nutrient Removal at the Robert W. Hite Treatment Facility: A Comprehensive Approach." The team was charged with removing the nutrient phosphorus to a very low level in anticipation of the client's need to meet stringent standards.

As part of their project, the students prepared a binder with proposed design, criteria they considered in selecting their design, an economic analysis of alternatives and an implementation plan. The students gave an oral presentation and answered questions from a panel. UW placed first in the national competition in 2011.

Members of the UW winning team were T.J. Gajda, Kingston, Ontario, Canada; Madison Gaulty, Lincoln, Neb.; Jonathan Herrboldt, Rapid City, S.D., currently pursuing a Ph.D. at the University of Texas-Austin; and Dustin Wheeler, Sheridan.

## High Bay Research Facility Breaks Ground in March



University of Wyoming and state elected officials broke ground March 9 for a new facility that will allow for large-scale, high-technology research in energy and other fields. Construction of the High Bay Research Facility began that day at the site of the project, along North 19th Street north of UW's Animal Science/Molecular Biology Building.

Speakers at the event included Gov. Matt Mead, UW President Dick McGinity and UW Board of Trustees member Dave Bostrom. The public was invited to the groundbreaking ceremony.

The High Bay Research Facility will contain about 90,000 square feet of high-bay and traditional laboratory

space, and affiliated office and meeting areas. The research spaces will be for research into unconventional oil and gas reservoirs, part of UW's Tier-1 Engineering Initiative, and will house the Center of Innovation for Flow in Porous Media, Improved Oil Recovery Laboratory, and Geomechanical/Petrology Laboratory. A Structures Research Laboratory also will be part of the new building.

The \$53.5 million building is funded by \$37.2 million in state dollars (pending final legislative action on the supplemental budget) and \$16.3 million in private contributions, with an additional \$9.2 million in private gifts for research equipment. Completion is expected by summer 2016.

## Nineteen UW Students Earn Certification in Well Control

The University of Wyoming chapter of the American Association of Drilling Engineers hosted Casper-based Wild Well Control, Inc. on Feb. 13–15 to teach a three-day College Fundamental Well Control class. The course provided students the means to identify and describe the basics of well control equipment, drilling fluids, pressure basics and concepts, Leak Off Test, Formation Integrity Test, causes of kicks, kick warning signs and detection, hard and soft shut in, lag time, well control calculations, well control methods and safety practices. Mike Vertner and Steve Richert certified 19 students from the Chemical and Petroleum Engineering department.



Photo courtesy of Thomas Smith



## CEAS Professor Awarded Research Grant

John Oakey, an assistant professor in the Department of Chemical and Petroleum Engineering, received a \$17,070 award as part of a 2015 Whitman Center Research grant. The funds will cover his costs for lab space and housing June 1–Aug. 15 to study at the Marine Biological Laboratory (MBL) in Woods Hole, Mass.

Oakey will conduct cooperative research with UW assistant professor Jay Gatlin of the Department of Molecular Biology. The duo will continue research into mitotic spindle assembly in regards to internal cell composition. Oakey's contribution to the project focuses on microfluidics.



# NEWS & NOTES

## UW Chair Publishes Drilling Paper

Hydraulic fracturing and horizontal drilling have had a transformative, positive effect on the U.S. economy, producing societal gains that likely outweigh negative impacts to the environment and human health from an economic perspective, according to a new paper co-written by a University of Wyoming faculty member.

Chuck Mason, UW's H.A. "Dave" True Jr. Chair in Petroleum and Natural Gas Economics, is one of the authors of "The Economics of Shale Gas Development," which has been accepted for publication in the *Annual Review of Resource Economics*.

## Alumni Writes Book Encouraging Young Engineers

UW alumni Dwight Lee Bates recently published *Due Diligence – Memoirs of the Life of an Engineer and Outdoorsman*, a book encouraging young students to consider a career in engineering. Bates also writes about a love for the outdoors, citing the need for the country to graduate and put more engineers into the workforce.

"If they read my accomplishments as an engineer, it will inspire them to want to become engineers," Bates says.

Bates, who graduated from UW in 1963, worked as an engineer for 44 years in the aviation, ship building and automotive fields. He worked as an engineer in the U.S. Department of Defense, U.S. Navy, Boeing and Warn Industries. He holds degrees in mechanical and aeronautical engineering.



## Students Learn Business Etiquette

Dinner is more than just a meal in the business world. It's an opportunity to network and learn how to handle oneself in the social situations that accompany many business interactions.

To help University of Wyoming students prepare for that adjustment, Cloud Peak Energy—working with the College of Engineering and Applied Science, the Johnson Career Center in the College of Business, and the Center for Advising and Career Services—hosted a UW Etiquette Dinner on March 5 at the Marian H. Rochelle Gateway Center. Cloud Peak Energy Inc., headquartered in Gillette, Wyo., is one of the largest U.S. coal producers.

The first hour of the event featured a networking reception with "mocktails," followed by a five-course, formal dinner. Professional business attire was required. Nearly 150 students signed up to participate. "This was an opportunity for upcoming graduates to learn and practice networking and dining etiquette to prepare for what they'll encounter in the business world," says Ann Jones, assistant director of the Center for Advising and Career Services. "A number of alumni employers, as well as UW faculty and staff, were invited to participate. It was a valuable learning experience—as well as an excellent dining experience—for the students who came."

## UW Scientist Wins Grant for Coal Conversion Research

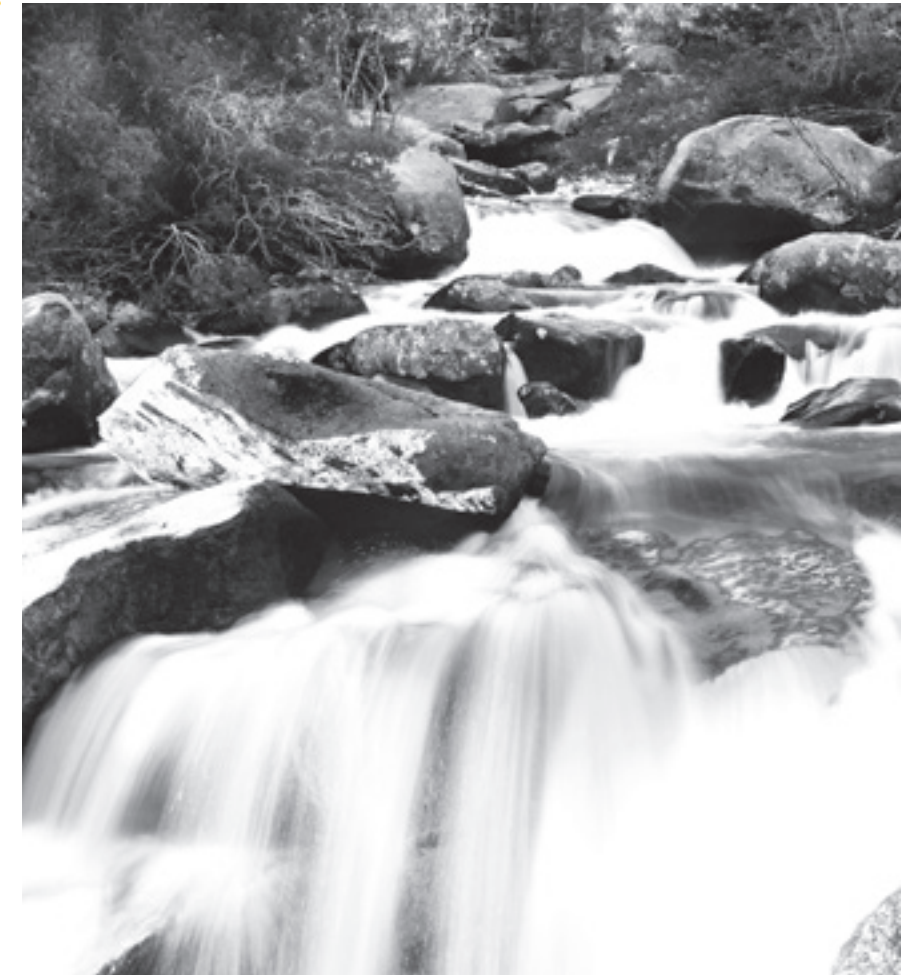
One of Wyoming's most abundant natural resources has great potential, and Maohong Fan wants to be part of the process to see it come to light.

Fan, UW School of Energy Resources professor in the College of Engineering and Applied Science Department of Chemical and Petroleum Engineering, has received funding from the U.S. Department of Energy for an innovative coal-conversion project aimed at producing a synthetic gas that can be used in the production of value-added chemicals. He secured the \$490,000 grant for his work with Wyoming's Powder River Basin subbituminous coal.

The process involves catalysts to produce a syngas containing little to no methane—the type of syngas needed for production of chemicals such as diesel and ethylene glycol. Fan explains that high concentrations of methane in syngas from conventional coal gasification are an obstacle to finding different uses for coal beyond traditional power generation.

## WES Announces Yearly Winners

The Wyoming Engineering Society honorees for 2014–2015 include Student Engineer of the Year Jakob Sumearl in civil engineering. Other program honorees include Todd Anderson (architectural), Ben Pelton (chemical), Karan Sodhi (computer engineering), Karolyn Hopfensperger (electrical), Matthew Daniel (energy systems), Elizabeth Smith (mechanical) and Evan Lowry (petroleum).



## Two Faculty Honored For Work In Water Resources

Two College of Engineering and Applied Science faculty members will be honored at a ceremony in May for their work with water resources.

Professors Robert Ettema and Fred Ogden each were notified in January by the American Society of Civil Engineers that they had been chosen for awards.

Ettema was selected by the COPRI/EWRI Einstein Committee to receive the 2015 Hans Albert Einstein Award. According to the organization, he earned the accolade for his "international recognition in advancing insight and engineering methods regarding sediment transport processes

at bridge waterways and other hydraulic structures, sediment transport under ice cover and river morphology, and for promoting river mechanics education and history."

Ogden was selected by the Environmental and Water Resources Institute to receive the 2015 Arid Lands Hydraulic Engineering Award for his "contributions to surface water hydrology through theoretical development, models and innovative applications."

Each was invited to accept the award during the World Environmental and Water Resources Congress in Austin, Texas.



# students **in** action

## From the Dairy to the Pump

### By UW Institutional Communications

For Allen Morris, choices for graduate studies were abundant. But the University of Wyoming landed at the top of his list. The Rocky Mountain lifestyle was appealing, along with a stipend from UW's School of Energy Resources (SER).

After graduating from Northern Kentucky University with bachelor's degrees in chemistry and accounting, Morris is nearing completion of a Ph.D. in chemical engineering. Meanwhile, UW and Wyoming stand to benefit from his pioneering research on producing liquid fuels from biorenewable sources, as the process he's advancing could augment future production of synthesis gas from coal and natural gas.

SER's competitive graduate assistantship program has attracted top students from across the country to UW to conduct research that benefits Wyoming's economy.

"Allen's work has the potential to contribute to the creation of a hybrid syngas from biorenewable and conventional fuels that would be a significant value-added product," says Joe Holles, associate professor of chemical and petroleum engineering. "It would leverage conventional energy sources in Wyoming for future uses and needs."

Originally from rural Ohio, Morris applied to a number of graduate



schools in the Rockies. A competitive bicycle road racer, he determined that UW had the most to offer. It didn't hurt that Holles reached out to him as well.

"The university has been great," Morris says, noting his research support, advising and opportunities through SER. "I am very comfortable here."

The lactose to fuel project has its origins with Holles, who was at Michigan Technological University when he learned that the cheese industry in the Midwest produces large amounts of cheese whey waste. Lactose is a component of cheese whey, and Holles decided to explore the idea of converting that waste into fuel.

Morris' research has shown that the metal combinations are effective catalysts to convert lactose to liquid fuel. The combinations are essentially creating

electrical hybrids, analogous to forming new elements with unique electronic behavior—as measured at the atomic level during testing at the Argonne National Laboratory near Chicago.

The research stands to benefit the petroleum industry, as the combined metal catalysts could reduce the amounts of platinum needed in the cracking units of traditional oil refineries, cutting costs significantly.

"This technology could be introduced into about any catalytic process," Holles says.

Converting lactose to liquid fuel likely won't significantly contribute to solving the nation's energy problems, Holles says. His calculations say if all of lactose produced as waste from the nation's cheese producers were turned into gasoline, it would equal only 10 percent of the nation's ethanol production. But the technology could contribute to U.S. efforts on biorenewable fuel production.

"Our graduate students are studying topics, including natural gas production economics, storage of different types of energy, carbon dioxide storage, enhanced coal technologies, wind farm design, enhanced oil recovery and much more," SER Associate Director Don Roth says. "It's all part of the university's effort to help the state's economy and way of life through technological innovation, workforce preparation and job creation."

## Undergraduate Engineering Scholars



### By Micaela Myers

As part of the University of Wyoming Tier-1 Initiative, the College of Engineering and Applied Science now offers competitive Undergraduate Excellence Scholarships—25 annually, increasing

over time. Not only do recipients receive \$6,000 of renewable annual funding, but they are also mentored in research and scholarship.

The scholars program already attracts top students such as Bethany Orrick of Forney, Texas, who planned on attending college in Texas before receiving the scholarship. "I got a letter from CEAS that changed everything," she says. "Within a couple days I had arranged a flight and was off to visit the campus. I was blown away, as nearly every hope was exceeded."

Until then, only private university campuses had met my expectations. UW has an amazing engineering program, a beautiful campus, friendly people everywhere I looked, and was—ultimately—the most cost effective."

Scholarships such as this prove the deciding factor for many students. "As an

out-of-state student, I am very grateful for the scholarships," Orrick says, "Without them, UW wasn't an option. It was because of the scholarships that I even came to visit the campus and then fell in love with the university."

Orrick, who entered UW in fall 2014, is majoring in both architectural engineering and environment and natural resources.

"I hope that with the concurrent majors I will be prepared to understand both the engineering and impact of future developments to help build sustainable structures in the future," she says.

Visit [uwyo.edu/ceas/engineering-initiative/undergraduate-scholars.html](http://uwyo.edu/ceas/engineering-initiative/undergraduate-scholars.html) for more information.

*To learn more about the requirements of the undergraduate engineering scholars program, turn to page 33.*

## The Rhythm of Engineering



### By Andy Chapman

Jakob Sumearll utilizes his many talents to achieve in the classroom. Thanks to that, the civil engineering senior was chosen as the 2014–15 Wyoming Engineering Society (WES) Student of the Year.

The Fort Collins, Colo., student was selected out of eight finalists by a committee for the prestigious honor and was awarded a \$2,500 grant.

"Everyone nominated for the honor was chosen for very good reasons," Sumearll says. "We're all relatively equal in the student component. But I do things that are very different. I am a dancer. I've developed, through dance, soft skills that are necessary in the engineering profession. I'm adept at networking, relating to people, explaining concepts at a non-technical level, and I have a willingness to communicate."

Eight of the disciplines in the University of Wyoming College of Engineering and Applied Science (architectural, civil, chemical, computer, electrical, energy systems, mechanical and petroleum) each

nominated their top graduating senior. The Scholarships and Awards Committee of the WES reviewed the nomination forms and interviewed each to select the Student Engineer of the Year. The criteria included educational achievements, engineering activities, extracurricular activities, work experience, career goals, references and an interview portion.

The winners were honored at annual convention in February.

The high-energy senior is skilled in more than concepts and theories. He travels to blues dancing competitions and has performed as an amateur DJ. He is learning another style of dance, lindy hop, with the Wyoming Swing Club.

"I don't feel fulfilled if I'm not constantly doing something," Sumearll says.



# faculty **in** action

## Keeping Things Afloat



**By UW Institutional Communications**

A University of Wyoming researcher's work could help global commerce keep chugging along.

Fred Ogden, the Cline Distinguished Chair in UW's Department of Civil and Architectural Engineering and Haub School of Environment and Natural Resources, leads a National Science Foundation (NSF) research project funded with a \$2.89 million grant to study water sustainability, land-use management and climate in the Panama Canal watershed.

Ogden says one hypothesis that will be tested is that converting land from pasture to forest will increase wet-season infiltration into the soil and increase groundwater recharge—which, in turn, will help increase dry-season river flows into the canal and ensure adequate

water-depth levels for cargo ships.

"Nineteen percent of U.S. imports and exports go through the Panama Canal, as does 5 percent of the world's commerce," Ogden says. "It's good the United States is still interested in the Panama Canal because of its economic importance to our country."

During 2010, the canal closed due to flooding for the first time in its 100-year history. The culverts that are normally used to fill the locks were opened to help relieve the canal's undersized spillways.

"The current expansion of the canal, with the addition of a third set of larger locks, will allow the canal to transit larger ships, but also require additional water for operations," he says. "We are interested in understanding the long-term sustainability of the Panama Canal,

and how land-use incentives can promote sustainability."

Ogden says the project continues the Smithsonian Tropical Research Institute's Agua Salud project. The NSF grant funds an interdisciplinary team that will study how various land uses affect water availability and flooding in the Panama Canal watershed. Land uses include agriculture, mature forest, pastureland, reforestation with native tree species or teak (tropical hardwoods) and deforestation.

"We found very large differences that can be attributed slowly to land use. During the storms, peak flows from a pasture catchment were remarkably higher than from a forested catchment," he says. "In the dry season, river flows from the forest catchment were about twice as large as from an agricultural catchment."

## King of the Air



**By Micaela Myers**

You'll have to forgive Jeff French if it seems like his head is in the clouds.

As the UW King Air research aircraft project manager and an

assistant professor in atmospheric science, he's responsible for studying the phenomena of weather-related issues and scientific questions. Those questions can include what exactly makes a storm produce rain so hard it causes flash flooding, and how we can better predict these events. French earned his doctorate in atmospheric science at UW in 1998.

"I'm interested in the development of precipitation in clouds, looking at different processes that lead to the growth of precipitation," French says. "Our platform is quite unique because we have the radar and lidar, which give us information at the aircraft, as well as away from it."

The Wyoming Cloud Radar was transformative for airborne atmospheric science.

"The radar allowed us for the first time to look at clouds away from the aircraft at a very high resolution," French says.

"The work that Professor Zhien Wang has done in the last six to eight years developing the Wyoming Cloud Lidar—an airborne observational system for the study of cloud structure and composition—has been the second major transformation."

The Department of Atmospheric Science is best known for cloud physics, having its roots in cloud seeding for precipitation augmentation. But the science has evolved and broadened significantly to look at the entire hydrological cycle.

"We've also branched out into cloud dynamics and into understanding air quality," French says.

## A New Team Member



**By Andy Chapman**

Erica Belmont was looking for a place where she could be an integral part of unprecedented research and growth. She found the environment that she

was looking for at the University of Wyoming, when she joined the UW faculty in fall 2014 as an assistant professor of mechanical engineering.

"I was drawn to UW by a number of things, but the most compelling was the investment that is being made in the engineering program through the Tier-1 Engineering Initiative," Belmont says. "I'm excited to be a part of this initiative and the college during this time of growth and transformation."

Prior to UW, she was a design engineer for microbial fuel cell systems and apparatuses to evaluate hormone release from microspheres. She earned her bachelor's and master's degrees from Tufts University, and went on to receive a Ph.D. from the University of Texas at Austin in 2014.

"My research focuses on thermochemical conversion, which includes combustion, gasification and pyrolysis," she says. "The overarching goal of my research is to better understand the underlying fundamental mechanisms of these processes, and apply these processes to the utilization of waste and natural resources for power generation."

As an accomplished industry professional and instructor, Belmont hopes that more women follow her lead and explore what engineering has to offer.

"Significant amounts of research have shown that engaging girls in engineering during their K-12 years is critical to their participation at the university level and beyond, so I advocate outreach activities and engagement with K-12 teachers and students," she says.



# COLLABORATION FOR THE GREATER GOOD

FOUR RESEARCH CENTERS OF EXCELLENCE AIM TO EXPLORE SOLUTIONS THAT WILL BENEFIT WYOMING AS PART OF THE TIER-1 ENGINEERING INITIATIVE.

By Micaela Myers

Today's business and academic landscape has challenged institutions both large and small to find innovative solutions to complex problems. No longer do departments stay within the strict confines of their particular interests. Simply put, the silos are crumbling, and University of Wyoming must adapt.

This integrated and collaborative approach is key to the UW Tier-1 Engineering Initiative, bringing researchers from across the university together to generate new understanding that will benefit Wyoming and beyond.

Enter the first four research centers of excellence that have been funded. They are headed by Maohong Fan, School of Energy Resources professor in the Department of Chemical and Petroleum Engineering; Vladimir Alvarado, Department of Chemical and Petroleum Engineering associate professor and associate department head; Mohammad Piri, Wyoming Excellence Chair in Petroleum Engineering; and Dimitri Mavriplis, Department of Mechanical Engineering professor.

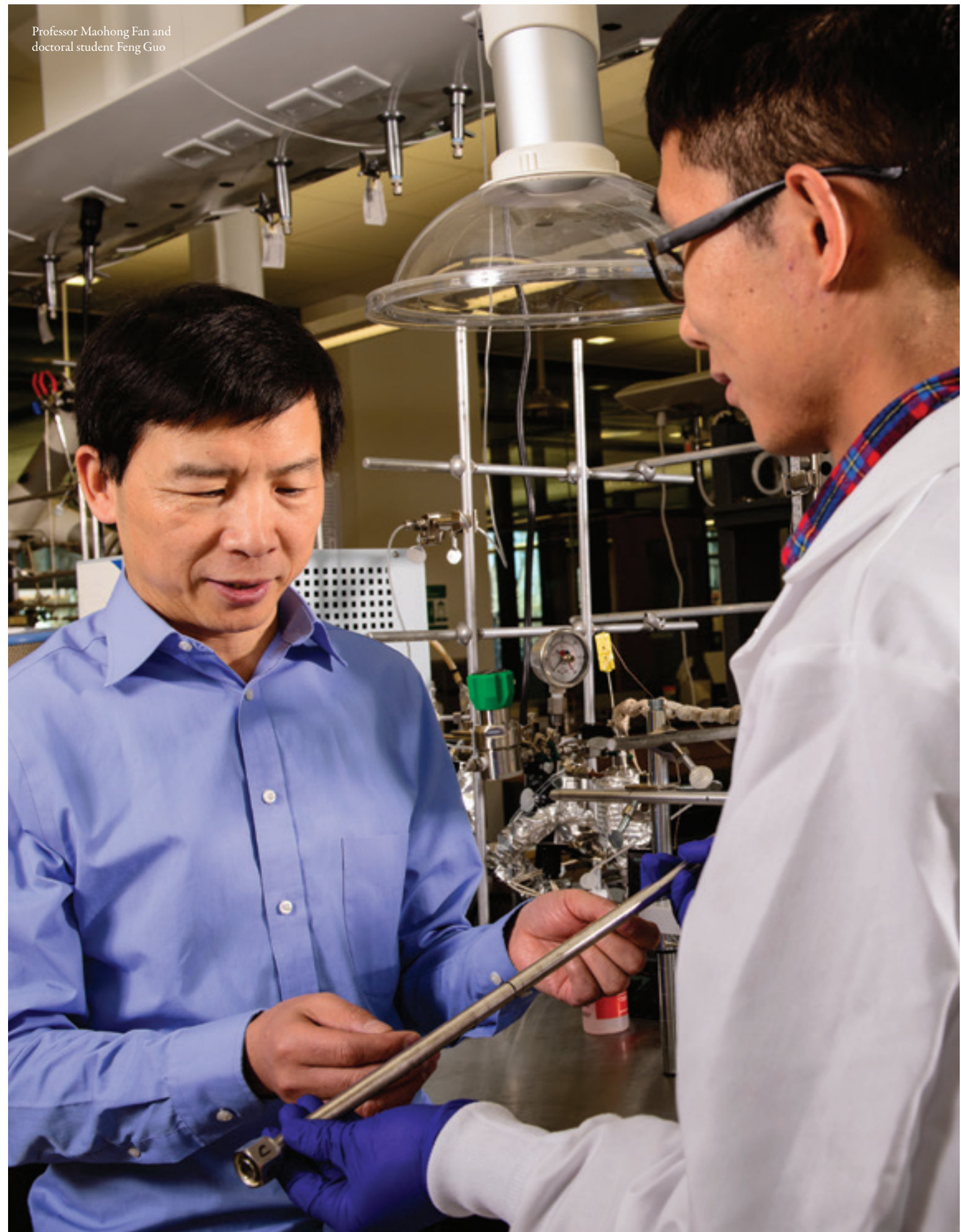
"One of the things that excites me is the integration aspect of the Tier-1 dream—really helping the university move from individual departments to working together in a collaborative, innovative way that produces things beyond what people thought was possible," says Thomas Botts, the retired executive vice president of global manufacturing for Royal Dutch Shell and a board director for EnPro Industries Inc. and Wood Group, who serves as co-chair of the Wyoming Governor's Energy, Engineering, STEM Integration Task Force. "The other thing that I'm especially excited about is that we're already seeing that this move to Tier-1 is attracting more and more industry partners. People and companies are keenly interested in the research that UW is doing and the progress we're making in developing programs around the niche areas."

Professionals from different departments must work together programmatically, sharing their knowledge and know-how to accomplish things that no single entity could achieve alone.

"Newly formed research centers of excellence will lead the research agenda growth, supporting the niche areas that have relevance and impact to the Wyoming economy," UW Tier-1 Engineering Initiative Program Coordinator Richard Horner says. "These target exploiting unconventional oil and gas resources, developing energy conversion solutions, and applying computational science and engineering to industry and business challenges."

The four areas of focus are no coincidence. They are fields of research in which the UW College of Engineering and Applied Science (CEAS) seeks to be a national leader.

"These first four research centers of excellence represent tremendous opportunities to build upon existing expertise and lift UW to international prominence in areas that also happen to be of great importance to Wyoming's economy," atmospheric science professor Al Rodi says. "They also illustrate the strong interdisciplinary approach that is essential for the Tier-1 Engineering Initiative to achieve its full potential."



Professor Maohong Fan and doctoral student Feng Guo





Professor Vladimir Alvarado (left)

### CLEAN COAL AND GAS TO LIQUIDS

Even as the most prolific coal-producer in the United States, annual coal production in Wyoming fell by 3 percent in 2013, making Fan’s research all the more timely.

“The overall objective of this center of excellence is to use the resources in Wyoming—including coal, natural gas and minerals such as trona—to produce value-added fuels and chemicals, such as diesel, gasoline or ethylene glycol,” Fan says.

Fan received a DOE grant for his

work with Wyoming’s Powder River Basin sub-bituminous coal. This innovative coal-conversion project aims to produce a synthetic gas that can be used in the production of value-added chemicals.

“This DOE project is designed to use a new composite catalyst prepared from Wyoming’s minerals for significant reduction of the methane in syngas,” Fan says.

“If we can convert these resources to a value-added product, the profit from

these Wyoming resources will be much higher.”

His main team members in the center of excellence include David Bell and Hertanto Adidharma from the Department of Chemical and Petroleum Engineering, and Yuan Zheng and Michael Stoellinger from the Department of Mechanical Engineering. Donations from Peabody Energy Inc. and Arch Coal Inc. were matched by the state to support this promising research.

### IMPROVED OIL AND GAS RECOVERY

Alvarado’s center of excellence will focus on improved oil and gas recovery in unconventional reservoirs. The potential economic impacts are immense: If this research were to enhance oil and gas productivity in Wyoming by just 1 percent, it could equate to \$51.4 million in additional income from oil and gas sales.

The interdisciplinary team includes Teresa Lehmann from the Department of Chemistry, John Oakey from the Department of Chemical and Petroleum Engineering, John Kaszuba from the Department of Geology and Geophysics, Michael Urynowicz from the Department of Civil and Architectural Engineering, and Klaas

van ’t Veld from the Department of Economics and Finance.

A generous donation from Exxon Mobil funded an advanced core-flooding dynamic geochemical flow-thru system and a state-of-the-art microfluidic experimental platform. These capabilities will provide UW with pioneering infrastructure to research the development of approaches to extract hydrocarbons from unconventional oil and gas reservoirs, including tight formations such as shale. The team has also received U.S. Department of Energy (DOE) funding.

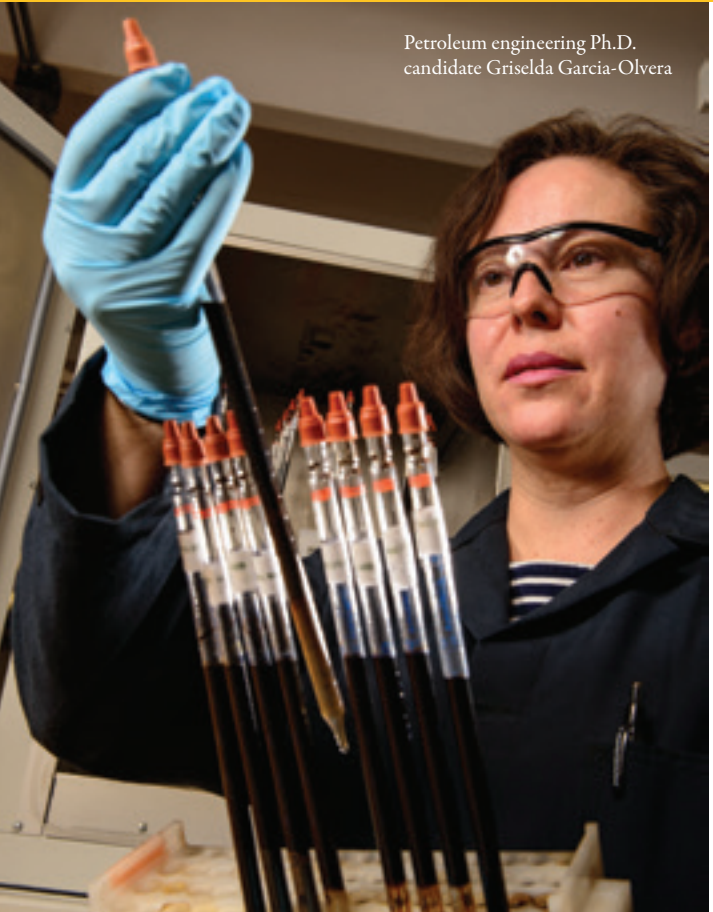
“We hope to map the unconventional oil and gas reservoirs in a very different

way,” Alvarado says. “We think that if we understand fluid-fluid interactions and fluid-rock interactions, we can actually change those interactions so that the oil will flow more naturally. Moreover, instead of using expensive reagents, we might be able to do it with treated gases or water to create economically viable improved recovery processes.”

At least two consortia of oil and gas companies will work with the team, and the researchers hope their work leads to patents and commercial technologies to offer industry new approaches to target, capture and exploit residual oil and gas in varying reservoir formation types.

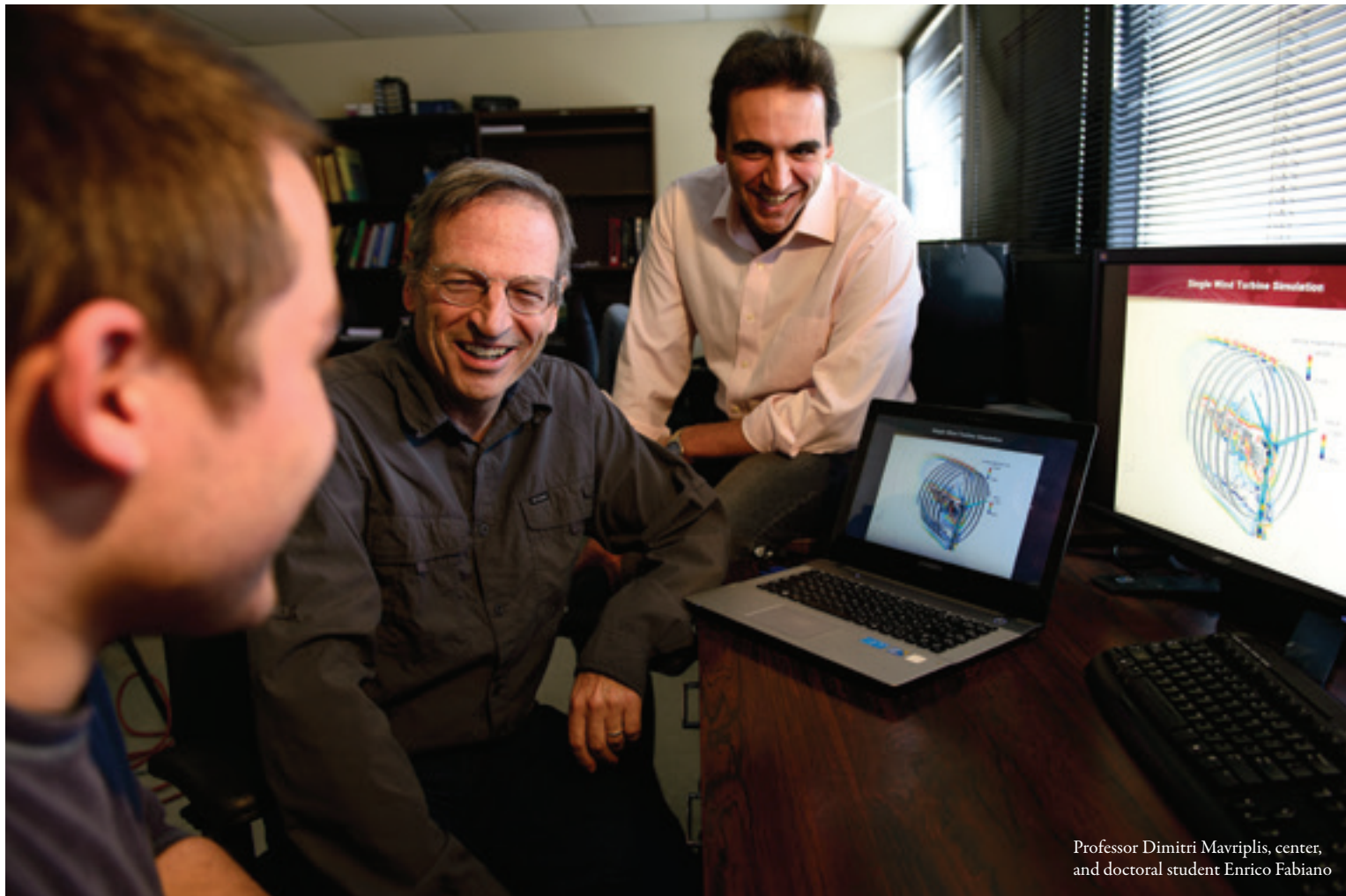


Alvarado holds a core sample for study.



Petroleum engineering Ph.D. candidate Griselda Garcia-Olvera





Professor Dimitri Mavriplis, center, and doctoral student Enrico Fabiano

## OIL AND GAS FLOW IN UNCONVENTIONAL RESERVOIRS

About 50 to 70 percent of the original oil remains stranded in Wyoming's aging fields, and enhanced oil recovery methods have the potential to retrieve 5 to 15 percent of that oil. Piri, an international leader in the field, will lead his team as they leverage the unique technologies and equipment at UW to examine oil and gas flow in unconventional reservoirs to discover the fundamental driving mechanisms that impact yield and output.

"The establishment of improved understanding of flow and transport in these systems will lead to the development of new hydrocarbon

recovery techniques," Piri says.

Principal team members include Lamia Goual and Saman Aryana from the Department of Chemical and Petroleum Engineering, and Dario Grana from the Department of Geology and Geophysics.

Their research will include a new permeability simulator model for improving uncertainty forecasting of oil and gas reservoir rock yields, improved reservoir characterization methods that relate static and dynamic geo-physical measurements, a new fundamental pore-scale model (atom level and upwards)

for establishing oil and gas flow in reservoir rock, and screening of new surfactants and nano-fluids to stimulate oil and gas productivity.

Piri's research has already resulted in significant collaborations with private industry, including financial support from Hess Corp., Halliburton Co., Saudi Aramco, Total S.A. and Encana Corp.

Mark Northam, director of UW's School of Energy Resources, says, "The results of this experimental and computational research hold the promise of significantly higher ultimate recoveries of oil and gas from both conventional and unconventional reservoirs."

## HIGH-PERFORMANCE COMPUTATIONAL SCIENCE AND ENGINEERING

This center of excellence seeks to solve a multitude of fundamental and applied engineering problems, as well as sustaining excellence within the fields of atmospheric research and developing new opportunities for creating wealth from natural resources, including minerals, wind and water. Recently, UW has focused heavily on developing world-class computational research infrastructure, and the state has made major investments both on campus and in attracting the NCAR-Wyoming Supercomputing Center to the state.

"The state also hopes to attract data and tech centers and has an advantage because of location, weather, power

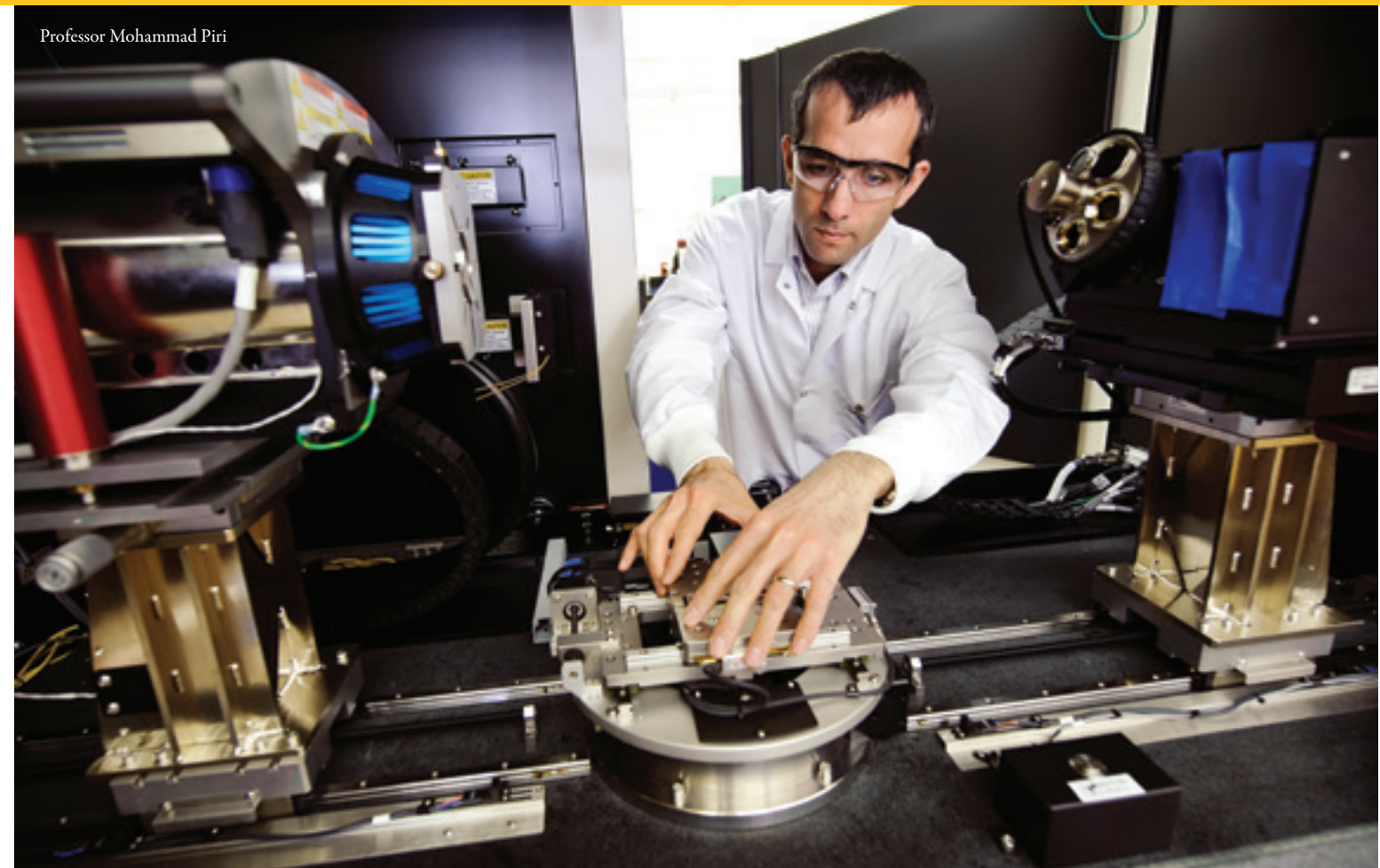
rates and more," Mavriplis says. "In terms of economic diversification, this is the way of the future. If you have the expertise here, you will also get spinoff companies, undoubtedly."

Management of big data and the development of sophisticated high-fidelity computer-based simulation models is becoming increasingly important across a wide range of industries, such as energy and manufacturing. Thus, sustaining a world-class position in these areas aligns well with UW's Tier-1 initiative.

The team includes Michael Stoellinger from the Department of Mechanical Engineering, Xiaohong Liu from the Department of

Atmospheric Science, and Liqiang Wang and Amy Banic from the Department of Computer Science. Team members already receive funding from the DOE, NASA, the U.S. Department of Defense and the National Science Foundation, and formal dialogues are underway with IBM to collaborate in a number of fields, including discussions on the potential to set up a center of excellence at UW in computational modeling and simulation. There is also potential to generate interest from other major players such as Intel, Nvidia, Microsoft, Google and other corporations that have a stake in scientific computing.

Professor Mohammad Piri





# DON'T PANIC - IT'S ONLY A DRILL

**UW students gain experience,  
practice in high-stakes world  
of drilling wells**

By UW Institutional Communications



Shirah Reyher practices drilling oil and gas wells on UW's DrillSIM-5000.



With literally millions of dollars at stake, a single miscalculation while drilling an oil well can be quite costly. Thanks to new technology at the University of Wyoming, the chances of those mistakes will be minimized.

On Oct. 1, 2014, the University of Wyoming and WPX Energy introduced a new drilling simulator teaching laboratory that lets students experience what it's like to drill an oil well—giving them the skills they need to operate today's oil and gas rigs.

Funded with a \$1 million gift from WPX Energy that was matched by the state, the 1,296-square-foot WPX Drilling Simulator Teaching Lab is located on the second floor of the UW Energy Innovation Center. It introduces students and industry personnel to realistic simulations of drilling and well-control operations. It also expands UW College of Engineering and Applied Science course offerings and eventually will offer professional well control certifications for drillers.

“The modern engineering education must use the latest technologies,” says David Bagley, head of the UW Department of Chemical and Petroleum Engineering. “The WPX Drilling Simulator Laboratory is a terrific addition to UW’s petroleum engineering facilities and allows us to provide students the state-of-the-art education they deserve and that industry needs. A drilling simulator allows students to learn in a completely safe and realistic environment so that they won’t make mistakes in the field.”

The WPX Drilling Simulator Teaching Laboratory is another step in the efforts to raise the profile of UW’s engineering and energy programs, propelling it into the ranks of premier schools such as the Colorado School of Mines and Texas A&M University, both of which have similar laboratories.



Shirah Reyher and Thomas Smith learn proper techniques for drilling oil and gas wells on a simulator.

“This new technology will enhance the petroleum engineering program and raises the national profile of UW’s engineering program,” says Jerry Barnes, WPX Energy vice president of land and the company’s former vice president of the Powder River Basin.

The lab includes the \$2 million drilling simulator with a classic console station and a raised rig floor and can be separated with a partition to include a classroom and a laboratory. The UW Department of Chemical and Petroleum Engineering also has purchased the license to operate 20 drilling simulation computer stations in the adjoining classroom.

“The WPX Drilling Simulator is another great example of how the university and its School of Energy

Resources is partnering with energy companies for the benefit of our students and the citizens of Wyoming,” UW President Dick McGinity says. “The WPX lab represents the emphasis that UW places on not only a rigorous education but a practical one—students taking the theory they learn in the classroom and applying it in real-world situations, better preparing them for future success.”

Although other universities have full-sized rig floor simulators with 3-D graphics, UW will be the first in the nation to operate a brand-new DrillsIM-5000 from the company Drilling Systems (UK) Limited, which provides drilling simulator systems to the industry and institutions around the world.

Currently, the lab offers classes that focus on drilling fluids, which are a vital part of drilling operations. The WPX drilling simulator allows students to design the drilling fluid properties (density, viscosity and components) to remove rock chips during drilling in the Basic Drilling course and the Drilling Fluids Laboratory course. In the Drilling Fluids lab, students prepare fluids, measure their properties and conduct computer simulations. Future courses will include Advanced Drilling Engineering and Well Control.

The new laboratory eventually will offer professional well control certification for industry onshore drillers and rig crews. State-level requirements may vary, but the majority of companies that drill onshore require

critical staff to hold a valid well control certification that includes a 30 percent simulator training time.

“The state-of-the-art drilling simulator lab in the Energy Innovation Center plays an important role in advancing UW’s energy agenda,” UW Foundation President Ben Blalock says. “It’s yet another example of furthering students’ practical knowledge in pursuit of careers in the energy industry. UW takes greatest pride in our partnership with WPX Energy.”

WPX Energy is a Tulsa, Okla.-based energy company specializing in the production of natural gas, natural gas liquids and oil with operations and interests in Wyoming, Colorado, New Mexico, North Dakota and Pennsylvania, as well as Argentina and Colombia.

# THE DRILLSIM- 5000

**What is it?** It’s a full-scale drilling and well-control operations simulator with sound effects and realistic computer-generated graphics. The unit contains a drilling controls console, drilling gauges console, surface blowout preventer control console, remote choke-control console, full-sized standpipe manifold, and graphics, student and instructor stations.

Safety, both human and environmental, is the first concern. The simulator allows students to see what may go wrong in a drilling operation and well design, allowing them to be prepared to “expect the unexpected.”

**Did you know?** Well drilling is an expensive endeavor. Controlling a well and drilling properly are key, as well costs range from \$10 million to \$30 million onshore and up to \$150 million to \$200 million for an offshore deep-water well. A well can be unsuccessful if it is drilled into a dry hole—an area where there is no oil or gas.



Professor Jonathan Naughton will research wind farm modeling thanks to a Department of Energy-EPSCoR grant.

# FINDING WEALTH IN THE WIND

By UW Institutional Communications

As it turns out, harnessing the power of Wyoming wind could mean big bucks for the state's economy.

University of Wyoming researchers will collaborate with several institutions in an attempt to do just that. UW has received a \$4.25 million Department of Energy-EPSCoR grant to research wind farm modeling, transmission grid monitoring and the economics derived from wind-generated power.

The three-year federally competitive grant began Aug. 15, 2014, and involves six UW departments—mechanical engineering, electrical and computer engineering, atmospheric science, economics and finance, statistics, and agriculture and applied economics. UW provided a \$1 million match for the grant.

“The grant will be used to look at barriers for penetration of renewables into the electrical grid,” says Jonathan Naughton, a UW professor in the Department of Mechanical Engineering and director of UW's Wind

Energy Research Center. Naughton is the principal investigator of the grant. “Our focus is on wind. Obviously, for Wyoming, that's most prevalent. This is work relevant to the state's economy.”

The grant will support 12 researchers from those six UW departments as well as researchers from Montana Tech. Involved in the work are individuals from other academic institutions, Cornell University and Western Ontario University, and four national government labs: the National Renewable Energy Laboratory in Golden and Boulder, Colo.; Sandia National Laboratories in Albuquerque, N.M.; Lawrence Livermore National Laboratory in Livermore, Calif.; and Pacific Northwest National Laboratory in Richland, Wash.

Potential impacts of the project include: improved location placement of wind farms; better efficiency of wind farm generation; more reliable integration of wind generation with the power grid; and a better understanding of the economic benefits of wind farms and grid optimization.





NCAR-Wyoming Supercomputing Center in Cheyenne, Wyo.

## Interdisciplinary Collaboration

The success of the project will rely on cooperation and data sharing among university researchers with diverse backgrounds and regional wind farm operators and power companies. The WIA, Power Co. of Wyoming and Bonneville Power Administration, groups that support the grant, will benefit.

“Part of the reason I think this grant was funded was the integration of a whole range of topics,” Naughton says. “It’s very interdisciplinary.

“The grant has larger effects than just building wind farms. It’s building on UW’s strength in energy research as well as its development of computational capabilities. This is a great fit with the university’s expertise and the state’s economic development.”

Bryan Shader, UW’s special assistant to the vice president of research and economic development, and professor of mathematics, says the grant project will strengthen strategic alliances between UW and national laboratories

and relationships between the university and Wyoming industries.

“The project will add to UW’s computational and data-enabled science and engineering capabilities through purchase of high-performance, data-storage equipment, which will be interconnected with UW’s Mount Moran computer system and the NCAR-Wyoming Supercomputing Center,” Shader says.

The grant can be extended another three years with additional funding.

“Clean wind power from Wyoming could be very cost-competitive with resources in California.”

– Robert Godby, UW associate professor of economics

## Three Areas of Research

### 1 Development of and optimization of wind plant performance.

The wind plant modeling capability will provide a better understanding of wind farm responses to transient weather events; provide information for potential wind farm turbine siting in complex terrain; and allow the design and testing of control strategies for optimizing power output and reliability of entire wind farms.

Currently, wakes created between wind turbines reduce the wind available to the turbine behind it and create energy loss.

“How do you place your wind turbines to maximize power production at a given site? Right now, we’re pretty awful at that,” Naughton says. “Right now, we can predict the wind power of one wind turbine pretty accurately. There is a lack of understanding of wakes and how wakes behave under different atmospheric conditions.”

### 2 Development of a measurement-based transmission grid modeling capability.

In recent years, electrical utilities and the DOE have invested a sizable amount of money into a new power grid monitoring system. This system takes power-related measurements, called synchrophasors, from throughout the power grid at a higher data rate than ever before,

says John Pierre, a UW professor of electrical and computer engineering, who is a co-investigator on the grant.

“Part of our project will look at this data to better understand how high use of wind power is impacting the reliability of the power grid,” Pierre says. “Already, unusual oscillations or variations in the power on transmission lines have been observed when high wind penetration is present.”

The ultimate goal is a safe and reliable grid that reduces widespread power outages.

### 3 Development of fully integrated economic models for more diverse and variable energy generation and transmission scenarios.

While Wyoming likely will never realize the full potential of the state’s wind because of the astronomical costs of transmission, as well as construction of other wind energy projects around the nation, some significant capacity likely will be built out in the state, says Robert Godby, a UW associate professor of economics and finance, and a co-investigator on the grant.

An example is the proposed Chokecherry and Sierra Madre Wind Energy Plant south of Rawlins. If built, it would be the largest wind farm in the United States. At 3,000 megawatts, it would more than double Wyoming’s 1,400-megawatt capacity at existing wind farms.

The Wyoming Infrastructure Authority (WIA) has been involved with another energy renewable project, the TransWest Express Transmission Project. The 725-mile-long DC high-voltage transmission line would likely take two to three years to build once approved.

“Chokecherry and Sierra Madre Wind Energy Plant could be nearing completion in five years, given the permitting work and efforts to secure financing already complete,” Godby says. “These are very large-scale projects that would have significant impacts on the power infrastructure and the region, and the local economy.”

California is considered a leader in wind-produced electricity, but also uses a large amount of energy. However, Wyoming has some of the world’s best wind resources, but is a net energy exporter. This means Wyoming has an abundance of energy, which it sells to other locations that are unable to meet their own power demands. In early 2013, Naughton produced a study, commissioned by the WIA, on the subject.

“Wind here tends to be available in greater amounts more often than wind there, and hits a peak in the mid-afternoon, a peak demand time in California and, therefore, a resource with significantly more value than wind resources in that state,” Godby says. “Clean wind power from Wyoming could be very cost-competitive with resources in California.”



# alumni **in** action

## From Football Star to Fighter Pilot



### By Micaela Myers

This past fall, U.S. Air Force Major Rich Peace—an F-16 Fighting Falcon pilot, 100th Expeditionary Fighter Squadron, deployed to Bagram Airfield, Afghanistan—sent a video message shoutout to the Cowboy Nation that was picked up by news outlets around Wyoming. Peace graduated from the University of Wyoming in 1997 with a bachelor’s degree in mechanical engineering. During his time at UW, he played on the football and track teams, earning five letters.

“I decided to join the Air Force after the attacks on Sept. 11, 2001,” he says. “I went through a rigorous

screening process and was ultimately accepted to pilot training.

“As a member of the Alabama Air National Guard, I have had the opportunity to live my dream flying fighters while simultaneously living my dream to help build jets. In my civilian life, I am a system integration and test engineer working on the F-22 and F-35 programs for Lockheed Martin Aeronautics, Air Combat Simulation in Marietta, Ga.”

Peace has served two deployments in Iraq and two in Afghanistan, as well as extended duty to Korea, Romania and Ukraine. Both of his parents also served in the Air Force, and his brother serves as a flight doctor in the Colorado Air National Guard.

“In November 2008 I flew over War Memorial Stadium for the 100th meeting between UW and Colorado State—a pretty great day for a former UW football and track athlete!” he says.

“I feel incredibly fortunate to be an F-16 pilot and I absolutely love flying the Viper. The F-16 is a fun airplane to fly, but it is a difficult aircraft to employ in a tactical or combat environment. Everything happens so fast that you have to be 15 or 20 seconds ahead of the jet at a minimum, or else you will find the world unraveling around you. The first major factor is that the F-16 is a single seat platform. That means I am the

pilot, the navigator and the weapons systems officer. We have many different sensors on the jet, and if you don’t have a good system for using them, you will become inundated with information and won’t be able to accomplish the mission.”

Multitasking is a skill Peace began to hone at UW. He gives credit to UW’s dedicated professors for helping him succeed. “Juggling the demands of an engineering degree, playing football and running track was incredibly difficult,” he says.

“The students, professors and my teammates made the experience one of the most amazing times of my life. I will never forget the late-night study sessions in the mechanical engineering lab or on the shop floor building my senior project. I will never forget walking out of the dark tunnel under the stands of War Memorial Stadium into the bright Wyoming sun to the cheers of thousands of fans.

“I have flown a MiG-21, MiG-29 and Su-27, all Russian built fighters. I have flown a single-seat F-16 over the Atlantic Ocean, Pacific Ocean, Mediterranean Sea and Red Sea. I have served our great nation in combat and fought for freedom. All these things have been made possible by the greatest university in the world! Go Pokes!”

## UW Grad Stays Busy On the Job



### By Micaela Myers

Taking it slow might work for some, but Kendra Williams has never been one to waste her precious time.

The 2012 University of Wyoming graduate in petroleum engineering approaches her job as a drilling engineer for Hess Corporation in Houston with an eye on the clock.

“What makes my job enjoyable is the fast pace,” Williams says. “We are averaging less than 20 days per well we drill and strive to operate more efficiently while still being focused on safely executing operations. This provides many opportunities to test new technologies and learn a lot in a short amount of time.”

The Pinedale, Wyo., native took advantage of the many opportunities in student organizations as an undergraduate student.

“I was an active member in the Society of Petroleum Engineers and American Association of Drilling Engineers

student chapters,” she says. “I was able to participate in field trips, get to know the professors in the department and develop strong relationships with my fellow classmates. I had a great 4.5 years at UW.”

She leans on the education she received while at UW.

“UW provided a very strong theoretical foundation of petroleum engineering sciences,” she says. “This theoretical background has been crucial for me to help relate technical aspects of my job to what should happen at any given moment. Because of the wide array of courses that are in the core petroleum curriculum, I am able to interact with many different disciplines of people in my company and feel comfortable in my background.”

## Startups Get Help From UW Grad



### By Micaela Myers

Giving start-up ventures a helping hand is what drives Neal Sample.

Sample, a product of Longmont, Colo., was appointed as the president of enterprise growth for American Express in New York City. He received a bachelor’s (’96) and master’s degree (’98) from UW in computer science.

“I was appointed as president of enterprise growth, a division within American Express that is leveraging emerging technologies to reach new customer segments and geographies, with a particular focus on fostering greater financial inclusion,” Sample says. “I oversee the Serve software platform and new alternative payment products such as Bluebird and American Express Serve, as well as American Express Ventures and the company’s \$100 million Digital Commerce Initiative, focused on investing in early-stage startups.

“I love the fact that I get to use all of the skills I learned in college and am able to apply my knowledge in computer science to something that can help do a bit of good in the world.”

Sample also worked at Yahoo Inc. and eBay Inc.

“I’d say the education I got at UW was the richest four to six years of my life in terms of learning,” Sample says. “I spent a lot of time on the UW debate team and won the national debating championship in 1995, which was made possible by UW creating the opportunity for someone like me to come in as a scholarship student and really earn my way through school while having a great time and ultimately being very successful doing so.”



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. Lynn D. Adams III  
BSEE '67 — Schenectady, N.Y.
- Mr. Robert P. Baker  
BSEE '53 — Albuquerque, N.M.
- Mr. Michael N. Berry  
BSME '62 — Santa Ana, Calif.
- Mr. Carl D. Cinnamon  
BSEE '57; MS '60 — Renton, Wash.
- Dr. Charles I. Davis  
Ph.D. '74 — Gilbert, Ariz.
- Mr. Joe M. Galovich  
BS '50 — Casper, Wyo.
- Mr. Neil J. Gillis  
BSCE '61 — Citrus Heights, Calif.
- Mr. Robert L. Haley  
BS '51 — Longmont, Colo.
- Mr. Ronald H. Johnson  
BS '70 — Torrington, Wyo.
- Mr. Carroll F. Kane  
BSEE '49 — Pittsfield, Mass.
- Mr. Edwin J. Kirk  
BSME '52 — Morton, Ill.
- Mr. Austin M. Rykhus  
BSME '12 — Draper, S.D.
- Mr. Harry W. Sizemore  
BSME '52 — Winston-Salem, N.C.
- Mr. Donald D. Tribble  
BSEE '48 — Carmichael, Calif.
- Mr. Murray A. Welton  
BS '61 — Virginia City, Mont.
- Lt. Durren L. Westbrooke  
BSME '66 — Cleveland, Miss.
- Mr. W.D. Willey  
BSCE '61 — Sheridan, Wyo.

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UW ALUMNI ASSOCIATION

120th Anniversary Gala

April 18, 2015

Marian H. Rochelle Gateway Center

Event to include:  
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- CONNECT
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  - Connect seamlessly with Facebook
  - Share photos
  - Post class notes

- COMMUNICATE
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  - View photos
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Please call (307) 766-7000 or e-mail [wyoalumn@uwyo.edu](mailto:wyoalumn@uwyo.edu) if you have questions.



# BREAKING THROUGH BARRIERS

By Andy Chapman

While she was outnumbered, she never was intimidated. The year was 1963, and Carolyn Hardy Olsen stood alone as the only female graduate in the civil engineering class for University of Wyoming's College of Engineering and Applied Science.

Fast forward to 2014, and she broke new ground again when she became the first female CEAS Hall of Fame inductee in the hall's 17-year history.

"I was good in math and science," Olsen says of her early decision to become an engineer. "At that time, you were somewhat limited in your career choices: schoolteacher, secretary or a nurse. The world was changing, but it was changing slowly."

The Cheyenne, Wyo., native used her training to make a difference around the world. Her first job was in Los Angeles as a city engineer, designing infrastructure projects. She became a licensed California Professional Engineer in 1967. Her husband Dennis worked for the Centers for Disease Control and Prevention (CDC), so when his career called him to Africa, he worked to eradicate smallpox and she taught math.

After returning to the United States, she oversaw sanitation districts in the San Francisco Bay area. Next came a move to Illinois, where she worked for the Environmental Protection Agency and obtained a master's degree in environmental engineering. A two-year smallpox eradication stint in India followed, strengthening her awareness of global environmental and health issues.

But where Olsen got an opportunity to shine professionally was in Atlanta. She was appointed to Mayor Andrew Young's cabinet as Commissioner of Water and Pollution Control. Her department of

1,200 employees provided water and wastewater treatment to more than 1 million citizens. Years later, she took over as the vice president in charge of water for an engineering firm. Prior to retirement in 2000, she was the assistant general manager of the San Francisco Public Utilities Commission, responsible for the operations of the water and power systems.

"I followed my husband with the CDC, so every couple of years I got a new job," she says. "Every time I got a new job, I knew I was only going to be there for a few years. I took an overview and saw what needed to be done and focused on that."

She's served on boards of several organizations, including the National Academy of Science, American Water Works Association, Association for Metropolitan Sewerage Agencies, Association for Metropolitan Water Agencies, National Drinking Water Advisory Council and Water Environment Federation, American Academy of Environmental Engineers and was president of Water for People.

Her career served as an inspiration to women in public works, environmental projects and water and wastewater management. She encouraged women and minorities to pursue work and education in non-traditional fields.

"Any time I talk to high school students, I encourage them to become engineers," Olsen says. "Civil and environmental engineering is one of the best disciplines, because you get to do things that improve the environment. It's important."

For more information on the CEAS Hall of Fame, go to [uwyo.edu/ceas/development/awards/index.html](http://uwyo.edu/ceas/development/awards/index.html).



## UW CALENDAR OF EVENTS

### APRIL

**Tau Beta Pi Banquet:** April 10

**'Just in Time' Job Fair:** April 15

### MAY

**Senior Design/Undergraduate Research Day:** May 2

**Finals week:** May 11–15

**CEAS commencement:** May 16

**Summer Session begins:** May 26

**Honors Orientation:** May 28–29

### JUNE

**Orientation Session 2:** June 1–2

**Orientation Session 3:** June 4–5

**Orientation Session 4:** June 8–9

**Orientation Session 5:** June 11–12

**Orientation Session 6:** June 15–16

**Orientation Session 7:** June 18–19

**Engineering Summer Program begins:** June 21

**Orientation Session 8:** June 22–23

**Select Summer Session courses begin:** June 22

**Orientation Session 9:** June 25–26

**Engineering Summer Program concludes:** June 27

### JULY

**Select Summer Session courses begin:** July 20

**Engineering Summer Bridge Program for incoming freshmen begins:** July 27

### AUGUST

**Faculty reporting dates:** Aug. 25 and Aug. 27

**Classes begin:** Aug. 31

### SEPTEMBER

**Cowboy Football vs. North Dakota:** Sept. 5

**Labor Day holiday:** Sept. 7

**Cowboy Football vs. Eastern Michigan:** Sept. 12

**Cowboy Football vs. New Mexico:** Sept. 26

### OCTOBER

**Cowboy Football vs. Nevada:** Oct. 17



For the latest events and information, visit [uwyo.edu/calendar](http://uwyo.edu/calendar).

UW Cowboys and Cowgirls: [wyomingathletics.com](http://wyomingathletics.com)

Fine arts: [uwyo.edu/finearts](http://uwyo.edu/finearts)



# WHY UW?



## REACH YOUR POTENTIAL!

The College of Engineering and Applied Science is a nationally recognized and ABET accredited 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.



90 percent of our graduates have jobs or go on to graduate programs within six months of graduation.



Small-class sizes (average: 28 per) ensure you'll have the opportunity to participate in hands-on learning.



Our graduates have gone on to careers with companies like American Express, Encana, ConocoPhillips and the National Oceanic and Atmospheric Administration.



Scholarships are available—more than 375 merit-based awards are allocated each year to current students and high school seniors.



Nearly 78% of our graduates report a starting salary greater than \$60,000 annually, and 89% report a starting salary greater than \$50,000 annually.



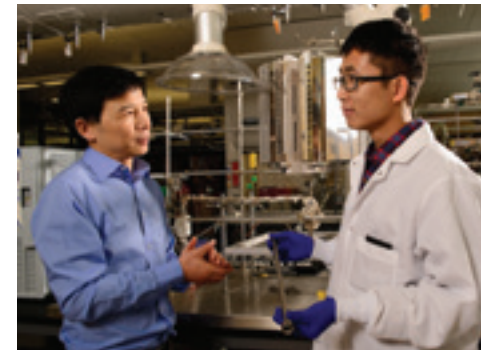
Choose from engineering programs like architectural, chemical, civil, computer, computer science, electrical, energy systems, mechanical and petroleum.



Working in collaboration with the UW School of Energy Resources, students can access some of the world's finest research facilities.



# SCHOLARS PROGRAM



## Undergraduate Engineering Scholars Program

As part of the University of Wyoming Tier-1 Initiative, the College of Engineering and Applied Science (CEAS) now offers competitive Undergraduate Excellence Scholarships—25 annually. Not only do recipients receive \$6,000 of renewable annual funding, but they are also mentored in research and scholarship.

Recipients are evaluated on their academic excellence (high school GPA, test scores, and curriculum rigor). The scholarship provides \$6,000 of annual funding to help cover the cost of tuition, room and board and associated fees. The scholarship is merit based and renewable for an additional three years for a total scholarship of \$24,000. In the first two years of the program, a total of 48 scholarships were awarded annually.

Awardees will be invited to participate in the "Engineering Scholars Program," in which they will be given V.I.P. treatment including opportunities for undergraduate research, one-on-one work with professors, industrial opportunities, etc.

### Application Requirements and Deadlines

To be considered for the Scholarship, the UW Admissions Office must have the following on or before Dec. 1:

- Application for admission and admission application fee.
- The student must have a declared undergraduate major within the College of Engineering and Applied Science or be on ENUN (engineering undecided) status.
- Official high school transcripts
- Official ACT/SAT test scores
- Students selected to receive the Scholarship must confirm their enrollment at UW by May 1.

Visit [uwyo.edu/ceas/engineering-initiative/undergraduate-scholars.html](http://uwyo.edu/ceas/engineering-initiative/undergraduate-scholars.html) to learn more about the scholarship.



**“UW has an amazing engineering program, a beautiful campus, friendly people everywhere I looked, and was—ultimately—the most cost effective.”**

**- Bethany Orrick**

*Read more about Bethany Orrick and her journey to UW on page 9.*



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**“One of the best parts of UW is the faculty because the professors here are so devoted to not only teaching us but oftentimes mentoring us.”**

- Anita Khannikova, Petroleum Engineering Graduate Student