Voiland College of Engineering & Architecture
WASHINGTON STATE UNIVERSITY
DEAN’S MESSAGE

Dear Colleagues,

I am honored to join the Voiland College of Engineering and Architecture as dean. It has been an exciting fall! After moving from Kansas to Pullman this summer, I have been enjoying many WSU and Voiland College traditions for the first time, such as the Voiland College ice cream social, Week of Welcome, meeting Butch, and, of course, my first WSU football game.

I have met many new students who are eager to study in our academically challenging engineering, computer science, and design disciplines and have greatly enjoyed getting to know faculty and staff as well as our alumni and friends.

Thanks to the hard work and support during the past decade from alumni, donors, faculty, staff, and state and industry leaders, this college has grown tremendously. I am excited about coming to Voiland College because I truly believe that our land-grant mission remains more critical than ever before in addressing our society’s biggest challenges.

The Voiland College provides access to education for the sons and daughters of Washington, and for students from across the nation and around the world. The Voiland College is special in that we provide this access in five locations around this state. Thirty-six percent of our students are first-generation college students, and we have dramatically expanded our programs in recent years to meet the needs of place-bound and nontraditional students and continue to work to make college more affordable (p. 2–3). Meanwhile, we have continued to increase enrollments and our research activities. I look forward to continuing these efforts.

I have also been excited to learn the details of the Voiland College’s research. In support of our land-grant mission, many of these projects are directly applicable to Washington industry. While the college already enjoys significant industry support, there are many opportunities for expansion. One of my priorities is going to be connecting people to address large, interdisciplinary challenges and bringing collaborators together from national labs, industry, and academic programs around the college and University. I look forward to working with more partners and letting them know about the college’s important work.

Like many of you, I was a first-generation college student. When I started college, it was possible to work your way through with scholarships, summer, and work-study jobs, which I did. I was fortunate to graduate in four years and get a good position in industry directly after graduating. My education changed the course of my life.

Such a scenario is impossible for this generation of students—even with jobs and scholarships, the cost of education generally requires additional funds. An ever-increasing number of students take on debt throughout their college years. As dean, I am making it a top priority to ensure that these students realize a positive return on their investments. I anticipate an enhanced focus on programs that promote student retention, allowing all who are qualified and work hard to realize the life-changing opportunities that a Voiland College degree provides.

The theme for this edition of Innovation is Cougs supporting Cougs. I have only been here a short time, but I am tremendously impressed with the support that I see around this college. I have also appreciated the very warm welcome I received. I greatly look forward to continuing the strong Cougar tradition.

Go Cougs!

Mary E. Rezac
Dean

INNOVATION
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The Voiland College of Engineering and Architecture continues to meet its land-grant mission and increase offerings to students around the state, country, and world. Within the past year, the college has started new programs in software engineering, data analytics, electrical engineering, and construction engineering to meet the high demand for engineers and computer scientists in the state. Data analytics and software engineering degrees are offered at WSU Everett and at Pullman, and a master’s degree in software engineering is available online. An electrical engineering degree program is also underway at Olympic College in Bremerton, and a construction engineering degree began on the Pullman campus.

Two new buildings for programs in Everett and Bremerton have also opened for the growing programs.

The programs continue the state’s efforts to educate more engineers and computer scientists to meet industry needs. Washington has one of the highest percentages of high technology workers, but has hovered near the bottom for the number of students that graduate in these fields. To address the high demand, the college has increased its student enrollment by 30 percent since 2012 to more than 4,300 undergraduates and nearly 800 graduate students.

The new degrees continue to promote significant enrollment growth, and offering them in Everett and Bremerton help remove barriers to education for place-bound and nontraditional students. (See p.4)
Not just in Pullman anymore:

Voiland College grows across Washington

**OLYMPIC COLLEGE AT BREMERTON**
- Degrees offered: B.S.
- Electrical engineering (new)
- Mechanical engineering

**WSU EVERETT**
- Degrees offered: B.S.
- Electrical engineering
- Mechanical engineering
- Software engineering (new)
- Data analytics (new)

**VANCOUVER**
- Degrees offered: B.S., M.S.
- Computer science
- Electrical engineering
- Mechanical engineering

**TRI-CITIES**
- Degrees offered: B.S., M.S.
- Civil and environmental engineering
- Computer science
- Environmental engineering
- Mechanical engineering
- Electrical engineering

**GLOBAL CAMPUS**
- Data analytics (new), B.S.
- Electrical power engineering (Professional Science Master’s)
- Engineering technology management (M.S.)
- Software engineering (M.S.) (new)
The Voiland College of Engineering and Architecture and WSU celebrated the opening of two new facilities in Everett and Bremerton in August that will expand WSU’s engineering offerings throughout Washington state and help to meet industry needs for high technology workers.

At WSU Everett, a new 95,000 square-foot building includes classrooms, laboratories, faculty offices, and services for students working toward degrees in science and engineering fields. In it, students will be able to take courses in new programs in high-demand fields, such as software engineering and data analytics, as well as electrical and mechanical engineering. The Boeing Company made a $250,000 gift to equip the building with state-of-the-art technology, and its new fabrication lab was named the Boeing Innovation Studio. The approximately $65 million project was completed in just under two years.

In Bremerton, the former CenCom building has been renovated to house a new electrical engineering program and to provide additional space and resources for the mechanical engineering program. Since 2009, WSU and Olympic College-Bremerton have offered a bachelor’s degree in mechanical engineering. More than 100 students have graduated from the program in the past six years. In 2015, the Washington State Legislature provided funding to expand WSU’s electrical engineering program to Bremerton in cooperation with Olympic College. In May 2018, the program will celebrate its first graduating class.
**Hands on**

Students in the Voiland College of Engineering and Architecture get hands-on, real-world experience that prepares them for their future careers. Every year, their WSU experience culminates with senior capstone design projects, in which they most often work with industry partners on real-world projects. Throughout the semester- or year-long projects, the students develop design and engineering skills while also learning critical soft skills, such as entrepreneurship, communications, scheduling, and project management.

**Engineering Students Design for African Communities**

Three teams of engineering students at WSU Tri-Cities designed technological advancements that will address challenges pertaining to farming, education, and agricultural business in rural communities in Africa. The technologies were designed to be easily replicated and maintained in various communities in Uganda at low cost. Scott Hudson, professor of electrical engineering, and Messiha Saad, clinical assistant professor of mechanical engineering, advised the student teams.

**Aquaponic System for Food Sustainability**

Electrical engineering students designed an aquaponic system that incorporates minimal water, fish, and a growing medium to produce a recyclable and sustainable agricultural system. The team included Amjad Al-Shakarji, Gabriel Fuentes, Trevin Schafer, and Daniel Cain.

The project aims to help people in the region who often don’t have access to their own farmland, or can’t afford it, with water in short supply. In their system, plants grow atop the apparatus, water is circulated via a solar-powered pump, and tilapia fish live in a water tank below, where their waste is then used as fertilizer.

**Solar Lighting for Additional Educational Hours**

An electrical engineering student team designed a solar lighting system to provide the same amount of light as a standard U.S. office building with capability to store enough energy for at least two hours of light per night. The team included Pierce Jones, Daniel Deaton, Steven Goulet, and Richard Dempsey.

“Right now, the villagers are using kerosene lanterns, which are not only very dangerous, but also very expensive,” Hudson said. “When you think about the fact that these people are making an average of $1 a day, that can eat significantly into the family’s budget.”

**Mushroom Dryer for Economic Growth**

A mechanical engineering team designed a mushroom dryer that will allow Ugandan villagers to dry and increase the shelf life of the oyster mushroom. The crop is considered a delicacy in Africa and a local source of jobs and income in the region. The team, including Sam Sparks, Rachel Estes, Keenan Moll, Ian Pierce, Lorraine Seymour, and Joel Larson, had to reinvent the traditional commercially available dehydrators, which require significant electrical power that is often unavailable.

“The biggest challenge we had to deal with is getting a mushroom, which consists of 90 percent water, down to 20 percent while dealing with the Ugandan climate that consists of about 70 percent humidity year-round,” Pierce said.
Work Ready

Active student clubs and entrepreneurship in the Voiland College of Engineering and Architecture help students gain real-world experience in engineering or architecture while they learn skills and grow their community. Students participate in a variety of activities, including regional or national competitions, field trips, guest speaker events, and social events.

Chemical Car Heads to Nationals

Chemical engineering students from Washington State University won second place at the regional ChemE Car competition and will compete at nationals in Minneapolis, Minnesota this month. The students developed a car that operates, starts, and stops using chemical reactions. This year’s ChemE Car team, which included 12 students, used a zinc air battery and an iodine clock reaction for their car. At this spring’s regional competition, three undergraduate students, Bardya Banihashemi, Marisa Gliege, and Kyle Groden, also presented their research on catalysis and fuel cells.

WSU Selected for NASA Launch

The Cougs in Space club will be building a CubeSat, a small research satellite, to launch into space within the next few years as part of NASA’s CubeSat Launch Initiative. WSU was selected for the competitive initiative based on how the project helps to meet NASA’s strategic goals in science, exploration, technology development, education, or operations. The club, which provides students with hands-on aerospace experience, will use this project to educate and reach out to students and establish a long term CubeSat development program. The cube-shaped satellite measures about four inches on each side and is set for launch in 2019.

What was the club experience that changed your life? Please consider supporting these important opportunities for our current and future students: vcea.wsu.edu/student-clubs-and-professional-societies/
Mars Rover
Washington State University’s Mars Rover Team participated for the second year in a row in the 2017 University Rover Challenge. In its first year, the team took second place and was the top finishing American team. A project of The Mars Society, the University Rover Challenge is considered the world’s premier robotics competition for college students.

Held in the southern Utah desert, the competition challenges students to design and build the next generation of Mars rovers that someday will work alongside human explorers on the surface of the Red Planet.

Engineers Without Borders
The WSU student chapter of Engineers Without Borders is planning their initial assessment trip to Zapote, Panama, as part of a project to help residents there develop an engineering solution for their water shortage. Students will begin by travelling to Panama in December to do surveying, test water quality, and develop a relationship with the community. The project aims to help about 1,000 residents in the area who have no access to a reliable water source for four months every year. The students designed their project during the 2016–2017 school year and completed a fundraising effort. They also worked with professionals, including WSU alumni Destry Seller and Suzanne Cox, to produce a functional and sustainable design for the community.

Harnessing Hydrogen
WSU researchers and students have started fundraising and are looking for help to build the first hydrogen gas station in Washington. They hope to use their gas station to demonstrate an inexpensive, portable way to liquefy hydrogen—which is considered the key to unlocking the clean hydrogen economy. “What we’re doing is unique,” said Jake Leachman, associate professor in the WSU School of Mechanical and Materials Engineering. “There isn’t a precedent for it.” Increasing the number of hydrogen fuel-powered cars on the road could help reduce harmful carbon dioxide emissions that are changing the earth’s climate. For more information and to donate, visit https://hub.wsu.edu/ise/.
Students in the Harold Frank Engineering Entrepreneurship Institute traveled to Silicon Valley during the summer to apply professional skills and gain networking and educational experiences with established executives.

The Frank program, established in 2004, provides training for students in entrepreneurship.

Working in interdisciplinary teams, the students

“If you’re uncomfortable, it’s a sign that you are growing.”

—Iris Bombelyn, Vice President, Lockheed Martin

learn to manage uncertainty, design, perfect presentation skills, work with fiscal and technical constraints, and develop technologies to solve problems.

During the Silicon Valley experience, the students connected with and learned from company executives at Facebook, Tesla Motors, Google, Luxe, Alta Devices, Zoox, Voke, Galvanize, and Gusto, and listened as the professionals shared lessons from their experiences. Topics included investor relations, beginning a startup, setting goals, working internationally, and targeting clientele.

Top and middle photos: WSU Harold Frank Engineering Entrepreneurship students visit Google headquarters. Bottom: Students try VR glasses during visit to Intel-Voke.
Students design homeless shelter

A WSU architecture student team has designed a shelter that they hope might someday improve the lives of homeless people. With their design, the students took first place in the Spokane chapter’s American Institute of Architects student design competition. A full-scale prototype of the shelter was displayed at Spokane’s River Park Square Mall. As part of the competition, the third-year architecture students in WSU’s School of Design and Construction designed shelters that aim to meet the needs of the homeless population.

“Architecture has always been evolving to serve the needs of cities and their citizens,” said Mona Ghandi, assistant professor in the School of Design and Construction, who teaches the homeless shelter architecture studio course.

“He was a wonderful, caring, and kind human being,” said Kessler. “His students knew that he cared about their education and wanted them to take it seriously. They knew he cared.”

After retiring in 1997, Allen enjoyed camping, as well as remodeling and traveling in old Airstream trailers. He eventually moved to Lowell, Idaho, along the Selway River where he was closer to the outdoors and beautiful scenery. He passed away in 2016.

Allen wanted the scholarship fund to provide to others the same kind of help that he and his brother received in their early years. Education was fundamentally important to him and to his parents, and they would have been pleased to see their lifelong quest for learning continue into the future. With no family of his own, it is telling that he left his money for encouraging and supporting future students, said Kessler.

“That is his legacy, and it’s a nice memorial for him,” he said. “He was that kind of truly giving person.”
Goldwater scholars named Amelia Brown and Ryan Summers are recent recipients of prestigious Goldwater Scholarship awards. The nationally competitive Barry M. Goldwater Scholarship is the most prestigious undergraduate scholarship in the natural sciences, mathematics, and engineering in America. Recipients are awarded $7,500 to support their studies.

Brown is a junior in materials science and engineering. She plans to earn a Ph.D. studying materials for biosensors and nanotechnology, then teach and research nanotechnology for biomedical applications—such as ultrasensitive diagnostic devices—at a university.

Summers, a computer engineering major, is interested in how parallel computing can help improve machine learning algorithms and make them more useful. He’s also interested in pervasive computing, or how computers can be implemented into many parts of our lives.

First cohort chosen for PNNL-WSU research Washington State University and the U.S. Department of Energy’s Pacific Northwest National Laboratory have selected the first group of students for the PNNL-WSU Distinguished Graduate Research Program.

The program adds a new dimension to WSU and PNNL’s long partnership, which includes joint faculty appointments and research projects. The program is available to students who have been accepted into a WSU graduate program and are primarily pursuing research in clean energy, smart manufacturing, sustainability, national security, or biotechnology.

“Engaging graduate students with the talented energy, environment, national security, and fundamental science researchers at our institutions will increase the scientific and research capacity in our region,” said Chris Keane, vice president for research at WSU.

Voiland College students who are participating in the first cohort include Jenny Voss, chemical engineering; Nadia Panossian, mechanical engineering; Priyanka Ghosh, computer science; Christina Louie, chemical engineering; Justine Missik, engineering science; Xu Liu, computer science; Trent Graham, chemical engineering; Isaac Johnson, material science and engineering; and Austin Winkelman, chemical engineering. The students will complete their coursework at WSU and collaborate with nationally recognized PNNL scientists on their thesis projects.

Students win NSF research fellowships Two students from the Gene and Linda Voiland School of Chemical Engineering and Bioengineering have been chosen for National Science Foundation graduate research fellowships. The prestigious awards have trained generations of American scientists and engineers, including Nobel laureates.

Jake Gray and Jenny Voss are among 2,000 students chosen from more than 13,000 applicants from across the United States. The fellowships provide three years of financial support—a $34,000 annual stipend and $12,000 payment to the student’s university—for graduate study leading to a research-based master’s or doctoral degree in science or engineering.

Gray, who holds a WSU bachelor’s in engineering, will study renewable and carbon-neutral hydrogen production from formic acid using electric field assisted catalysis. Voss of Aberdeen, Washington, who has a WSU bachelor’s degree in chemical engineering, is studying the catalytic conversion of carbon dioxide and hydrogen into long-chain alcohols.

First cohort of students participating in the joint PNNL-WSU graduate program.
Washington State University researchers have developed a low-cost, portable laboratory on a smartphone that can analyze several samples at once to catch a cancer biomarker, producing lab quality results.

The research team, led by Lei Li, assistant professor in the School of Mechanical and Materials Engineering, recently published the work in the journal *Biosensors and Bioelectronics*.

At a time when patients and medical professionals always expect faster results, researchers are trying to translate biodetection technologies used in laboratories to the field and clinic, so patients can get nearly instant diagnoses in a physician’s office, an ambulance, or the emergency room.

The WSU research team created an eight channel smartphone spectrometer that can detect human interleukin-6 (IL-6), a known biomarker for lung, prostate, liver, breast, and epithelial cancers. A spectrometer analyzes the amount and type of chemicals in a sample by measuring the light spectrum.

Although smartphone spectrometers exist, they only monitor or measure a single sample at a time, making them inefficient for real-world applications. Li’s multichannel spectrometer can measure up to eight different samples at once using a common test called ELISA, or colorimetric test enzyme-linked immunosorbent assay, that identifies antibodies and color change as disease markers.

Although Li’s group has only used the smartphone spectrometer with standard lab-controlled samples, their device has been up to 99 percent accurate. The researchers are now applying their portable spectrometer in real-world situations.

“The spectrometer would be especially useful in clinics and hospitals that have a large number of samples without on-site labs, or for doctors who practice abroad or in remote areas” — Lei Li

Li is investigating startup opportunities through participation in WSU’s NSF-sponsored I-Corps program. The program provides an introduction to LEAN entrepreneurship and allows participants, including faculty and students, to interact with their likely customers.

The work was funded by the National Science Foundation and a WSU startup fund.
Researchers develop environmentally friendly, soy air filter

Katie Zhong

Washington State University researchers have developed a soy-based air filter that can capture toxic chemicals, such as carbon monoxide and formaldehyde, that current air filters can’t.

The research could lead to better air purifiers, particularly in regions of the world that suffer from very poor air quality. The engineers have designed and tested the materials for the bio-based filter and report on their work in the journal Composites Science and Technology.

Working with researchers from the University of Science and Technology Beijing, the WSU team, including Weihong (Katie) Zhong, professor in the School of Mechanical and Materials Engineering, and graduate student Hamid Souzandeh, used a pure soy protein along with bacterial cellulose for an all-natural, biodegradable, inexpensive air filter.

Soy captures nearly all pollutants

The WSU and Chinese team developed a new kind of air filtering material that uses natural, purified soy protein and bacterial cellulose—an organic compound produced by bacteria. The soy protein and cellulose are cost effective and already used in numerous applications, such as adhesives, plastic products, tissue regeneration materials, and wound dressings.

Soy contains a large number of functional chemical groups—it includes 18 types of amino groups. Each of the chemical groups has the potential to capture passing pollution at the molecular level. The researchers used an acrylic acid treatment to disentangle the very rigid soy protein so the chemical groups can be more exposed to the pollutants.

The resulting filter was able to remove nearly all of the small particles, as well as chemical pollutants, said Zhong.

Filters are economical, biodegradable

Especially in very polluted environments, people might be breathing an unknown mix of pollutants that could prove challenging to purify. But, with its large number of functional groups, the soy protein is able to attract a wide variety of polluting molecules.

“We can take advantage from those chemical groups to grab the toxins in the air,” Zhong said.

The materials are also cost effective and biodegradable. Soybeans are among the most abundant plants in the world, she added.

Zhong occasionally visits her native China and has personally experienced the heavy pollution in Beijing as sunny skies turn to gray smog within a few days.

“Air pollution is a very serious health issue,” she said. “If we can improve indoor air quality, it would help a lot of people.”
WSU receives grant to study heart problems

Washington State University researchers have received a $1.57 million National Institutes of Health grant to understand the molecular-scale mechanisms that cause cardiomyopathy, or heart muscle disease.

The four-year project could lead to improved diagnostics and new treatments for hereditary heart conditions. Cardiomyopathy affects as many as 1 in 500 people around the world and can often be fatal or have lifetime health consequences.

Proteins targeted
The researchers will be studying mutations in three important proteins that play a key role in healthy heart function.

“Mutations in these proteins are found in patients with myopathy,” said Alla Kostyukova, assistant professor in the Gene and Linda Voiland School of Chemical Engineering and Bioengineering and leader of the project. “Our work is to prove that these mutations cause these problems and to propose strategies for treatment.”

Beautifully designed
Heart muscle is made of tiny thick and thin filaments of proteins. With the help of electrical signals, the rope-like filaments bind and unbind in an intricate and precise architecture, allowing heart muscle to contract and beat. The thin filaments look like beaded necklaces and are made of actin, the most abundant protein in the human body. Tropomyosin, another protein, wraps itself around the actin filaments. Tropomyosin together with two other proteins, tropomodulin and leiomodin, at the end of the actin filaments act as a sort of cap and determine the filament length.

“It’s beautifully designed,” says Kostyukova, whose research is focused on understanding protein structures.

Family genetics
In families with cardiomyopathy, genetic mutations result in formation of filaments that are either too short or too long. Those affected can have significant heart problems that cause disability, illness, and death.

The researchers will use state-of-the-art approaches to make the key proteins and study them at the molecular and cellular level. The work entails designing the molecules, constructing them at the gene level in a plasmid, and then producing them into bacterial or cardiac cells. The researchers hope in the long term to identify the components and molecular mechanisms that regulate thin filament architecture, whether diseased or healthy.

“Better understanding of the thin filament’s function and its regulation is critical to understanding muscle disease pathogenesis, to improving diagnostics, and to potentially identifying novel drug targets,” said Kostyukova.

The multidisciplinary group is collaborating on the grant with a research team from the University of Arizona led by Carol Gregorio, director of the Department of Cellular and Molecular Medicine. WSU’s group has expertise in protein structure, structural biochemistry, and properties of actin filaments and regulatory proteins. Dmitri Tolkatchev, assistant research professor in the Voiland School, will be using nuclear magnetic resonance tools to study the proteins and mutations at the atomic level.

“Our work is to prove that these mutations cause these problems and to propose strategies for treatment.”
—Alla Kostyukova
A Washington State University research team has improved an important catalytic reaction commonly used in the oil and gas industries that could lead to dramatic energy savings and reduced pollution.

They report on their work in the German journal Angewandte Chemie, which has designated the paper of particular interest and importance. The research is led by Jean-Sabin McEwen, assistant professor, and Su Ha, associate professor, of the Gene and Linda Voiland School of Chemical Engineering and Bioengineering at WSU.

Efficiently converting methane

Methane gas is a byproduct in much of the oil and gas industry, where it may build up during operations and cause a safety concern.

Methane also is a primary ingredient in natural gas used to heat homes, and it can be converted into many useful products including electricity. But breaking the strong bond between its carbon and hydrogen takes a tremendous amount of energy.

“It’s a very happy molecule,” said McEwen. “It does not want to break apart.”

To convert methane, the oil and gas industry most often uses a nickel-based catalyst. But it is often less expensive to simply burn the methane in giant flares on site; however, this adds greenhouse gases to the atmosphere, contributing to global warming, and wastes energy.

In the United States, for example, the amount of methane burned annually is as much as 25 percent of the country’s natural gas consumption.

“Right now, we just waste all those gases,” said Ha. “If we can efficiently and effectively convert methane from shale or gas fields to electric power or useful products, that would be very positive.”

Nickel carbide an effective catalyst

The researchers determined that they can dramatically reduce the energy needed to break the bond between carbon and hydrogen by adding a tiny bit of carbon within the nickel-based catalyst. This creates nickel carbide, which generates a positive electrical field. This novel catalyst weakens the methane molecule’s hydrogen-carbon bond, allowing it to break at much lower temperatures.

The researchers found that while too much carbon in the catalyst kills the reaction, a very low concentration actually enhances it. They have built a numerical model of the reaction and are working to show the work experimentally. The work was funded by the American Chemical Society’s Petroleum Research Fund with computational support from Argonne National Laboratory.

Building sustainability in seismic areas

By Erik Gomez, Voiland College of Engineering and Architecture intern

Washington State University researchers have received a National Science Foundation grant to develop guidelines that will help builders use more sustainable timber in high-rise buildings in earthquake-prone areas.

Daniel Dolan, professor in the Department of Civil and Environmental Engineering at Washington State University is working in collaboration with Colorado State University, Colorado School of Mines, University of Washington, Lehigh University, University of Nevada at Reno, Forest Products Lab, and American Wood Council to develop new designs for using cross-laminated timber (CLT) in buildings in seismic areas. The project is led by Shiling Pei at Colorado School of Mines.

Testing 10-story tall structure

As part of the $1.5 million National Science Foundation grant, the researchers will test designs for a 10-story tall, wooden building by simulating a real earthquake in a laboratory.

CLT is a relatively new heavy timber structural material made of lumber layers that are glued together to create thick, solid wood panels. The panels can be used for structural parts of a building, such as for walls and floors and make timber high-rise buildings possible. The Brelsford WSU Visitor Center and the
Washington State University researchers have developed a new software tool that will improve scientists’ ability to identify and understand bacterial strains and accelerate vaccine development. The tool, called RepeatAnalyzer, is able to track, manage, analyze, and catalog the short, repeating sequences of bacterial DNA.

The researchers used the software to characterize *Anaplasma marginale*, a tick-borne bacterium that affects cattle, and published their work in the journal *BMC Genomics*. The research team includes computer science student Helen Catanese; Kelly Brayton, Department of Veterinary Microbiology and Pathology; and Assefaw Gebremedhin, School of Electrical Engineering and Computer Science.

Like many types of bacterial pathogens, *A. marginale* has a huge variety of strains and is widely distributed geographically, which makes vaccine development challenging. Scientists use short, repeating sequences of DNA, called repeats, to understand the bacteria, its heredity and geographic distribution, and to determine how harmful it is.

But for *A. marginale*, for instance, researchers have found more than 235 repeats. Without any kind of database, researchers had to mine published literature to keep track of the sequences. The task is also error prone when done manually, said Brayton.

“We developed RepeatAnalyzer precisely to bridge that gap,” said Gebremedhin.

They developed the software for *A. marginale*, but it can be extended to any other species with similar repeating DNA sequences. It also provides a visualization tool so researchers can track strains on a world map, said Catanese.

“This reliable software tool can fuel research and collaboration and accelerate the path to the discovery of a vaccine,” said Gebremedhin.

RepeatAnalyzer has garnered significant interest, and Brayton’s collaborators in South Africa and China are already using it, she said.

“Here is something that was overlooked and didn’t exist,” said Gebremedhin. “More than anything, it will help people. When you have a tool, and the right metrics and analysis, you may find things you might not have known before.”

The researchers are working to extend the software to collect and handle similar datasets on other bacteria, as well as expanding on the visualization and analysis functionalities.

The work was supported by Gebremedhin’s National Science Foundation CAREER award, which supports development of fast and scalable algorithms for solving problems in data science.
Brian Lamb Fund supports atmospheric research

Dagmar Cronn was working at her first research job in the Laboratory for Atmospheric Research at WSU when her mentor, Elmer Robinson, told her she could colead an important research project and would go to Antarctica to do it.

Afraid of the challenging conditions, she refused; she did not want to go to Antarctica.

Robinson kindly threatened to fire her and told her that she had to bring a camera along to boot, which she also didn’t want to do.

“OK, I will donate my body to science. I will die of frostbite,” she told him.

Cronn went on to lead the project. She endured survival school in an actual blizzard and didn’t freeze. She returned and spent 15 years as a scientist in the lab, traveling the world to take data from the Panama Canal to Malaysia, China, and Antarctica.

She fondly remembers the tremendous support, mentoring, and high expectations that helped her launch a successful career in academia.

To continue the long tradition of the lab’s supportive culture and to return the kindness to her, Cronn and her husband, Bob, have established the Brian Lamb Endowment for the Laboratory for Atmospheric Research.

The fund, named for longtime faculty member and regents professor Brian Lamb, will support graduate scholarships, equipment, and research grant matches. Lamb, a member of the Washington State Academy of Sciences, is a leading researcher in regional grid modeling of photochemical air quality and wind-blown dust, application of atmospheric tracer techniques, biogenic emissions, 3-D turbulence modeling, and greenhouse gas emissions.

Cronn came to WSU shortly after completing her doctorate in atmospheric chemistry. She soon realized that as a student, she had received little of the critical support and mentoring needed for a successful career.

“I had sort of persevered by accident,” she said.

Her supervisors at WSU immediately gave her a raise, making sure she was well paid. The salary was important, particularly, to raise her stature as a woman in science, she said.

During her time at WSU, her colleagues made her part of the LAR team, so that she worked collaboratively on proposals. The group shared its resources, so that everyone had access to
equipment. Staff and graduate students were part of the integrated team. The only thing that Cronn struggled with was football pools, since she didn’t understand the game. Someone on the LAR team always managed the voting for her.

“I was a part of the Laboratory for Atmospheric Research—and, the ‘of’ is important,” she said. “In my education experience, I had been ‘in’ but not ‘of.’”

Her mentors pushed her to reach for new heights. They helped her with networking, introducing her to internationally known scientists around the world who were conducting research in areas such as acid rain and stratospheric ozone depletion. She soon became a well-connected member of these science communities, which was critical to her success.

“You couldn’t get any better than that,” she said. “It was a really nice time in my life.”

And, when it came time to leave, her colleagues again supported her career. She remembers that President Sam Smith had become a mentor and advisor to her. He had nominated her for a fellowship and leadership training and had provided support for her to participate. He told her that if he couldn’t find an administrative position at WSU when she returned from her training, that he would help her find one elsewhere. He kept his promise.

She went on to become dean of the College of Sciences at University of Maine and provost and vice president of Academic Affairs at the University of Oakland. She retired in 2007.

Cronn hopes the new endowment will continue the collaborative and supportive spirit in the lab for many years to come and that others who benefited over the years will support it as well.

“I’ve always had the kind of relationship with WSU that people usually have with their alma mater,” she said. “I went off to other institutions over the years, but I always have had a soft spot for WSU.”

To support the Brian Lamb Endowment, contact Bridget Pilcher at 509-335-0144 or pilcher@wsu.edu.

**WSU research in the Arctic**

Scientists in a rare and sometimes dangerous study of the Arctic found that the region’s thinning sea ice is more prone to melting and storms, threatening its role as a moderator of the planet’s climate. The researchers spent several months, much of it on a ship frozen into the ice, as part of the first wintertime expedition to examine the younger, thinner sea ice that typifies the “new Arctic.” In a study led by the Norwegian Polar Institute, Von Walden, WSU professor of civil and environmental engineering, spent a month on the project and documented the first observations of how winter storms affect the surface energy balance of the young, thinner sea ice.
Faculty Highlights

**Anjan Bose**, National Academy of Engineering member and regents professor in the School of Electrical Engineering and Computer Science, received the CIGRE (International Council on Large Electric Systems) U.S. National Committee Phillip Sporn Award, which is the organization’s highest award.

**Yong Wang**, Voiland Distinguished Professor in the Gene and Linda Voiland School of Chemical Engineering and Bioengineering, received the American Chemical Society’s Industrial and Engineering Chemistry Division’s fellow award.

**Kelvin Lynn** received the 2017 WSU Eminent Faculty Award. The award honors the career-long excellence of those who have changed the thinking in their fields through research, creative scholarship, teaching, and service. Lynn, a regents professor and director for the Center for Materials Research, is a pioneer in using positron beams to measure material properties.

**Yuehe Lin** is among the top-cited scientific researchers in the world, named by Thomson Reuters as among the top one percent of those cited in their field. He conducts research in nanotechnology, particularly with the development of small-scale devices, materials, and analytical systems for biomedical diagnosis, drug delivery, energy, and environmental applications.

**Diane Cook**, Huie-Rogers Chair Professor in the School of Electrical Engineering and Computer Science, was named a fellow of the National Academy of Inventors. Cook conducts research in data mining and artificial intelligence, focusing on the design of smart homes that use machine learning to provide health monitoring and intervention.

**HONORS AND AWARDS:**

- **Jean-Sabin McEwen**
  National Science Foundation CAREER award

- **Steven R. Saunders**
  National Science Foundation CAREER award

- **Dae Hyun Kim**
  Defense Advanced Research Program Agency (DARPA) Young Faculty award

- **Xiaopeng Bi**
  WSU President’s Distinguished Teaching Award for Instructors and Clinical Faculty

- **Brian Lamb**
  Elected to the Washington State Academy of Science

**FACULTY FELLOWS:**

- **Noel Schulz**
  Institute of Electrical and Electronics Engineers

- **Katie Zhong**
  American Association for the Advancement of Science

- **Susmita Bose**
  American Association for the Advancement of Science
Ensor Lectureship: A gift with impact

When David Ensor ('63, ChemE) thought about how he might support the chemical engineering program at WSU, he wanted to have a big impact.

His support, with the suggestions and effort of Jim Peterson, school director, led to the establishment of the Gene and Linda Voiland School of Chemical and Bioengineering's Ensor Lectureship, which promises to bring world-class researchers to WSU. The annual lectureship, established in 2016, will feature emerging research in chemical engineering, bioengineering, aerosol technology, and nanotechnology.

In the past year, Ensor lecturers have included Professors Gabor Somorjai from University of California, Berkeley, and Bruce Gates from University of California, Davis, who are leading researchers in the field of catalysis and surface science. Both are members of highly influential and prestigious national academies. Somorjai is the recipient of some of the highest honors bestowed on scientists, including the National Medal of Science, bestowed by the president of the United States, and the Priestley Medal, the highest honor of the American Chemical Society.

“I think the Voiland School is at a transition point,” said Ensor. “The school may be at a juncture in how it develops, and assisting the process is what we want to accomplish.”

The experience can be especially transformative for students and can really change their perspectives, he said.

“You find out that you’re kind of just like they are—maybe a little taller or shorter—and that they just worked extremely hard; I’m sure there are people here with that same potential,” he said.

Ensor grew up near rural Reardan, Washington, and came to WSU with an interest in math and science. His small high school didn’t have a science club or advanced math classes, and, he recalls, he didn’t have as much preparation as some of his fellow students. What he did learn from his rural, farming upbringing was how to work hard, which he applied to his studies. He went on to graduate school and a successful career in environmental and chemical engineering.

He retired in 2014 as a distinguished fellow, emeritus, of RTI International (formerly Research Triangle Institute), a nonprofit organization that provides research and technical services. He holds several patents and has published almost 200 papers. In 2016, he received WSU’s Alumni Achievement Award in recognition of his contributions to aerosol science and in protecting workers and the public from air pollution.

“The Ensor Lectureship enables us to bring research leaders to our campus for valuable interactions and collaboration that truly enhance our program, its reputation, and opportunities for our students,” said Jim Petersen, school director. “We’re so grateful to David and Sara for their support that has made these wonderful opportunities possible.”

Chemical engineering faculty and students with David Ensor (far right) and Gabor Somorjai (third from right).
REMEMBERING FAMILY...AND WSU
ONE FAMILY’S DEDICATION

Brothers Ralph Lowry Jr. and Robert Lowry never attended Washington State University, but the school has always held a special place in their hearts through the great affection both their parents and grandparents had for the University.

Ralph Lowry Jr., known by his family as Ted, established the Ralph and Gladys Waller Lowry Scholarship Endowment in 1993 to honor his parents, who both graduated from what was then known as Washington State College (WSC). The endowment supports scholarships and graduate fellowships for many students in the Voiland College of Engineering and Architecture.

Ralph Lowry Sr. received a master’s degree in civil engineering in 1912, and Gladys was the daughter of Osmer Lysander Waller who was vice president of WSC for twenty years and dean of engineering. Ralph Sr. grew up in Republic, Washington, where he received a scholarship to go to State Normal School at Eastern Washington when he was 14 years old. At that time, he had lost both parents but was adopted by two family friends with the help of his older brother. He eventually arrived at WSC. There, he succeeded in his engineering studies. He was also captain of the basketball team, a track team star, and a member of the Sigma Nu fraternity.

It was through serendipity that he met Gladys. At the time, faculty members hired students to do their laundry at home, and Ralph’s fraternity brothers mentioned that the Waller family had three beautiful daughters, all of whom eventually graduated from WSC. Ralph began doing laundry for the family soon after and went on to marry Gladys in 1916, while working in Sunnyside, Washington.

Several years after graduation, Ralph got a job with the U.S. Bureau of Reclamation in Denver as an engineer. As the family grew, they relocated periodically while Ralph supervised dam building projects throughout the west, including Hoover and Shasta dams. During Ralph Jr. and Robert’s childhoods, the family lived in Pendleton, Las Vegas, Boulder City, Denver, and in Montana.

Robert, now at the age of 99, recalls some of his fondest childhood memories being the two years he spent in Pullman living with his grandparents, the Wallers, at their house on Maple Avenue. The first stay was in 1926–27 where Robert attended third grade because a school was not available where his father was working. Grandfather Waller doted on his grandson, and Robert fondly remembers learning from him how to use tools and making bows and arrows. They would even visit the college’s farm to try to milk a cow. It was also the year that Charles Lindberg flew across the Atlantic and in those idyllic days, Robert spent evenings with his grandparents listening to radio adventure series like Jack Armstrong, the All American Boy and Little Orphan Annie. After the Amos ’n Andy show, it was time for bed. He dug vegetables in their garden and picked fruit from the family’s cherry and apple trees. On Sundays, his grandfather took everyone on drives around the countryside in his Studebaker, and Robert loved it when they headed up Roundtop Hill with the engine roaring by using exhaust cut outs. Later, in high school, Robert spent another year with his grandparents when Osmer Waller was 78 and in ill health. The family provided dedicated care for Osmer in his last years.

Growing up, the Lowry boys learned valuable lessons in giving others a helping hand. While their family was relatively well off, they saw firsthand many families who were struggling through the depths of the Depression. During those hardest times, remembers Robert, young men and families came to Boulder City by riding the rails in search of jobs on Hoover Dam. His mother, Gladys, would pack four lunches every day to give to the unemployed knocking at their door looking for work.

After high school, Robert went on to the University of Nevada and the University of Michigan. Having grown up in Las Vegas before air conditioning and near Hoover Dam, he wanted to get as far away as possible from the hot desert. He studied naval architecture and went on to have a career in shipbuilding with the federal government.

Ralph Jr. went to high school in Redding, California, and served in World War II in the Army Air Corps as a radar
HONORING A FATHER BY SUPPORTING WHAT HE LOVED

Alice Spitzer (’66) learned the WSU fight song almost as soon as she could talk—her father made sure of it.

“Dad was a total, total Coug,” she said.

So when he passed away, she honored him in a way that she knew he would love with the establishment of the Hendrik Baarslag Jr. Study Abroad Endowed Scholarship. The scholarship provides support for WSU engineering students to study abroad.

Baarslag (CE, ’32) was born in Amsterdam in 1909. He emigrated with his family as a child, eventually making his way to the Federal Way area. He attended WSU, where he graduated with a master’s degree in civil engineering. For most of his career, he worked for the city of Tacoma, eventually retiring as superintendent of the water department.

Spitzer remembers how her father loved his time at WSU, which at that time was known as Washington State College. Every semester, he loved the freedom as he caught the train that took him to far away Pullman, and he enjoyed the challenging engineering programs. He was particularly fond of the friends he made living in Stimson Hall. When the school considered tearing down the residence hall in the 1970s, he got involved with saving it.

“From the time we could talk, he was teaching us the WSU fight song,” she said.

When it came time to go to school, Spitzer’s father strongly encouraged all of his children to attend WSU.

At the same time, Baarslag also loved to travel. With his European origins, he realized the importance of a global view, said Spitzer. He traveled around the world, including to Africa, India, Thailand, Japan, Australia, New Zealand, and to his native Holland.

Spitzer, too, became interested in distant places from the earliest age. She loved to pore over the family’s National Geographic magazines, and a high school Spanish teacher provided inspiration for her course of study.

“I inherited my love of travel from my dad,” she said.

During her time at WSU, Spitzer majored in foreign language with a minor in anthropology. She spent time abroad, living with a Spanish family in Madrid, Spain, where she worked as a governess. Later, she travelled across Europe. After she graduated, she joined the Peace Corps and worked in Tanzania.

Having the chance to study abroad and to experience foreign cultures is something every student should have, she said. Spending time in another country helps students learn about different cultures and habits across the world and broadens perspective. For engineering students, a foreign study experience prepares them for an increasingly global marketplace.

Many of the students who have received Baarslag scholarships indeed had never been outside the United States or had the chance to travel much before these study abroad experiences. With the support, they have reached far corners of the world, including China, Japan, Cuba, Norway, Spain, Australia, and Ireland. Their experiences have included learning about music in Ireland, studying Swahili, working as an intern at a water treatment facility in Tanzania, and seeing businesses “stacked up like a game of Jenga” in Japan.

Spitzer said her father would have loved helping students gain perspective about the world and become more globally engaged.

“The American way is not the only way,” she said. “We aren’t necessarily better. We’re just different from each other.”

A WIDENING GLOBAL REACH

WSU is the first university in the state to receive European Union funding to support international student and faculty research exchanges. The funding fosters WSU’s focused initiatives to grow and expand international collaborations for engineering, architecture, computer science, and other WSU faculty and students with leading overseas universities, including the Technology University of Dresden, Technology University of Eindhoven, and the University of Stuttgart. Pictured are Jonathan Whitley, undergraduate exchange student, and Andrew Porter and Talitha Johnson, students in the international double master’s degree program, at Switzerland’s Zurich University of Applied Sciences.
When Trinitie Vance (ME, ’12) was a student at Washington State University, she not only learned a variety of engineering skills, but she also learned how to find important problems to solve. Now, she is using her skills to develop technologies that could both support the struggling coal industry and help the environment, too.

Vance is part of an engineering team at ClaroVia Technologies that has developed a modeling tool that coal companies can use to evaluate the feasibility of producing useful new products from the otherwise environmentally harmful byproducts of coal-fired power generation.

“In changing a byproduct to a profit-generating material, the new technology could help struggling coal companies generate significant revenue from their massive ash buildup, operate more cleanly, and create new jobs to support the economy,” said Brian Hewitt, director of operations at ClaroVia Technologies. “This is almost a new form of mining that didn’t exist before, turning low-value byproducts into something valuable.”

Although Vance is a mechanical engineer, she had to learn a tremendous amount about the chemical makeup and processing of fly ash.

“She became a chemical engineer in a short amount of time,” said Hewitt. The work that she is doing will go a long way toward helping coal companies, some of which are small family-owned operations struggling to survive, he added.

Vance’s involvement with ClaroVia began back when she was a student in WSU’s mechanical engineering program at Olympic College in Bremerton. The program, which started in 2010, offers a way for place-bound students to get a WSU engineering degree, said Marvin Pitts, the program’s coordinator. WSU alumni, Albert Madakson (ME, ’15) and Mark Pitcher (ME, ’15), were also involved in fine tuning the chemistry involved in the process.
CONTINUED FROM PREVIOUS PAGE

“For students who simply can’t move to Pullman, this program makes a tremendous difference in helping them achieve their degrees and in getting started on promising careers,” said Pitts.

One of the teaching foundations of WSU’s world-class engineering program is the design project that each student completes with an industry partner prior to graduation. The senior design project provides students with real-world experience prior to graduation that gives them a leg-up on their career.

While the mechanical engineering degree program doesn’t cover many of the technologies that Vance and Madakson worked on, it laid an important foundation for them to understand complex chemistry and massive-scale process engineering.

“This program provides enough fundamental knowledge and problem solving skills that our graduates can continue to learn and contribute,” said Pitts.

ClaroVia Technologies and its CEO, Dan Preston, have supported 10 senior design projects at WSU’s program at Olympic College since 2012. Preston is an inventor who holds more than 75 patents and pending applications and developed the technologies that are used in GM’s digital OnStar® system and vehicle infotainment systems such as Ford Sync®.

ClaroVia has given students the chance to develop new technologies and apply for patents on a variety of technologies they developed prior to graduation. They have guided more than 40 students, including both Vance and Madakson, in developing and successfully submitting 10 patent applications in six years.

“ClaroVia is the driver in a unique partnership between the company and our senior design projects,” said Pitts. “They have contributed significantly to helping our students learn about IP [intellectual property] and patents and have really contributed to student interest in entrepreneurial projects.”

What Madakson valued the most during his experience was what he learned from Preston about divergent thinking.

“He gave me the opportunity to expand my knowledge way beyond our books and to be innovative,” he said.

Vance also values the real-world skills she learned at WSU and is returning the favor. She now guides and mentors WSU students at Bremerton in their senior projects, entrepreneurial efforts, résumé development, and in their job searches.

“I wouldn’t be where I am today without the WSU engineering program at Olympic College and the ClaroVia senior project,” she said. “As such, it is important to me, and to ClaroVia, to give back to and support the program in any way we can.”

Preston notes that Vance, Madakson, and Pitcher have been a key part of his company’s engineering production team.

“Their modeling showed that we have potential to be a player in a $329 billion industry that is responsible for 618,000 American jobs,” he said.

The company is now designing a pilot project that will incorporate the novel technology, funded by private investors.

LEARNING ENTREPRENEURSHIP

In the past five years, students in the WSU mechanical engineering program at Olympic College in Bremerton have been working with ClaroVia Technologies to learn entrepreneurship skills, including filing for patents. Forty-three students have received patents or provisional patents on a variety of inventions:

- System and method for dynamically configurable power distribution control and management system and an energy management system for monitoring and communicating characteristics of an intelligent energy storage device. Patented in 2012, purchased and filed by Eagle Harbor Holdings.
- Method and apparatus for dynamic configuration of a multiprocessor health data system, a health monitoring system which can collect data generated from multiple health, fitness, and environmental data generating devices by a health application running on a portable smart device. Pending patent in 2012, purchased and filed by Eagle Harbor Holdings.
- System and method for real-time guidance and mapping of a tunnel boring machine, an integrated navigation system that provides real-time parametric guidance information to a tunnel boring machine. Patented in 2013, purchased and filed by Eagle Harbor Holdings.
- Dovetail binding system for splitboard, splitboard boot bindings for backcountry splitboarding, 2014, provisional expired, marketed to K2.
- System and method for a multipurpose modular smart tool, 2015, provisional expired.
- System and method for aerosol overspray control, 2016, provisional expired.
- Multipurpose blender with programmable motor and interchangeable rotary element, 2016, provisional expired.
**BIM LAB MOVES FORWARD**

In the 21st century design workplace, contractors, architects, and engineers increasingly use Building Information Modeling (BIM) to collaborate over long distances using virtual technology.

With support from alumni and donors, the School of Design and Construction is building a BIM laboratory that will let students experience a global working environment on campus and gain access to equipment, software, and updated classrooms that reflect current industry technology.

The lab will educate students in creating and navigating multidimensional models and in manipulating models and documents using collaboration technologies. It will annually serve 200 construction management and 120 civil engineering students, who are in high demand upon graduation.

Funds raised for the project are covering construction costs, equipment, and training. The initiative also establishes a fund for future technology infrastructure.

McKinstry Co. and Hoffman Construction Company provided lead gifts for the project and funded the project’s first phase, which includes smart boards, cameras, microphones, and speakers so that students can learn about BIM-based workflow. A $60,000 gift from PCL Construction Services, Inc. is supporting the project’s second phase, which creates semi-immersive stations in the classroom for collaboration with BIM in 3-D virtual environments.

The design and construction workplace has changed dramatically in the past decade, said Darin Chestnut, ('86 Arch., '87 CM), director of major projects with PCL Construction Services, Inc. and a member of the SDC Advisory Board.

PCL started its virtual construction program in 2005, and it has expanded significantly since then. The company uses BIM throughout its building projects. Its construction team can take the architect’s model and easily integrate all of its building components—down to metal studs and finishes—to make sure everything fits. The tool helps the builders identify potential conflicts and eliminate problems before they ever show up on a work site.

“It’s really an important tool that is changing the way we do construction,” said Chestnut. “We build it once and we build it right.”

The company is excited to support WSU’s new lab.

“We think that virtual construction is going to have a major impact in our industry—we’re already seeing it,” he said. “We’re excited about helping to give that exposure to WSU students so they’re better prepared when they get out into the workforce.”

Skanska USA is also supporting the work. The final phase of the project will include equipping the space for a fully immersive virtual reality experience with the addition of VR and augmented reality (AR) headsets and software for student training in visualization and navigation.

“At the rate that technology is changing the way that we deliver construction, it is essential that university graduates are exposed to the BIM tools that are becoming more prevalent in our industry every day,” said Mark King, Seattle’s Virtual Design and Construction (VDC) manager for Skanska USA. “Through their exposure to BIM in school, these creative young minds will also develop new ways to leverage the power of the tools at their disposal and hit the job market well ahead of the curve.”

The Ingersoll Rand Foundation has also recently supported the initiative with a $25,000 grant. The grant will support faculty and student training. In particular, it will combine technology, instruction, and real-world collaboration scenarios for student instruction through BIM technology.

“We commend Washington State University for all that you do in education and are in full favor of producing graduates who are skilled in running BIM technology in a virtual global setting,” said Warren Michelson, vice president of Trane. “The Ingersoll Rand Charitable Foundation is proud to partner with WSU and looks forward to hearing how our employees engage with WSU students as their mentors.”
Kristoffer Christianson (CM, ’06) didn’t have a lot of choices when it came to going to college: It came down to finances and WSU was it.

Freshman orientation was his first visit to Pullman, and he arrived with only $350 in cash to get through the semester. His decision to study construction management was based on practical considerations. Coming from a family of architects and knowing that wasn’t for him, he found construction management to be a perfect fit. In high school he was guided by an industry mentor—a construction management degree would provide him with hands-on skills for a future in the construction industry.

At WSU, Christianson learned skills that launched his successful career, and his life was transformed. He is now a manager at Spee West Construction Co. The company is giving other construction management students a similar chance through the establishment of a Spee West scholarship fund.

Soon after he arrived on campus, Christianson quickly got a work-study job helping with IT for the architecture and construction management program. The job provided cash while also allowing him to get to know some of the faculty members in the school. He worked throughout his time at WSU, which, he says, made the difference in getting to graduation. Break times also meant earning needed cash, and he spent his vacations working construction in the Seattle area. By his senior year, he was managing his first projects for Spee West.

While he was working hard to attain his degree, Christianson says he also received tremendous support from faculty members like Max Kirk and Rick Cherf. He grew to love the WSU experience and his program. He met his wife in Pullman and, through his fraternity, made lifelong friends. By the time he graduated, it seemed that he knew everyone in Pullman—he saw friends or familiar faces every time he walked across campus.

“My experience at WSU was extremely meaningful,” he said. “It helped me

CONTINUED ON NEXT PAGE
His professors helped him every turn, and the experience was life changing. He was able to visit several countries while circumnavigating the globe and now uses both his degree and experience from the trip in his volunteer efforts. He has been helping to build a school and orphanage in Haiti.

After graduation, Christianson started as a project engineer at Spee West and quickly became a project manager. The company builds public institutions, with schools its primary focus.

The success of WSU’s construction management program is proven by graduates’ employment rate, and the students coming out of the program are highly sought after, he says. “When I got out, I was immediately able to use what I learned and to jump right into what we do,” he said. “My tool belt was full, and I knew how to handle situations that I encountered.”

**“My experience at WSU was extremely meaningful. It helped me grow as a person, and I am so appreciative of every opportunity I was afforded there.”**

—Kristoffer Christianson
DEPARTMENTAL RESEARCH EXPENDITURES FY 16

Voiland School of Chemical Engineering & Bioengineering, $3,854,013
Mechanical & Materials Engineering, $5,044,129
Electrical Engineering & Computer Science, $7,475,569
Civil & Environmental Engineering, $11,212,193
Other Departments, $518,383

STUDENT ENROLLMENT HAS INCREASED BY 30% SINCE 2012

*Starting in 2016, incoming students with math preparation below the pre-calculus level are considered in pre-engineering and are not counted in the college's enrollment. For 2016, there were 146 students in pre-engineering.

DID YOU KNOW?

RESEARCH EXPENDITURES HAVE ALMOST TRIPLED SINCE 2007.

VOILAND COLLEGE PATENT DISCLOSURES
Why did you choose to come to WSU?
I have known about WSU and Voiland College for nearly 20 years and have always been impressed with the outstanding research and quality educational opportunities that it provides.

I’ve also had the pleasure of working with WSU President Schulz when we were both at Kansas State University. I’ve been impressed by his positive energy and visionary leadership.

As I learned more about Voiland College, I was impressed with the scope and quality of teaching and research. The multilocation system intrigued me. To my knowledge, the Voiland College is unique in that it provides educational opportunities in five locations. This structure provides opportunities to create a unified vision for the Voiland College with education and research programs designed to take advantage of the unique characteristics of individual locations and programs.

How has your experience prepared you as dean of Voiland College?
I’m proud to be a first-generation college engineering graduate. I grew up on a small cow-calf ranch in northeast Kansas where I learned to do many things from rebuilding a tractor engine to making our own butter. I know that Voiland College is graced with many first-generation college students, and I remember the added burden to learn not only engineering, but how to be a college student. I’m hoping to be able to create programs that make this transition easier for our students.

I worked in research and development in the oil industry for several years after getting my B.S. but before going to graduate school. That experience taught me a great deal about industrial research, connecting research to corporate profitability, and managing teams across distributed geographic locations.

Perhaps most importantly, fostering an active safety culture was deeply ingrained in my being. I believe that it is essential for leaders to set expectations and pattern behavior relative to safety. Within our college, we have opportunities to help students develop this understanding through classroom teaching and the one-on-one
mentoring realized in the teaching and research laboratories. I plan to work with college leaders to ensure that we’re taking full advantage of the opportunities in this area while providing a safe environment for learning and research.

What are the biggest opportunities you see for Voiland College?
I’m excited by the fact that Voiland College is in a very strong position with outstanding students, faculty, and staff; impressive facilities on several campuses; a state government that recognizes the importance of higher education and STEM training; and a vibrant state economy fueled by the hi-tech sector.

I see a great opportunity for the college to more fully realize its potential. In particular, I plan to focus on increasing the retention and graduation rates of students, improving industrial partnerships, strengthening programs to support the talent needs of the state, and ensuring that the Voiland College continues to attract and retain world-class faculty passionate about both teaching and research.

“I WANT TO CREATE AN ENVIRONMENT THAT CELEBRATES THE COLLECTIVE NATURE OF THE COLLEGE WHILE RECOGNIZING AND LEVERAGING THE UNIQUE STRENGTHS OF INDIVIDUAL UNITS.”
—Mary Rezac

What are your top priorities as dean?
I want to create an environment that celebrates the collective nature of the college while recognizing and leveraging the unique strengths of individual units.

I’ve termed this “One Voiland” to remind us that we’re members of the same college, independent of discipline, degree, or location. We will grow and succeed as a united college working together for a set of common goals.

To accomplish this, I plan to spend time to meet the students, faculty, and staff in Bremerton, Everett, Pullman, Tri-Cities, and Vancouver. I also plan to meet with current and prospective corporate partners. In these discussions, I want to learn about the needs of these industries to ensure that the students graduating from Voiland College are well-positioned to be successful in finding employment to launch their careers.

Additionally, I’d like to learn about the unique research needs of Voiland College’s corporate partners. Our faculty, graduate students, and research staff have markedly increased the volume of research conducted in the past decade. As we continue this expansion, I will work to connect our researchers to interested corporate partners.

What do you like to do in your free time?
I like the outdoors—hiking, camping, skiing, and geocaching. I’m looking forward to taking some time with my family and getting to know the Palouse and the wonderful outdoor recreation it has to offer. I’m always open to suggestions, so if you’ve got a favorite spot that I shouldn’t miss, I’d love to hear about it!
DO-IT-YOURSELF

Micah Peyron wanted a longboard skateboard. Instead of buying one, she made it.

She and other students are now teaching each other important skills for their own projects—such as how to use band saws, sanders, drills, laser cutters and 3-D printers—through the Frank Innovation Zone (FiZ) hands-on learning space at Washington State University.

The FiZ provides WSU students from any major with space and equipment for hands-on activities that are not found in the typical curriculum—as long as they adhere to the strict safety conditions. The Voiland College of Engineering and Architecture's Executive Leadership Board provides financial support for materials and equipment.

“At first I was scared to attempt building my own board just because I have always had a fear for woodworking,” said Peyron. “That is mainly the reason I picked this project—I wanted to become familiar with the tools and see what amazing projects I could create. I will say my board turned out way better than I could have ever imagined.”

Peyron was asked by Kirk Reinkens, FiZ director, to teach a four-week pop-up class. These short workshops let students teach each other hands-on skills and information about equipment, for their own projects.

“There was so much innovation happening,” she said.