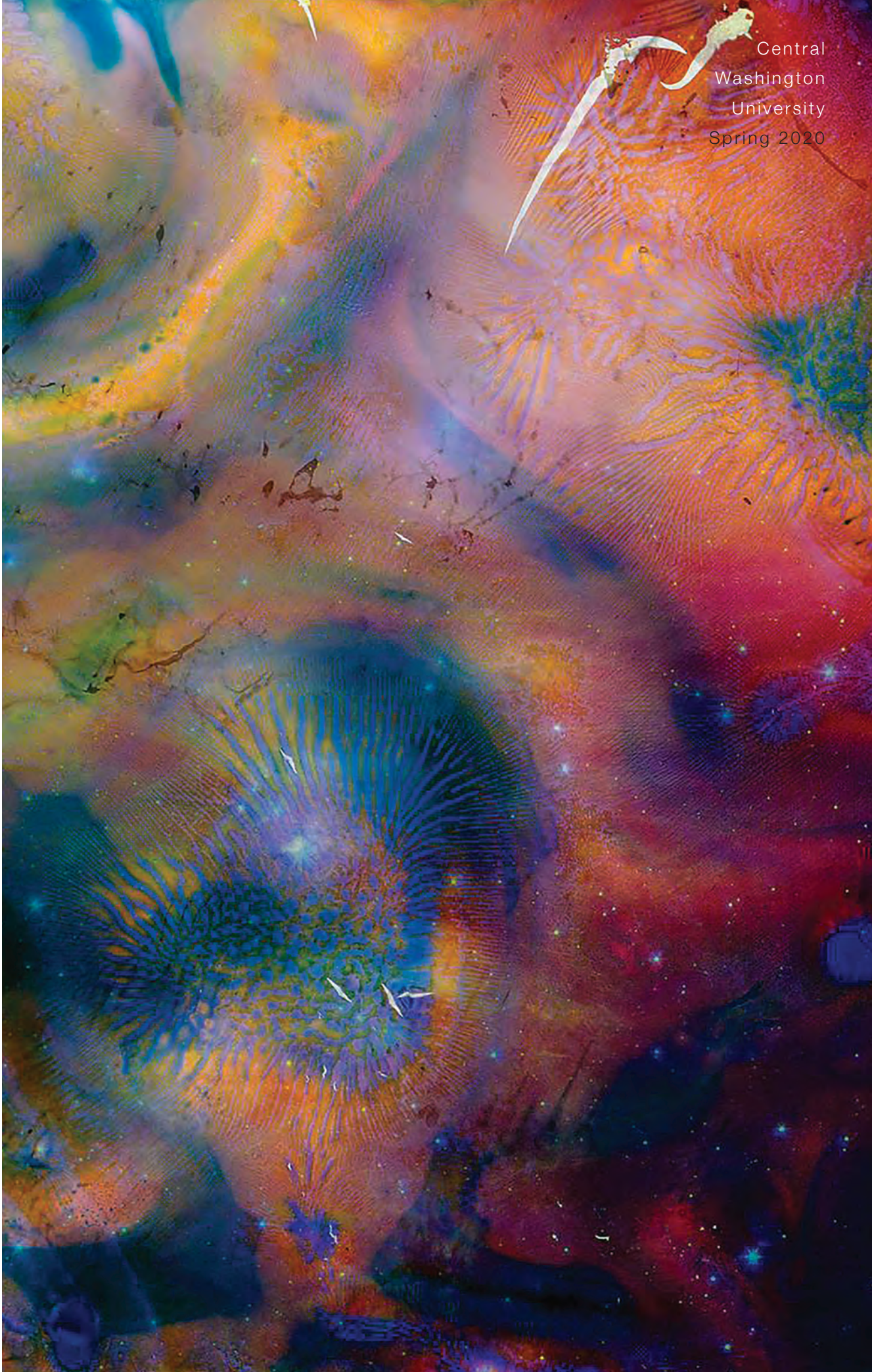
CRIMSON & BLACK



Central Washington University

Spring 2020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Web Extras

Go to *CWUCrimsonandBlack.com* for an enhanced digital edition of CWU *Crimson & Black*. Find extended versions of stories, read web exclusive articles, and view related videos.

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On the cover: *Photo eaten by bacteria found on a bathroom door handle. Part of a series called "Cosmos," by CWU art professor Marcus DeSieno. See story and more photos on page 32.*

Archival pigment print of bacteria grown on photographic film. Courtesy of Marcus DeSieno.

Left: *Historic Barge Hall was bathed in blue light throughout the month of April to show respect and encouragement to those on the front lines of the COVID-19 pandemic.*

Photograph: David Dick. Photo illustration: Bret Bleggi

CRIMSON & BLACK

Central Washington University
Crimson & Black
is a semi-annual free publication.
Issue number: Vol. 2, No. 1.
Issue date: May 2020.

Address:
Crimson & Black magazine
Central Washington University
Public Affairs
400 E University Way
Ellensburg WA 98926-7505

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PRESIDENT'S MESSAGE

JAMES L. GAUDINO PHOTO: DRAKE BUSATH, BUSATH STUDIO & GARDENS

I am proud of our Wildcat community. These past few months have tested all of us in ways we never could have foreseen. We closed our campus for weeks, converted our classes to online instruction, and learned how to carry on from home. The COVID-19 pandemic had a major impact on how we teach, learn, and work at Central.

Overcoming the challenges of the past few months has demonstrated the amazing character of our Wildcat community. It's why we created a campaign, #CWUTogether, to recognize the strength of that community, working together, to push through this difficult time.

I want to commend our faculty and students for how they have adapted to online teaching requirements and techniques. I applaud our staff and administration for the way they embraced new ways of how we must conduct the business of the university. I am thankful for our students, who have adjusted to all of these changes, and pressed forward toward their degree completion.

As we've changed the way we do things, our faculty, staff, and students have adopted new tools—including new technologies. One of the lasting impacts of the COVID-19 pandemic will no doubt be that it accelerated the use of technology in our classrooms. I think that once faculty and students become accustomed to these tools, they will become more routinely utilized.

Indeed, technology—the theme of this issue—remains one of the defining aspects of our lifetime. As I look back on my academic career, I can see an amazing trajectory as we transitioned from pens, paper, and chalkboards to overhead projectors and handheld calculators to virtual reality headsets and 3D printers. And who knows what's next?

One of the major changes I have helped implement during my time as Central's president is the rapid spread of technology not only in the classrooms but in our research laboratories. Because the primary tenet of a Central education is experiential learning, the presence of such technology, whether it is a high-powered electron microscope or a spectrometer, provides our students with the tools to prepare them for the next steps in their lives and careers.

That, too, makes me proud.

James L. Gaudino
President

Note: President James L. Gaudino announced in February that he will step down as president on July 31, 2021, after more than 11 years of service. "Serving as president of this wonderful university has been an honor and the privilege of my professional life," he said. "I want to express my appreciation to the faculty, staff, students, alumni, legislators, community members and trustees, past and present. They have joined in the work of building the strength and reputation of CWU as a welcoming community for everyone seeking a first-class university education."

CENTRAL WASHINGTON UNIVERSITY
CWU
•1891•

A BIG WILDCAT
Thank You!

To all of our Wildcat family members for their tireless service during the COVID-19 pandemic.

#CWUTogether

Commencement 2020

Due to safety concerns as a result of the COVID-19 pandemic, CWU announced that the 2020 Commencement ceremonies will not be conducted this year.

In a letter to 2020 graduates, Interim Provost and Vice President for Academic and Student Life Lynn Franken said that she understood the decision is "deeply disappointing" to the graduates and their families but that it was "the only responsible decision we could make at this time."

"Our priority has always been the safety and well-being of our students, staff, and community," she wrote. "CWU's Commencement ceremony brings tens of thousands of guests from all 50 states and several countries each year, and while rescheduling it may sound like a reasonable compromise, the university ultimately decided that having so many people in close proximity to one another—even six months from now—may contribute to a resurgence of the outbreak."

Franken said all 2019-2020 graduates will be allowed to participate in the 2021 Commencement exercises next June, where they will receive a diploma cover, a copy of the commencement book, and any special honors. Those who do not wish to participate in next year's ceremony will also be able to receive their diploma cover, a copy of the commencement book, and any special honors in a package that will be mailed to their home.

Additionally, the university plans to conduct a virtual commencement address to recognize the class of 2020 on Saturday, June 13, 2020. Details are still being finalized for that event and will be available later on a dedicated webpage **cwu.edu/commencement**.

Michelle DenBeste

CWU Names New Provost

Michelle DenBeste is CWU's Provost/Vice President of Academic and Student Life. A Pacific Northwest native, DenBeste earned a BA in Russian and East European Studies from the University of Washington in Seattle before completing an MA and PhD in history at Southern Illinois University. She previously served as Dean of the College of Social Sciences at California State University, Fresno.

CWU President James L. Gaudino said DenBeste displayed a dedication and enthusiasm for higher education that impressed members of the search committee, faculty, and trustees.

"At Fresno, Dr. DenBeste was known for her leadership and for her commitment to engaging with students, faculty, staff, and the community," Gaudino said. "She is a proven, effective administrator who has worked on strategic planning, enrollment management, creation of new degrees, and diversifying faculty."

Starbucks Exec Joins CWU Board of Trustees

Governor Jay Inslee has appointed Zabrina Jenkins, senior vice president and deputy general counsel for Starbucks to the CWU Board of Trustees. Jenkins graduated from Central in 1992, with a degree in business administration.

Note: *In the previous edition of* Crimson & Black, *Jenkins's job title was incorrectly stated.*

Governor Names Financial Services Executive to BOT

Jeff Hensler, Senior Investment Strategist and Partner with the Bellevue-based financial services firm, Sound Consulting Services, is joining the CWU Board of Trustees. Governor Jay Inslee appointed Hensler, who graduated from CWU in 1998 with a double-major in economics and geography.

Wildcats in Windows

Starting in May, CWU's popular mascot Wellington P. Wildcat began popping up in windows all over campus and the community as part of a 'Wildcat in the Window' hunt.

The hunt was a variation of the phenomena of neighborhood "bear hunts" occurring throughout the country. The hunts began as a result of families abiding by social distancing guidelines and stay-at-home orders looking for activities for their bored children.

"Numerous employees suggested taking the 'bear hunt' idea and make it relatable to the CWU campus as well as our university centers and sites," noted Staci Sleigh-Layman, executive director of CWU Human Resources. "We thought this might be something fun."

Participants downloaded images of Wellington from the #CWUTogether website (**cwu.edu/cwu-together**), printed out the image, colored it, and hung it in their windows. They were also encouraged to take a photo of their Wildcat image to post on social media.

Wellington Wildcat coloring page in a window as part of the 'Wildcat in the Window" hunt.

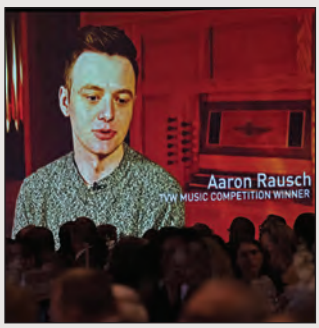
Five Recognized as 2020 Distinguished Faculty

In May, CWU honored five faculty members with the 2020 Distinguished Faculty Awards. Established in 1977, the awards annually recognize faculty who excel in teaching, research/artistic accomplishment, and public service.

The Distinguished Faculty Awards are the highest honor attainable at the university. Each honoree received a $5,000 monetary award and their names will be added to a permanent display.

THIS YEAR'S HONOREES INCLUDE:

- **Carey Gazis**, Geological Sciences, Distinguished Faculty for Service. This award honors a faculty member whose service contributes to the welfare of individuals, professional organizations, university groups, the community at large, or the university.
- **Yingbin Ge**, Chemistry, Distinguished Faculty for Teaching. This award honors a tenure-track faculty member who has a demonstrated knowledge of his or her field of study, effective ways of presenting material, continues to advance his or her field of study, and helps student understand the material.
- **Jennifer Green**, Communication, Distinguished Faculty for Non-Tenure Teaching Track. This award honors a non-tenure-track faculty member who has a demonstrated knowledge of his or her field, is an effective communicator, assists students in understanding material, and continues to advance his or her field of study.
- **Jeffrey Snedeker**, Music, Distinguished Professor. This award is bestowed on a faculty member who has demonstrated a long-term combined record of excellence in teaching, scholarship, or artistic activities, and service.
- **Lixing Sun**, Biological Science, Distinguished Faculty for Research/Artistic Accomplishment. This award honors a faculty member who has contributed scholarly or scientific investigation or inquiry in his or her discipline or has significant and/or innovative artistic accomplishments.



CWU Student Wins TVW Music Contest

A musical composition by CWU student Aaron Rausch will be broadcast around the state this year as the state government news network TVW celebrates its 25th anniversary. Rausch's work was selected as the winning entry in the TVW Music Composition Contest, a partnership between the Olympia-based broadcasting company and CWU.

CWU Prof Named to State Commission on Hispanic Affairs

Governor Jay Inslee appointed Rodrigo Rentería-Valencia, CWU professor in the anthropology and museum studies department, to the Washington State Commission on Hispanic Affairs (WSCHA).

Teaching with Tech

How New Tools Change the Way Students Learn

By Richard Moreno

The professor is in your spectacles.

She is not actually in the room with you and the other dozen students, but in the lenses of the stylish smart glasses you're wearing, she appears to be standing in front of you explaining the meaning of Newton's Third Law of Motion.

A small bird suddenly and unexpectedly appears in her open hand, and as it flaps its wings and slowly rises, the professor explains that for every action there is an equal and opposite reaction. Then she asks if anyone in the class has any questions.

It's not science fiction. It's science fact. And it's coming soon to a classroom near you.

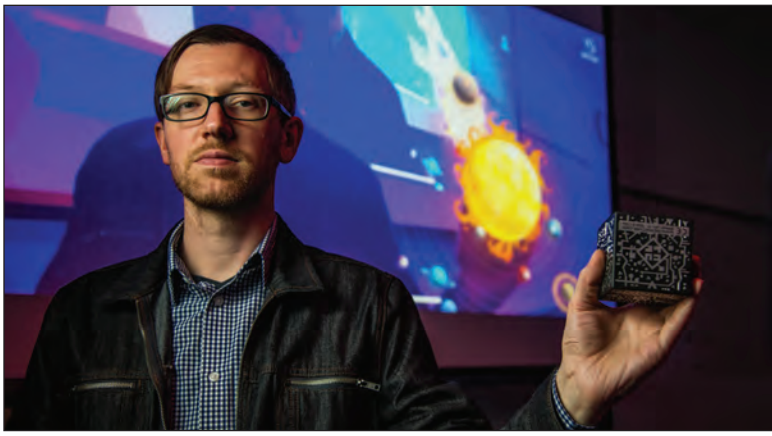
"If you look a few years into the future, I think there will be some component of augmented reality coming into play with teaching," noted Donald Davendra, chair of CWU's Department of Computer Science. "It's becoming so affordable that perhaps it will become part of the course fee, like a lab fee."

Davendra and Szilard Vajda, an assistant professor in Computer Science, are enthusiastic ambassadors for new technologies and systems that will transform the way students learn and how instructors teach.

"We are teaching using some cutting-edge technologies," Vajda said. For example, students in the department are learning things like mind-mapping (a way of brainstorming thoughts organically without worrying about order and structure), machine learning, robotics, virtual reality, augmented reality, artificial intelligence, video game design, medical imaging, and computer programming languages.

Davendra said one of the more impressive tools CWU students can utilize right now in their research is the university's super computer, Turing, named after Alan Turing, a famous English mathematician. Turing consists of a cluster of linked, high-performance power systems enhanced by accelerators and other technology that make it operate ten to 100 times faster than a typical desktop computer.

One of the more interesting current applications of technology in the classroom is "Meccy," a robotic device made by Double Robotics that Computer Science lecturer Rosemary Salter has used to teach classes. It resembles a tall, thin version of a Segway transporter device with a computer tablet affixed to the top. As Meccy, named after the Multimodal Education Center or MEC, moves around a room, the user's face appears on the tablet.



Nat Nickel, a senior media technician in the Multimodal Learning Department, shows off a "merge cube," which allows an instructor to incorporate augmented reality into a lecture or presentation.

PHOTOGRAPH: DAVID DICK. PHOTO ILLUSTRATION: BRET BLEGGI

"This is what you would call a telepresence robot. Basically, it makes it like there's a person in the room," she said. "It's very real; it's not just a machine. It really does feel to them [my students] like there's somebody in the room."

Salter said she decided to utilize the robot instructor—which cost a little under $4,000 and was funded from the Multimedia Education Center's revenue budget—in her classes at CWU-Sammamish last year because there was only an hour break between a class she taught in Ellensburg and one she was scheduled to teach in Sammamish.

"You can't get to Sammamish in an hour, not even driving 80 miles per hour," she said. "I saw this robot they [Multimodal Learning] were testing in the hallway and I latched onto her and used her as my replacement in the classroom."

Salter said in addition to being a useful teaching tool, the telepresence robot—controlled remotely from a desktop computer or laptop—is being used in medical applications, such as connecting a doctor to patients in remote areas.

Robots also are centerstage in classes taught by Computer Science professor Adriano Cavalcanti, who operates CWU's robotics laboratory. Cavalcanti's students not only program a NAO autonomous humanoid robot but they can use a brainwave-reading helmet that allows them to direct the robot using their thoughts.

"The OpenBCI [helmet] is a set of sensors on a cap that basically reads the person's brainwaves," he explained. "When you are thinking about something, your brain makes patterns or brainwaves. Basically, we integrate all the readings from the brainwave with machine learning and then, after training it, we have a pattern for certain actions or thoughts."

Computer Science lecturer Rosemary Salter stands beside "Meccy," her robotic doppelganger.

PHOTO ILLUSTRATION: DAVID DICK.

A CWU student experiments with a virtual reality headset.

In addition to allowing the user to give commands to a robot, the helmet has other applications, such as allowing a person who is blind to surf the internet, he said.

One of those providing support services for much of the new technology is Nat Nickel, a senior media technician in the Multimodal Learning department. Nickel oversees 3-D scanners, virtual reality devices, and augmented reality equipment. His job is to educate faculty on the potential uses of new technology, particularly related to virtual reality (VR) and augmented reality (AR).

"I'm not sure how many faculty members are aware of it or familiar with it," he explained. "Our job has been to reach out to the departments and say, 'Hey, we have this [technology] available to you. Here are some ways you could think about using it in your classes.'"

Nickel said he sees enormous potential for VR with distance education, and in the not-too-distant future he predicts many professors will use VR programs like "Lecture Capture," which allows the instructor to interact with students via a three-dimensional image in the classroom.

"That's already available," he said. "Not only that, but those lectures can then be recorded and played back in VR."

Additionally, CWU's Active Learning Classrooms have begun using "Merge Cubes," which are a form of AR. The technology works by synchronizing a computer-generated image to a hand-held cube. When viewed through a device, such as a tablet or cellphone, the image of the cube is replaced by the computer-generated image. Nickel demonstrated this by making it appear he was holding the solar system in his hand on a cellphone screen.

He also sees other new technology—such as special glasses with extra information overlaid on the real world (a more sophisticated version of "Google Glass" devices)—as being adopted in classrooms within the next five years.

Cool technology on the CWU campus isn't confined to computers, however. Angela Halfpenny, director of the Murdock Research Laboratory, housed in the Department of Geological Sciences, oversees seven separate lab facilities containing $3 million in state-of-the-art equipment, funded from university equipment funds and donors. Some of the high-tech devices in the lab she works with are a field-emission-scanning electron microscope (SEM), a benchtop X-ray diffractometer (XRD), portable handheld, X-ray fluorescent (XRF) instrument, and several sophisticated spectrometers.

"We are actively trying to encourage people to add more of the instruments into their classes and it is growing each year," she said. "So far, we've had professors from history, geology, chemistry, and environmental sciences use various instruments and the lab spaces in their classes."

To prove her point, Halfpenny pointed to a close-up image of a cat's tooth, taken by a student using the nearly $1 million scanning electron microscope. The detailed scan depicted a scratched, pitted surface that gave a clear indication this particular feline's diet included bird and mouse bones.

"You see the scratches on the tooth? This tells them [the students] how this creature lived and what it was eating," she said.

Other projects handled by the lab have included a student project on detecting wine fraud—i.e., does the wine in a bottle match what the label says? They can even identify fake paintings—is a Monet actually a Monet?—by measuring trace elements in paint.

"We're always producing research-level, publishable results," Halfpenny said. "Even in our undergraduate and graduate classes, we are having them work at research-quality levels so they get a proper background and experience in what it would be like to get a job in an analytical facility." ■

Robotics students test an OpenBCI helmet, which allows them to use their minds to remotely control a robot.

Sound Advice

CWU professors use the latest technology to educate students, develop real-world solutions

By Dave Leder

When CWU professors aren't teaching, grading papers, or crafting lesson plans, they are often conducting research on campus or in the field.

The processes they follow, the technology they use, and the data they collect are used to prepare students for careers in science, medicine, engineering, and academia. But many of the research projects currently taking place at CWU are also intended for a broader audience. With the help of new technology, these scientists are taking steps to benefit the world at-large.

Andy Piacsek, an associate professor of physics, said he and his colleagues enjoy exploring technology-based research projects for a variety of reasons.

"We want to help people in the real world, but we also have a curiosity about how things work," he said. "That's just part of being a scientist."

In Piacsek's specialty area of acoustics, he employs high-tech instruments and computer software to study how sounds and vibrations travel in complex situations. One project involves testing stringed instruments to determine if they sound better after they have been played for an extended period of time.

Conventional wisdom says a new instrument should sound better after it has been played for a long time. But some in the music industry have been wondering if this assertion is true.

"Some luthiers [someone who builds and repairs string instruments] charge extra for mechanically pre-vibrating their new instruments, but there is a question about whether the customer is getting anything out of it," Piacsek said.

Hammond Ashley Violins of Issaquah has asked CWU to study their inventory and compare the sound of unplayed instruments to those that have been artificially played for many years. Using a $350,000 piece of equipment (purchased from Discovery Hall's equipment budget) called a laser-scanning vibrometer, Piacsek and his students are creating digital maps of the instruments' vibrations to solve the mystery of whether pre-played instruments do, in fact, supply better acoustics.

"We'll keep testing them over time to see if there's a consistent change," he said. "Then we can ask why they're changing—if they're changing at all. The result of the study will help the industry decide if pre-vibrating new instruments is even necessary."

APPLYING THERMODYNAMICS

Similarly, Piacsek's Physics Department colleague Benjamin White uses other forms of emerging technology in his laboratory to develop solutions for real-world applications. The assistant professor, who specializes in solid-state physics, has been conducting research with superconductors and magnetocaloric materials during his five years at the university. Both feature practical applications and environmental benefits.

White hopes his thermodynamics research, which makes use of numerous magnetocaloric materials, will contribute to the development of more energy-efficient refrigerators.

PHOTOGRAPH BY JOEL WYNCOTT ON UNSPLASH

"Magnetic refrigerators can operate more efficiently than traditional refrigerators, but the problem is, we haven't found the best materials yet," he said, adding that some of the most effective materials contain gadolinium, which is relatively rare and would be too expensive for everyday use.

Another useful magnetocaloric material is manganese-arsenide, but White said that compound can't be used for magnetic refrigeration because it is too toxic.

"The work we've been doing has shown a lot of promise, but our goal would be to find non-toxic materials containing common and inexpensive elements that will achieve the same results," he said.

White also has been making progress with superconductor materials. The goal of his superconductivity research is to discover a material that might someday be able to replace copper wires in households.

He explained that copper wires have a low electrical resistance, and when an electrical current runs through them, the wires heat up due to a process called "power dissipation." In copper wires, some of the energy is transferred to the wire, but superconductors have zero resistance, meaning that the electrical current can travel without any loss of energy.

"With current technology, you're always losing some energy, but if you could replace all of those wires with superconducting wires, you wouldn't have any loss," he said. "That would create better efficiency throughout the electrical grid. Electricity would become cheaper and we wouldn't need to produce as much of it."

ASPIRING ROCKET SCIENTISTS HONE SKILLS

Another CWU Physics Department faculty member employing the latest technology to forward her research is Darci Snowden. Over the past few years, the assistant professor and planetary scientist has been helping her students build instrumentation devices that can be attached to weather balloons.

Snowden's recent work has centered around creating micro-controllers, called Arduinos, and mini-computers known as Raspberry Pis. The relatively inexpensive Arduinos communicate with sensors and perform simple tasks like moving a motor. A Raspberry Pi, on the other hand, is a more sophisticated device that can be connected to monitors and acts like a mini-computer. Raspberry Pis also can be operated by Linux operating systems.

"This technology is being used more now with the emergence of the student robotics competitions, like FIRST (For Inspiration & Recognition of Science & Technology)," said Snowden, who also serves as the faculty advisor for the CWU Rocket Club. "The Arduinos and Raspberry Pis are easy to use and they show students what it's like to build actual space instrumentation."

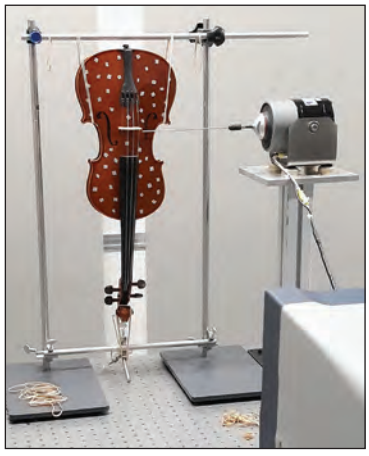
After the students develop instruments using the micro-controllers and mini-computers, they attach the devices to weather balloons and launch them into the atmosphere—as high as 100,000 feet—where the devices record data that is stored on the balloon and recovered after the balloon lands.

"Everything is automated, so once the devices are up in the air, they're out of our control," Snowden said. "You can't make any adjustments. They just have to work. Having that kind of hands-on experience is really valuable for students who want to go into engineering."

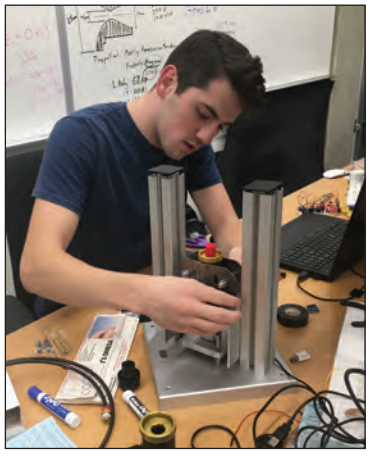
Some Rocket Club members are working on other high-tech projects to prepare for careers in aerospace and rocket science. One student is working on a wind tunnel using principles of fluid dynamics. Another has developed a thrust table that measures force and pressure inside a rocket motor as a way of testing engine and nozzle designs.

"Rocket science is enjoying a bit of a renaissance with companies like SpaceX and Blue Origin," Snowden said, adding that there are a growing number of career opportunities in Washington state. "Using this type of modern technology is a great conduit to teach students how things are done in the real world." ■

Members of the CWU Rocket Club prepare to launch a weather balloon with scientific instrumentation attached.



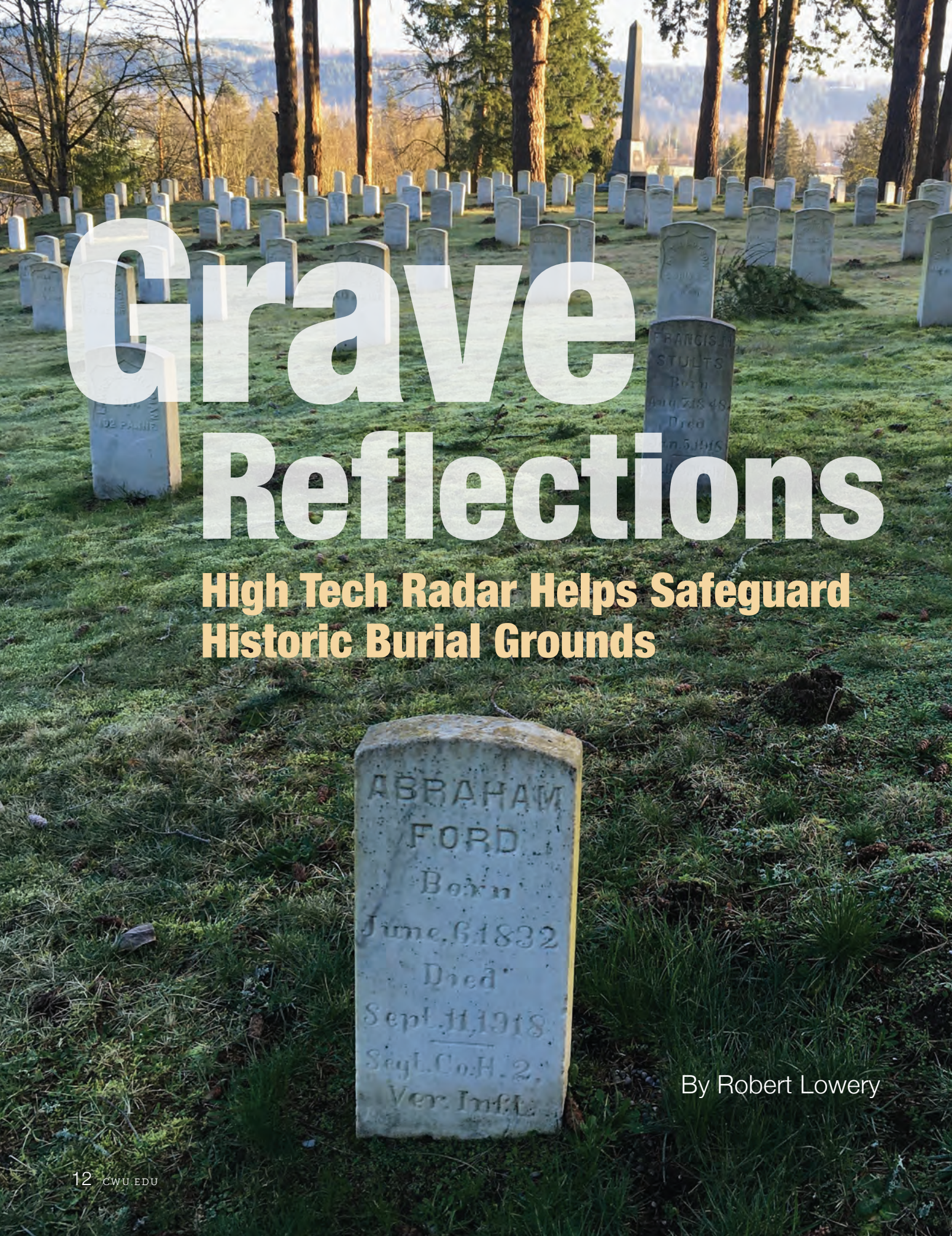
A violin is set up for acoustics testing, using a shaker and laser-scanning vibrometer.



CWU physics and engineering student Josh Maclurg develops an instrument to measure rocket engine thrust and pressure.

Grave Reflections

High Tech Radar Helps Safeguard Historic Burial Grounds



By Robert Lowery

When the Washington Soldiers Home Cemetery in Orting decided to build a new road on its property it faced a dilemma—how to construct it without knowing exactly where all the burial sites are located?

In fact, one of the main difficulties of doing any construction around an historic cemetery or burial ground is knowing where it's safe to work without disturbing graves. Often, precise records of such details weren't kept back in the day.

Fortunately, CWU Anthropology and Museum Studies Professor Steve Hackenberger and his students can help. Hackenberger, working with teams of five or six students, utilizes high-tech locational equipment known as ground penetrating radar or GPR to find burial sites that may have been forgotten or overgrown.

The Soldiers Home Cemetery posed unique challenges because it is the final resting place for more than 2,200 veterans from the Civil War, Spanish American War, World War I, World War II, Korean War, and Vietnam War, including five Medal of Honor recipients. The historic cemetery was established in 1891.

"[Fortunately,] there was nothing that looked like a grave in the area where they want to construct the road," Hackenberger said. "Because of a state law that protects graves, the [Washington] Department of Archaeology and Historic Preservation has been asking people to be extra careful with all work within cemeteries."

Hackenberger said he was contacted because his team had been involved previously in similar projects, including at the historic Roslyn Cemetery, for the City of Cle Elum, and in assisting a local landowner to avoid disturbing an early historic mission site.

Mallory Triplett and Josh Allen display GPR results. The color map computer printout (left) shows a grave site in red. The GPR data logger (right) provides a black and white radar profile of the grave site.

PHOTOGRAPH OF ORTING'S WASHINGTON SOLDIERS HOME CEMETERY AND OTHER PHOTOS COURTESY OF CWAS.

GPR Proves Beneficial in Many Fields

CWU undergraduate and graduate students from geology and geography also use the university's GPR unit for research.

Students in the field methods in environmental geology class collect GPR data and apply their findings to topics that are of current interest in water resources management, as part of the Yakima Basin Integrated Water Management Plan.

Summer field school students using the sled configuration for a Yakama Nation fisheries project.

Students have also used GPR to map the depth to groundwater on a gravel terrace along the Yakima River.

Karl Lillquist, a CWU geography professor, said his cultural and environmental resource management graduate students have been using GPR to assess the composition of rock glaciers in the Cascade Range. This work is aiding in understanding how much frozen water is actually held in those rock glaciers.

All of the work done by Hackenberger and his students is conducted through the Central Washington Anthropological Survey (CWAS). Under the direction of Josh Allen, CWAS performs archaeological investigations throughout the Pacific Northwest. Its goal is to enlist public involvement in identifying and protecting regional archaeological resources.

Typically, rotating teams of students will work on each GPR survey project, with up to 20 students involved in some projects. The field work leads to computer data processing and imaging, and report writing. Students learn the theory, method, and technique of geophysics with hardware and software.

According to Allen, who has been overseeing the Soldiers Home Cemetery project, there is a growing need—including by state and federal agencies along with Native American tribes and nations—for the services CWU offers.

For example, Hackenberger and his team have been invited to work with the Puyallup Tribe to complete a GPR survey of a forested cemetery area. Washington State Parks has also reached out to Allen to help survey a sensitive area of coastal dune.

"By the end of the month, we'll have student researchers and staff working on other GPR survey projects," Allen said. "We'll be looking to identify and document potentially unknown or unmarked grave sites."

Hackenberger added that the true benefit to the type of work the students have been able to do is that it gives them real-world experience.

"The only way you can learn to use this is through hands-on," he said. "Students get exposed at different levels. Even my introductory class learns about it and gets to use it. The software is really as interesting as the hardware." ■

Changing the Face of Technology

By Nicole Klauss

Technology and the other STEM fields are among the fastest-growing industries in the world today. These career paths traditionally are male-dominated, but efforts are underway to bring more women into the mix.

Outreach continues to improve every year, although some people, like CWU senior Kirti Patel, say the technology field still feels like a boy's club. For example, in her capstone project—making inventory software for a client—she was the only female in her group of five.

"All classes were heavily male-skewed," said Patel, a computer science major. "I think I was the only female in my first computer science class. That was a surprise to me."

Regarding the number of people of color represented in technology fields, Patel, who is Indian, believes the situation has improved and is less pronounced than the gender gap.

"I think representation is getting better in the industry," she said. "I've had so many family friends that work in the industry, and that's what motivated me to get into it. They're not being treated unequally anymore, so that's a good start."

Senior computer science major Emily Bodenhamer said she hasn't noticed a significant difference in female participation during her time at CWU, saying the number of women in her classes decreased as she advanced further into her program.

"As you progress through the major, the amount of women in the major gets smaller," she said. "In general, the amount of people gets smaller because computer science is such a hard major."

Mariannly Marquez, who hails from Maracaibo, Venezuela, chose CWU as the place where she wanted to study physics. She was impressed by the school's commitment to hands-on learning.

FACULTY PERSPECTIVE

Rosemary Salter, a CWU lecturer who teaches new and advancing technologies and technical writing, said she doesn't typically have many female students in her classes. In her two sections of technical writing during the winter quarter, she only had two females out of 44 students.

"I think we're just not getting them in … Sometimes I wonder if the word 'technology' isn't scaring away some of the young women," Salter said. "And yet tech is such a fun, all-encompassing area, so I don't know if I need to address that or if that is an issue."

Her observations may be following a trend where women tend to pursue the softer skills versus the more technical areas. Of the 1,219 students in the Information Technology Administrative Management (ITAM) major this school year, about 40 percent (485) are women. Of the 326 computer science majors, only 60 of them—about 18 percent—are women, although that number has increased from 2017-2018 when only 13 percent were women.

Virginia Tomlinson, Central's new Chief Information Officer, said she has heard anecdotally that women enter into IT at the same rates as men, but they don't always continue their careers in IT.

"When men would move on to get to the manager positions and those higher IT positions, women seem to change careers sooner," she said. "They tend to stay in the softer skills—the service desk, design and web, and those areas—instead of highly technical areas like networking and system administration."

On campus, 32 percent of CWU's employees in the Information Services department identify as female, Tomlinson said, adding that the statistic doesn't include IT personnel in other departments.

REACHING GIRLS EARLIER

The limited number of women pursuing computer science is a national issue, and it is one that most colleges and universities are trying to change.

Joell Boast, a computer science teacher at Morgan Middle School in Ellensburg, said reaching girls at a younger age is key to getting them excited about computer science. She has seen a decrease in participation among girls in her computer science classes as they get older.

"I do think the awareness is getting better, but we're talking about it and addressing it at the college or high school level, and that's too late," she said. "The biggest thing we have to solve is reaching our students earlier."

Boast said there is a misconception where people think you have to be good at math to succeed at computer science.

"You just have to be good at thinking, but what are we doing with younger kids to help them practice thinking?" she said. "And that's where your project-based learning comes in. It's a mind shift."

Boast had an opportunity last year to take a group of middle school girls to Central to work with the CWU Girls Who Code Club. Introducing those students to female role models in the industry also helps inspire interest in STEM, she said.

One program that has been gaining traction among young women in Central Washington over the past four years is Game On! The partnership between CWU, Microsoft Corp., and the Real Madrid Soccer Foundation was developed to teach computer coding and leadership skills and values through the sport of soccer to middle- and high-school students from underrepresented groups. The program started in the Yakima School District in 2016-17 and has since expanded to Ellensburg and Mattawa.

During its first full year, Game On! served 119 students, 32 percent of whom were female. Those numbers grew significantly in 2018-19, when girls made up 49 percent of the 515 students who participated

"We aim to serve underrepresented middle- and high school students from economically disadvantaged communities in Washington state," noted Manuel Rodriguez, director of the Game On! program. "Our goal is to grow the Game On! program to support high school completion and stronger pathways to college, particularly in the STEM fields."

Other organizations on campus have hosted events to encourage girls to pursue STEM careers. Last fall, the CWU chapter of Women in Aviation International brought girls ages 8 to 17 to campus to learn about the aviation industry. In addition, CWU's Center for Excellence in Science and Mathematics Education hosts the Expanding Your Horizons event for girls in fifth through ninth grades. Program manager Dannica Price said the event was canceled this year, but it is expected to return in 2021.

Campus clubs, like the Women in STEM Club promote, support and provide resources for underrepresented female students at CWU. There are women in positions of leadership with the other STEM clubs like Rocket Club, Astronomy Club, and the Society of Physics Students.

Mariannly Marquez, who hails from Maracaibo, Venezuela, said she chose to study physics at Central because she was impressed by the school's commitment to hands-on learning—especially being able to construct her own rocket.

"I'm really glad I came here. During the beginning of the quarter, we began building our own rockets," she explained. "We took them to Pasco and we did rocket launches and we got certified [by the National Association of Rocketry] in Level 1 [high power] rocketry. That was a really great experience for me."

Patel, the computer science major, is president of CWU's Association of Computer Machinery. Since taking on a leadership role, she has transformed the group into a productive organization where students host internship panels, build their professional portfolios, and work on coding activities.

"I just wish women would see the beauty of computer science, and maybe more of them would join," Patel said. ■

Left to right: CWU's Cyber Security Ethical Hacking Club members Braden Koering, Connor Hilburn, Christine Manzanes, Lwin Htet, and Josh Schnell.

PHOTOGRAPH: DAVID DICK.
PHOTO ILLUSTRATION: BRET BLEGGI

Thwarting 'Hackt

CWU partners with industry to prepare students for real-world cyber-attacks

By Robert Lowery

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One trillion. That's the estimated number of computer hacks attempted every day. Roughly one hack every 12 minutes for each person on Earth.

These cyberattacks can affect everyone from the college student, who inadvertently reveals personal information that can lead to identity theft, to a small town that suddenly finds its financial records encoded and held for ransom.

The latter possibility, in fact, led the cities of Ellensburg and Cle Elum to invite a group of 65 CWU students, partnering with the Public Infrastructure Security Cyber Education System (PISCES) Northwest and its technical support contractor, Seattle-based CI Security, to monitor their internet activity.

"Normally, we wouldn't have such high-level supervision against potential infection of our systems," noted Cle Elum's City Manager Robert Omans.

In fact, within days of the start of PISCES monitoring, an anomaly was discovered in Cle Elum. While it turned out to be a normal part of the information technology (IT) system, Omans, who also oversees the city's IT, said it proved the monitoring worked.

"It's nothing but good," he said. "Because of all of my responsibilities, I don't get to spend, probably, more than two percent my time on IT, unless there is some type of problem. This is certainly beneficial for small jurisdictions where officials have to wear many hats."

Deb Wells, a CWU Information Technology and Administrative Management (ITAM) lecturer who oversaw the project, said it provided students a real-world experience.

"It was a priceless opportunity for them to see live data and make decisions on whether or not there was a possible attack or breach," she said.

How It Works

Students were able to use highly sophisticated technology that analyzes computer network traffic. When they did determine something was amiss, they informed the PISCES Cyber Range in Poulsbo to initiate a response with the organization being monitored, and with permission to share the information with the Washington State Fusion Center (WSFC).

The purpose of WSFC is to support government agencies to quickly protect privacy and civil liberties, ensure information and operational security, and support communications and collaboration.

"Because students served as operational analysts for government organizations that must safeguard critical infrastructures, they will be much better prepared to enter the workforce after graduation," Wells said.

Hitting the Ground Running

The success of the project also illustrates the growing need for qualified computer-security analysts. CI Security Chief Information Security Officer Michael Hamilton said CI Security is expecting to expand its Ellensburg operations center soon (it also operates centers throughout the state).

O'Rynn Hayden (ITAM 2019) is one of four CWU graduates who now serve as Security Operations Center analysts for CI Security in Ellensburg. He said working in the cybersecurity field is rewarding because he feels like he is doing something good for the world, especially in helping

CWU was one of 103 teams that participated in the U.S. Department of Energy's 2019 Cyberforce Competition.

to prevent attacks on organizations that provide health care and keep the lights on.

"We have multiple clients across the world and we, in real-time, monitor their networks for potential security breaches," Hayden said. "And we find out what kinds of requests certain users are making on our clients' networks. We can find out a lot about what's going on."

Hayden believes he was well prepared to assume that role and was able to jump right into his career.

"I felt very comfortable right off the bat looking at a lot of different types of data and looking at different types of exploit attempt," he said. "I feel like I'm able to pick the new things up a lot quicker because of the skills I learned at Central."

Hamilton concurred, adding, "The dude's already been promoted twice—that's what we think about the resources that we've been getting from Central. I spend a good amount of time with a number of institutions in our state. I know the academic underpinnings of the different programs. Because Central focuses a lot on learning how networks work—that is the key. We can teach how to sort through the data and look for a problem. They need to come through the door knowing how networks work."

"The dude's already been promoted twice—that's what we think about the resources that we've been getting from Central."

Michael Hamilton
CI Security, Chief Information Security Officer

CYBER-HYGIENE 101

The top 5 tips, and 1 freebie

1 **Rotate or change your passwords every 45 to 90 days, or earlier if you learn of a potential breach.**

2 **Do not use the same password for everything. Consider incorporating a password manager for all of your accounts and website logins.**

3 **Use a virtual private network (VPN) to encrypt your network's incoming and outgoing data.**

"This is vital if you are using free Wi-Fi and it's very smart—and should be a policy—if you are teleworking," ITAM lecturer Deb Wells said.

4 **While on the Internet, limit your browsing to sites that use the prefix "https" (hypertext transfer protocol secure), as they offer an added layer of security.**

"You can even add an extension to most web browsers to do this automatically," Wells pointed out. "It's called 'HTTPS Everywhere.'"

5 **Make sure to install anti-virus or malware software on your system, beyond what may come with your operating system. Free and low-cost options are available.**

6 **If you get a message to update your system, then you should UPDATE YOUR SYSTEM.**

"Companies specifically distribute these updates as soon as they can to fix any known or discovered bugs in their software or operating system," Wells noted. "So, it's not wise to ignore them."

"You need to have that drive to pull on that thread to see where it goes. Some of that we can teach and turn into process. But some (has to do with) an individual's personality and character."

Michael Hamilton
CI Security, Chief Information Security Officer

DOING IT THE CIA WAY

The foundation of the cyberwarfare training at CWU is understanding the Central Intelligence Agency's (CIA) Triad—considered the three main rules for cybersecurity, according to Deb Wells.

The first leg involves recognizing an attempt to gain access to confidential information. Each year, millions of cyberattacks try to gain unauthorized access to customers' personal data.

"Not everyone needs the 'keys to the kingdom'—everybody in an organization, or a home for that matter, doesn't need to have access to all the data or all the servers," Wells said. "What matters most is making sure that the people who need to know are only the ones who get to know. Access to assets, data, information, and so on, should be available only on a need-to-know basis. Data encryption is a good way to help ensure confidentiality."

The second leg of the Triad is integrity, which involves compromising or tampering with stored data when it's being transmitted.

"Information in underlying systems, such as databases, also needs protection," Wells said. "Access controls need to be put in place, and there should be an accepted procedure to input or change the stored or transmitted data."

Access controls are measures that are implemented to protect the data and ensure it cannot be manipulated by, what she termed, a "bad actor."

The third leg of the Triad is availability. A common type of cyberattack aims to cut off accessibility. These attacks are typically known as denial of service (DoS), which use a single computer and Internet connection to overwhelm a targeted system or source.

Hackers also can use what is called a distributed denial of service (DDoS) attack, which uses multiple computers and Internet connections, to overwhelm a computer system. In both cases, the hackers are attempting to make sure the services are no longer accessible.

"This could mean 24/7, 365, or simply when an organization is open for business," Wells said. "An iconic example of an availability attack was when most of the people living in Estonia were unable to access the internet after the country's entire network was shut down because of a dispute with Russia. Estonian officials are said to have ignored warnings of a Russian response. It came and the [DDoS] attack lasted 22 days."

Not surprisingly, the complexity and variation of cyberattacks can be mind-boggling.

"Even cyber professionals can get confused or distracted by all the 'noise' generated in the cyber world," Wells said. "For example, when our students are monitoring traffic for the PISCES project, they have thousands of feeds they can get bogged down with.

"However, with the knowledge they gain of the CIA Triad and the solid visualization tools available to them, they can stay on track and not get lost down a virtual rabbit hole."

Typically hackers target data confidentiality, integrity, and availability (known as the CIA Triad). Such breaches can negatively impact the accuracy and integrity of a system's data, which concerns Wells, who served as a cyber-computer officer in the Air Force for more than 21 years.

"That's a passion of mine, especially when you talk about the industrial control systems," she said. "SCADA (Supervisory Control and Data Acquisition) allows for remote monitoring and control of things like power substations, which depend on accurate data. If a hacker gets in and changes settings, while making it appear that things are still normal at the control center, then you can have loss of life."

Preparing for What's to Come

A big area of concern for most people is the theft of their confidential personal data. That applies even to people who believe they are not at risk because they don't do online banking or social media—or even use a computer.

"If they pay their taxes, then the IRS has all of their data," Wells noted. "Even if a person doesn't do anything wrong, their data could be stolen."

It's not only desktop computers and systems that hackers target. They have a new and emerging quarry: the internet of things (IoT).

The IoT is seen as one of the most crucial challenges right now because everything is connected digitally. This includes wearables, wireless routers, lightbulbs, refrigerators, voice-enabled AI (artificial intelligence), cars, and more. Robert Lupton, chair of the ITAM department, said the different layers of security are becoming highly sophisticated.

"It's challenging to prepare students to be ready for all of this because it's changing all the time," he said. "Lifelong-learning skills are going to be extremely important."

In terms of education, Wells also offers cybersecurity tips and training off campus during frequent presentations at service clubs, organizations, and businesses around Washington. Her IT students also chip in, providing specific risk assessments to Ellensburg businesses.

"You can't put your head in the sand and say, 'They're not going to hack into my device,'" she said. "Hackers have lots of nefarious reasons. Education is key to being safer, but there's no surefire way to be entirely safe online."

CI Security's Hamilton added that along with the technical expertise CWU students gain, they're also developing another valuable trait for budding cybersecurity professionals: curiosity.

"You need to have that drive to pull on that thread to see where it goes," he said. "Some of that we can teach and turn into process. But some (has to do with) an individual's personality and character." ■

What is the INTERNET OF THINGS?

The Internet of Things (IoT) moniker is commonly used and frequently misunderstood. The IoT is the wide range of everyday devices that digitally connect us.

IoT items include everything from voice assistants to refrigerators to medical equipment. There are even smart buildings, where lighting systems can automatically adjust depending upon immediate needs.

"IoT and 'smart devices' are an incredible addition to our technological advancement," Deb Wells said.

For example, small sensors embedded in road surfaces collect information about conditions ahead that can be relayed to corresponding receivers in cars and trucks driving on the highway. Medical devices use sensors to manage patient health, while ranchers are even implanting them in cattle as a way to manage herds on the open range.

The applications and uses appear to be limitless, and new technology is being designed and tested "virtually" every day.

But is the IoT secure?

"Yes … and no," Wells said, apprehensively. "Many times, a new 'smart' gadget comes with a default username and password. The consumer must go in and change that password and ensure (the devices) are locked down as much as possible. It's the responsibility of the user to ensure they change passwords and keep their networks safe and secure."

No matter how smart our devices become, Wells encourages users to be even more vigilant.

Alexa is Here to Help

Creating Smart Res-Hall Rooms

By Robert Lowery

"Alexa, what are my Monday morning classes?"

It's a question that dozens of CWU students can now ask—and have answered—as a result of a new customized version of Amazon's popular cloud-based voice service that has been installed in rooms in Dugmore Hall.

Students now have access to accurate, up-to-date information on more than 16,000 potential questions including about campus events, class schedules, and homework due that day.

The application was created by a team of CWU computer science students working with a consulting firm, Hybrid Cloud Gurus.

"Today's students expect universities to provide voice-enabled technologies that align with how they interact and engage with the world around them," said Andreas Bohman, CWU's Vice President of Operations, who department supplied the Echo Dot devices used for the project.

"This is a small portion of what we should do as an institution to prepare for Generation Alpha. They are, essentially, children born in 2010 and later who are coming to campus with an expectation of access to technology," he continued.

Hybrid Cloud Gurus' principal Bob Rapp agreed, saying, "The mentorship we do here on campus is all about making sure that the students are interacting with next-generation technologies."

The Central-centric personal assistant program was developed through a 10-week, winter quarter capstone course that allowed the students to customize the devices so they are more campus-oriented while ensuring the privacy of student users.

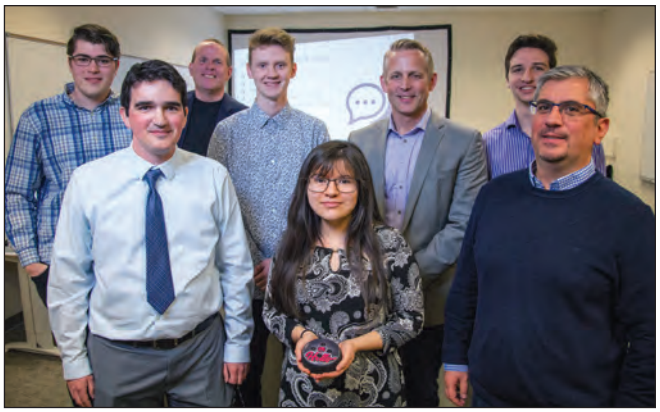
During a proof-of-concept demonstration at the end of the winter quarter, the five participating students had a chance to reveal their achievements. Senior Riley Krall, of Snoqualmie, was among them. The project helped him hone his skills for his desired work in software development.

"Dealing with cloud services is not something I had (done) before, but it's absolutely relevant," he said. "Working with this project gave me a lot of valuable experience that will be valuable in my career."

Rapp added that the students did such a good job with the design and user testing that the frequently asked questions (FAQs) could be rolled out soon to all student phones and voice-enabled devices. He said the main thing they needed to do was figure out what students cared about and how, if they asked a sensitive question, they could find better answers while remaining anonymous.

The FAQs include details about campus building hours, event times and locations, as well as students' classes and assignments that are due on a particular day.

"They did a really good job of architecting this solution," he said. "They were really smart and efficient about how they designed this. I'm really proud of their work."



Central Connect project students, faculty, and staff (l. to r.) Riley Krall, Jack VanWell, Bob Rapp, Tyler Huson, Emily Bodenhamer with Alexa, Andreas Bohman, Patrick Perkins, and Szilárd Vajda.

Krall said the different capabilities and what the students managed to implement went beyond what they thought they would get out of the project.

"It actually does make it easier to quickly learn information about Central," he said.

The information, which is continuously updated, pertains to the Ellensburg campus and the university centers and instructional sites too.

"Students, faculty and visitors on campus were all asked to interact with the Alexa devices," Rapp explained. "The results were overwhelmingly positive. Everybody liked the fact that they could ask a question specific to Central and about the university centers and instructional sites as well."

Rapp said the plan is to have an extended trial, involving more students and then next year release it on a limited basis and put it into production. In the future, he imagines adding similar devices, such as Google Voice.

"We might also add AI (artificial intelligence), which could link a particular question to additional information that might be relevant but was not sought as a part of the original question," he said.

CWU computer science professor Szilárd Vajda, who served as the students' advisor, praised the students' work and added, "As this project has been so successful, the next generation of capstone projects will, probably, continue to develop the skill capabilities of these devices."

Bohman said the partnership is a great example of how the university connects student-led initiatives to long-term strategies in delivering new technology solutions to campus.

"This has been a great opportunity for our students and our university," he said. "Being able to work on emergent technologies in an entrepreneurial incubator setting is a unique and invaluable experience for our students."

Or, as Alexa says: "Thank you for trying Central Connect. Have a nice day." ■

FOLLOW YOUR MUSE—AND HAVE A BACK-UP PLAN

By Robin Burck

CWU alum Matthew Clegg was passionate about music, but an engineering degree has made him more marketable

We often hear about the two sides of the brain and the different tasks each side performs. The right side is credited with logic, science, and mathematics, while the left side carries out functions that have to do with creativity and art. One side of the brain is believed to be dominant in most individuals, but CWU alumnus Matthew Clegg proves that you can use both sides to broaden your horizons.

In the early 2000s, Clegg was studying trombone performance at Central, one of the final stepping stones in his dream of becoming a professional orchestral musician. The experience, passion, and dedication demonstrated by the music faculty at Central left him no doubt that they would be exceptional teachers and lifelong mentors.

As graduation neared, the Great Recession hit, and Clegg watched several friends struggle to enter the classical music industry. With many orchestras going bankrupt, an already competitive audition scene had become out of reach. It was time to re-evaluate, adapt, and overcome.

In the months leading up to this decision, Clegg worked closely with his trombone professor and mentor, John Neurohr, to explore other options that could bolster his skillset. Watching his friends study engineering, combined with a lifelong interest in machines, led him to forge another path: increase his marketability by graduating with degrees in music performance and industrial engineering technology.

"I was always mechanically inclined, but I hadn't yet explored this other half, so I ran for it," Clegg said. "The fall quarter after I graduated with a music degree [2011], I came back to Central as a post-baccalaureate engineering student. Ultimately, I was able to intersect the workforce during a period of economic growth, and with a far more robust skillset.

"Initially, I didn't think I could market a music degree on an engineering résumé," he added. "The science degree paid my bills, and I thought it would inevitably eclipse my fine arts background. I lacked industry perspective and it seemed like an all-or-nothing situation."

Clegg's industry background now includes over 30 SolidWorks (CAD) certifications, machine design, welding and fabrication, and multiple additive/subtractive manufacturing technologies. He also chairs the Society of Manufacturing Engineers – Seattle Chapter 39, and works as a marine designer in the Equipment Division of Manson Construction, all while staying actively involved in music. Clegg also enjoys playing trombone in multiple Seattle-area orchestras and jazz bands, and he coaches low brass in the Maple Valley Youth Symphony.

"The key was learning how to translate the music world into traditional business concepts, and pivot between them very quickly and seamlessly during an interview," he said. "Any worthwhile employer values punctuality, self-motivation, leadership, and the ability to communicate complex ideas to a wider audience. Many of them don't realize someone with a music degree has likely been honing these skills since early childhood and has maintained them at a very high level throughout their musical career to remain competitive for auditions. If you can see the person across the table light up after hearing that, they will remember you."

Clegg explained that once his career was underway, he could quickly transition from one industry to the other and minimize the economic impact.

"Even if students don't invest in two majors, having a minor in an opposite field can still serve well during economic downturns," he said.

Clegg was recently invited back to campus to participate in the College of Arts and Humanities (CAH) Alumni Day, where he had the chance to sit on a panel and speak to students, showcasing the advantages of diversifying their education.

"I had a blast coming back to campus for the CAH alumni day," he said. "I'm proud to be a grad, and inspired to see the university investing in our alumni community. I believe this will keep Central competitive far into the future. This spirit of belonging is one of the primary reasons I initially chose Central; several former professors have remained my mentors to this day. Central's effort to connect CAH students and alumni is an investment we, as industry professionals, can't afford to pass up."

As a member of the CWU Alumni Association, Clegg enjoys remaining engaged with the university by working with faculty members to mentor current engineering and music students. As the chair of SME Seattle, Clegg encourages local employers to explore the value of candidates who feature an arts and humanities background, along with an engineering degree.

Clegg advocates for students in the arts and sciences to look to one another for inspiration, strength, and community. No matter which career path they follow, he hopes future CAH graduates will remember to embrace their creative potential and problem-solving abilities when faced with adversity, empower each other as leaders within their communities, and inspire the next generation of students to succeed. ■

HONORING CWU'S FINEST ALUMNI

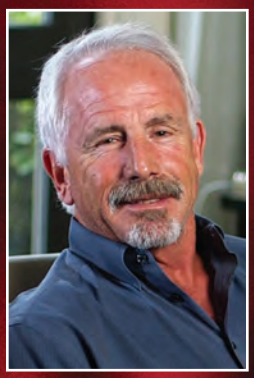
By Robin Burck

The 2020 Distinguished Alumni and 4 Under 40 award winners include 11 individuals who embrace Central Washington University's spirit and passion.

Robert Ford, senior director of alumni relations, said the Distinguished Alumni Awards provide CWU with an opportunity to celebrate what it means to be a Wildcat.

"This year's recipients have blazed new trails and demonstrated the grit and determination necessary to make a difference in our communities and in the lives of our students," Ford said. "This group has not only given back through their time, talent, and financial resources, but have also encouraged others to give back."

Please join us in congratulating this year's Distinguished Alumni Award winners.



ALUMNI OF THE YEAR

Sid Andrews ('82)

Sid Andrews graduated from CWU-Lynnwood in 1982 with degrees in accounting and business administration. Last December, he made a generous financial contribution in the name of one of his former professors, creating the Allen Vautier Endowed Accounting Scholarship.

PHILANTHROPIST OF THE YEAR

Jean Putnam

Jean Putnam joined the CWU physical education department in 1967 and was a member of the university faculty through 1992. She was the first female academic dean at Central and has made significant contributions to the Wildcat Commons project.

YOUNG PHILANTHROPIST OF THE YEAR

Justin Compton ('06)

Justin Compton graduated with a degree in mathematics in 2006 and works as an actuarial pricing analyst for Trupanion, a medical pet insurance company. He contributes to the Math Actuary Endowment fund, which helps students overcome the barriers of expensive actuarial exams.

DISTINGUISHED ALUMNI DEPARTMENT AWARDS

College of Arts and Humanities

d'Elaine Johnson ('54)

d'Elaine Johnson is a 1954 graduate who is being recognized for her body of work as an influential artist and for her 24 years of teaching art for Seattle Public Schools.

College of Business

Spike Anderson ('67)

Spike Anderson is a 1967 graduate who is being recognized for investing his time in the CWU Entrepreneurship Program, and for his 50 years of experience as an owner and manager of operating businesses and commercial real estate investments.

College of Education and Professional Studies

Beth Vogt ('72)

Beth Vogt is a 1972 graduate who is being recognized for her almost 50 years of teaching, her continued involvement with Central, and for serving as a mentor to many students.

College of the Sciences

Michael Johnson ('84)

Michael Johnson, 1984 graduate, is being recognized for the various ways he has applied his degree, including his time serving in the Army and starting his own company, Crafted Analytics.

CWU's 4 Under 40 Honorees

excel in their industries or communities through their leadership roles, share a commitment to personal growth and community involvement, and exemplify true Wildcat spirit. Award winners are recognized leaders in their profession or in their volunteer service, and are under 40 years of age.

This year's honorees included:

COLLEGE OF ARTS AND HUMANITIES
Simone Corbett ('17)
TV Assistant and Field Producer for Entertainment Tonight (ET)

COLLEGE OF BUSINESS
Hilary Tanneberg ('09)
Senior Accountant at Moss Adams

COLLEGE OF EDUCATION AND PROFESSIONAL STUDIES
Mark Saretsky ('08)
Site Director for Aviation Technical Services Components Facility

COLLEGE OF THE SCIENCES
Greta Smith ('04)
District Ranger for Mt. Baker-Snoqualmie National Forest

Simone Corbett

Hilary Tanneberg

Mark Saretsky

Greta Smith

GIVING IS CENTRAL

When you support CWU, you tell today's students that you believe education is transformational. Support Central students today and help them become the best versions of themselves.

CENTRAL WASHINGTON UNIVERSITY • 1891 • CWU ™

UNIVERSITY ADVANCEMENT

cwu.edu/give

Diversity Award Winners

The annual CWU Diversity Awards recognize the work of people or groups who have made positive, observable, and sustainable impacts on diversity, inclusion, and equity for the campus and/or wider community. This year's honorees include:

Jessica Hernández: A CWU student who is involved in supporting and empowering other students through Movimiento Estudiantil Chicanx de Aztlan (MEChA) and is the current ASCWU VP for Equity and Community Affairs.

Verónica Gómez-Vilchis: A CWU staff member who bridges cultures and communities through advocating for others and implementing opportunities for mutual learning. She has been integral in the creation of the Día de los Muertos event, the growth of the Latinx Alumni Association, and student participation in the US Hispanic Leadership Institute (USHLI).

Susana Flores: An assistant professor in the College of Education and Professional Studies who promotes the interests of Latinx students on campus and has been a longtime supporter of the Deferred Action for Childhood Arrivals (DACA) program.

Michel O'Brien: An assistant English professor at CWU who promotes safe spaces for colleagues and students. O'Brien is a founding member and mentor for Queer Arts Collective (QuAC) which has developed new curricular opportunities in the English department around social justice topics for marginalized groups.

Malbert "Mal" Stewman: A CWU alum who now serves as the academic success coordinator for student athletes. He has been successful in helping men and other advantaged groups to take action to help create a more socially just community. His work with Green Dot, men of color, and male athletes to bring awareness and understanding of masculinity and its consequences has made a distinctive mark on campus.

Tylene Carnell: An Ellensburg community member who serves as the regional philanthropy officer for the Pride Foundation. She supports and advocates for human rights, with much of her work benefiting the Ellensburg community. Carnell founded VOICES (Visions of Improving Communities through Education and Support) and is a founding member of Helen House and Justice for our Neighbors.

Bobby Cummings: A CWU English professor, who was honored with a lifetime achievement award in recognition for her commitment to multiculturalism and diversity. Cummings, who earned a Distinguished Professor award for service in 2011, was instrumental in establishing the Africana and Black Studies minor.

"We received a lot of thoughtful, detailed submissions this year, and the committee is very grateful to everyone who participated in the nomination process," said Sigrid Davison, the selection committee chair and an associate director for the Office of the Associate Provosts at CWU. "It was inspiring to learn about all of the things people on campus and in the community are doing to promote diversity."

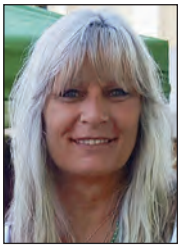
Jessica Hernandez

Veronica Gomez-Vilchis

Susana Flores

Michel O'Brien

Mal Stewman



Tylene Carnell

Bobby Cummings

New Transfer Center Aids Transition

Central is hoping to make transferring an easier proposition. With that in mind, the university is opening a new Transfer Center, which will be fully operational in fall quarter 2020. "The center will help support the best undergraduate experience for transfer students to ensure a smooth transition and timely progress toward graduation and beyond," said Aaron Brown, associate dean of Student Development and Achievement.

CWU's Online Degrees are Tops in the Northwest

Intelligent.com, a web-based research organization that evaluates higher education, named CWU as one of the nation's Top 60 Most Affordable Online Colleges for 2020. Central was number one in the Northwest and, overall, ranked 36th in the nation in affordability.

Select Construction Degrees Now Online

Responding to a growing need in the construction industries, CWU has begun offering two new online degrees, including Bachelor of Science and Bachelor of Applied Science programs in Risk, Insurance, and Safety Management (RISM).

Student Earns Courtroom Honors

CWU student Mariah Hogan can be very persuasive. For the second year in a row, the CWU law and justice major has been recognized as an outstanding attorney at the recent American Mock Trial Association (AMTA) Seattle Regional at the University of Washington Law School. Hogan, a junior from Kent, Wash., was one of only 10 named to the all-regional team.

Mariah Hogan

New Comstock Commons area in Samuelson Hall

Comstock Commons

After a donation of $200,000 by Dale Comstock and his late wife, Mary Jo, the commons area in the new Samuelson Hall is being named in their honor. The Comstocks are CWU alumni and Dale Comstock taught mathematics at Central from 1964 to 1996. In 2013, Dale was named a CWU Distinguished Alumni. The Comstocks previously established the Dale and Mary Jo Comstock Distinguished Thesis Award and the Dale and Mary Jo Comstock Scholarship for students majoring in mathematics.

Architectural drawing of new Health Sciences Building

Groundbreaking for New Health Sciences Building

Construction began in November on the new $60 million Health Sciences Building, a state-of-the-art facility that will house the school's exercise sciences, clinical physiology, nutrition, paramedicine, and public health programs.

At a ground-breaking ceremony last year, President James L. Gaudino said the new 80,748 square foot building allows the university to consolidate its health sciences programs, which had outgrown existing facilities. The programs currently operate in four separate buildings spread across campus.

"This project is the culmination of our multi-year, campus master plan for what we call the 'Science Neighborhood,' which includes Science Hall, Discovery Hall, and Samuelson Hall," Gaudino said. "Its completion will help catapult Central to the top in terms of providing state-of-the-art, STEM-related academic facilities for our students."

The new facility is scheduled to be open in late 2021.

University Centers Gain New Degree Programs

Starting next fall, CWU-Lynnwood and CWU-Sammamish will each offer a new BA in Liberal Studies that allows students to earn a degree without a specialization. According to Scott Robinson, director of Liberal Studies and Film, who oversees the program, the new major permits students to take upper-division courses in a specialized program, which they can incorporate into their degree. CWU-Sammamish is also adding a BS in Information Technology and Administrative Management in the fall.

Literacy Prof Named to National Book Award Committee

Literacy professor Sharryn Larsen Walker was named to the selection committee for the annual Notable Books for a Global Society Award contest. She will serve a three-year term on the prestigious committee, a children's literature and reading special interest group through the International Literacy Association. Walker is a CWU alumna who has taught at the university since 2007.

Marcus DeSieno's Microbial Masterpieces

By Richard Moreno

It's ironic that visual artist Marcus DeSieno is more fascinated with unseen things.

"I've always had a desire to see what can't be seen or to see the invisible," he said. "Although, it sounds contrary to say that as a photographer."

DeSieno, who is an assistant professor of photography at Central, has been described as an artist who is interested in how the advancement of visual technology changes and defines our understanding of the world.

Several years ago, DeSieno's interest in the unseen took him to the world of bacteria for a series of photographs depicting images of microscopic bacteria. The photos, called "Cosmos," have an otherworldly quality that evokes the vastness of the universe but in a microscopic world.

"My goal was to use unseen organisms to create something visual," he said.

His photos—even more timely now in light of the COVID-19 outbreak—appeared earlier this year in *The Washington Post*. They have also been featured in *Wired*, *Slate*, *Smithsonian*, and *National Geographic* magazines.

DeSieno, 31, who has been teaching at Central since 2017, told the *Post* his photos were inspired by his fear of germs and his own obsessive-compulsive disorder.

"I was terrified by germs as a child, and I would wash my hands compulsively after touching something that even remotely seemed dirty," he said.

DeSieno said he created the images by using cotton swabs to collect bacteria samples in "ubiquitous" places, such as a door handle, a toilet seat, his cat's litter box, and his iPhone screen.

A thin layer of nutrient agar was applied to photographic transparency film and the sample was placed on top to grow. The bacteria ate through the agar and then the layers of the film.

Color film is comprised of layers of silver halide crystals and dye couplers, he explained. The end results were images that appeared surreal and cosmic, hence the name of the series.

DeSieno recalled that he was living in Florida at the time, so in order to get his cultures to grow properly, he needed a place that was dark and humid—so he stored them in the trunk of his car.

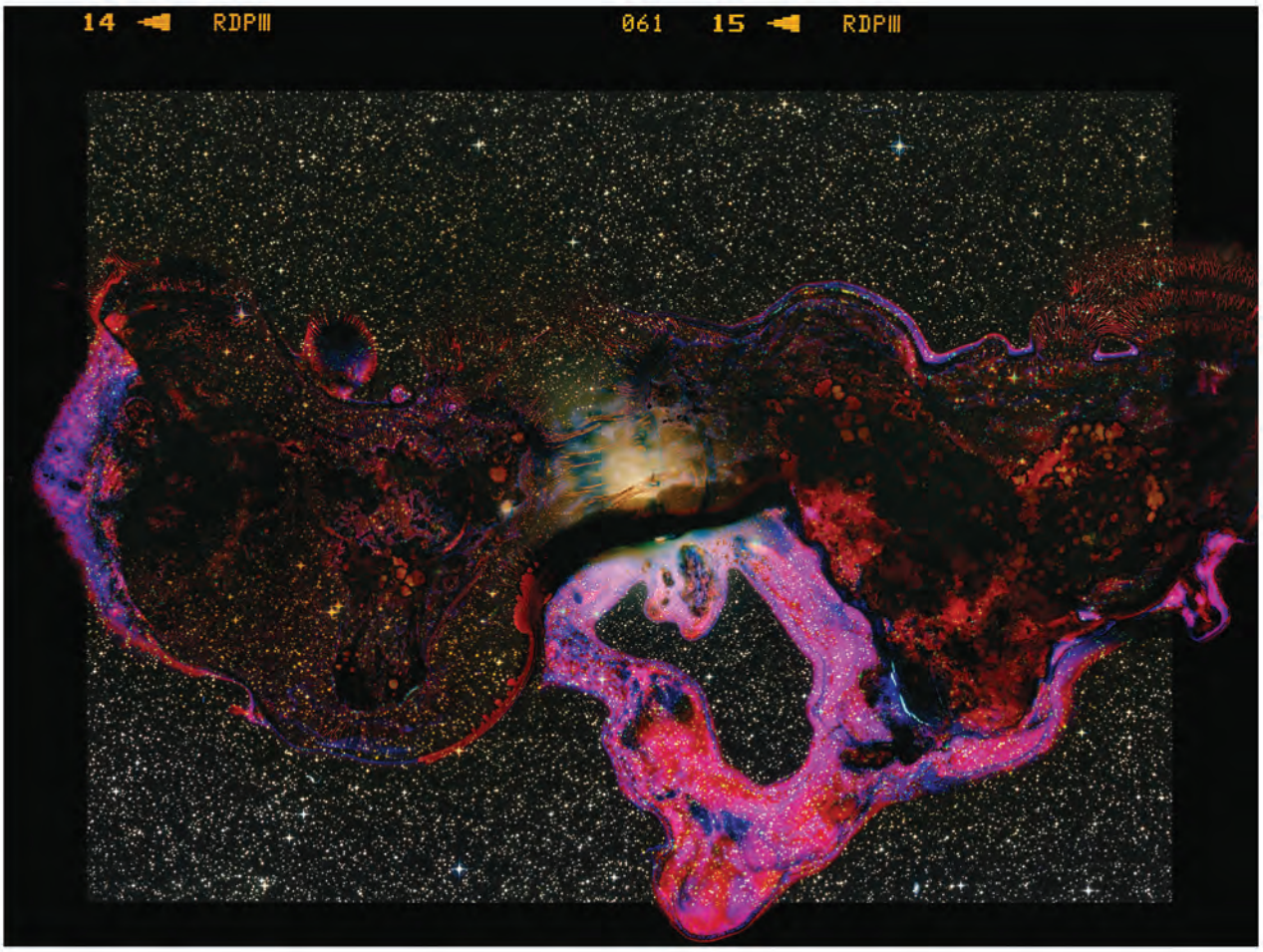
"The smell was so bad that I'm surprised I was able to later sell that car," he added with a laugh. ■

To see the rest of the Desieno's "Cosmos" series visit marcusdesieno.com/cosmos.

Marcus DeSieno

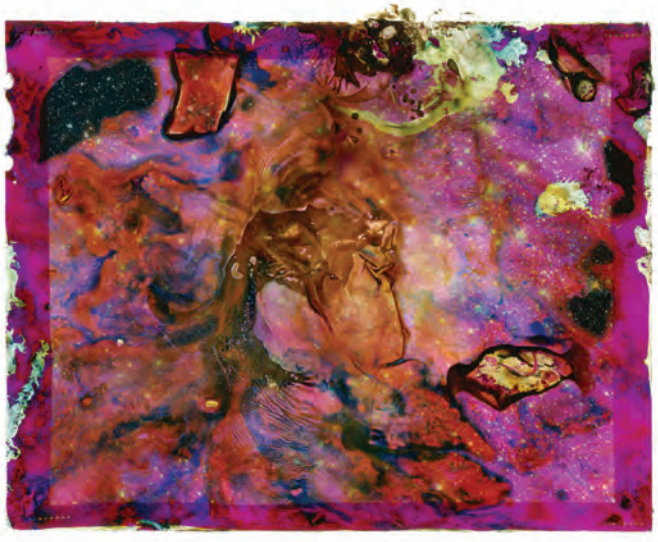
Photograph of Pandora's Galaxy Cluster consumed by bacteria from a cat litter box.

Archival pigment print of bacteria grown on photographic film. Courtesy of Marcus DeSieno.



Little Dumbbell Nebula eaten by bacteria found on DeSieno's gym's 20-pound dumbbells.
Archival pigment print of bacteria grown on photographic film. Courtesy of Marcus DeSieno.

A star cluster eaten by bacteria found on DeSieno's iPhone screen.
Archival pigment print of bacteria grown on photographic film. Courtesy of Marcus DeSieno.



A star cluster eaten by bacteria found on a light switch.
Archival pigment print of bacteria grown on photographic film. Courtesy of Marcus DeSieno.

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