Features
As buildings go up, so does construction waste. By finding ways to recycle that waste, our researchers hope to usher in an "era of reconstruction." 24

What keeps women from entering and remaining in science, technology, engineering, and math? It’s not new. 30

Upfront
Washington blazed new trails with the legalization of recreational cannabis. There were many unanswered questions but also new insights found en route.

WSU by the numbers 15

Dreaming of when clean energy is not a rarity. 16

Discovering the undiscovered. Meet a scholar who digs it. 17

Something has been zapping Washington’s tax revenue system. 19

It was a spiritual and inspirational time and place for multiple generations 20
From java, no jive  Clothing and gear from coffee grounds and other recycled waste  UPFRONT
Private Support Helps Veteran Realize Dreams

While serving as a medic in the U.S. Army, Benji Stander completed many successful combat missions, including two life-changing tours in Afghanistan. Initially, he thought he’d become a career soldier but was so intrigued by medicine, he decided to pursue another dream. He received the Hix Family Endowed Scholarship, designated for non-traditional students, including veterans. Benji said, “Private support makes seeking a degree much easier and less stressful.” Benji majors in biology at WSU Vancouver and plans to seek a career in the medical field.

Students like Benji are changing the world because of private support. Learn how you can make a difference at WSU: foundation.wsu.edu/scholarships.
In 1928, Wenatchee tree-fruit entrepreneur Grady Auvil began his mission to revolutionize the industry. His out-of-the-box thinking won him countless awards, including the Washington State Medal of Merit. Before Grady and his wife Lillie passed, they established the Auvil Fellowship at WSU through their estate. The couple wanted to sustain innovative thinking through undergraduate research.

Today, WSU Pullman sophomore Hannah Goodspeed is carrying on that legacy. As a Latinx woman in civil engineering, she is a 2019-2020 Auvil Fellow who conducts life-changing research and promotes equality for women and minorities in STEM. “The fellowship assures me that I am capable,” Hannah said. “And that I belong in engineering. Private support gives me confidence and motivates me to stay in STEM.”

Learn more about how you can create a legacy at WSU: foundation.wsu.edu/estate
FirstWords

Ever a green state

There’s nothing new about being green.

Two millennia ago, Chinese Minister for Agriculture Tsai Lun in the first-century Han dynasty called for subjects of the emperor to boil old linen rags for papermaking. Professional recyclers in medieval England collected dust and ash left from fireplaces, then sold it to brick manufacturers as an inexpensive base material. More recently, World War II saw an uptick in recycling, with many common household items like clothes, scrap metal, and tires turned into new products for the war effort.

The same spirit of innovative recycling inspired Washington State University’s Taiji Miyasaka and David Drake to invent a construction block from gypsum drywall waste. Similar to a cinder block, the low-cost building material has insulating properties and great potential.

Another area of sustainable exploration at WSU, and one with some urgency, is finding replacements for rare earth elements and metals, such as cobalt and lithium, used in most of our tech devices. Not only are those materials expensive and difficult to extract, they’re often mined by children or gathered in exploitative situations. WSU’s JCDREAM seeks earth-abundant replacements for substances such as cobalt.

Of course, Washington is known for its green fields, and that includes the latest cash crop, cannabis. After recreational cannabis was legalized by an initiative in 2012, it opened the gates to sorely needed research into all aspects of the drug and related hemp. Almost 100 researchers at WSU are working to clear up misconceptions in this billion-dollar industry.

That’s a lot of money, and when you have greenbacks from sales, you have taxes. The Hoops Institute of Taxation and Research Policy in the WSU Carson College of Business keeps abreast of the latest issues, including illegal “tax zapper” software used to hide retail sales. The institute works with the state to identify and educate users about this method to cheat on taxes.

There are some evergreen problems that keep cropping up, such as the ongoing need for more women in engineering, mathematics, and other scientific fields. Thanks to work by WSU alumni and faculty, we might bring more girls and women into those areas, which we really need because, as Voiland College of Engineering and Architecture Dean Emeritus Candis Claiborn says, “the more people who look at a problem, the better the solutions.”

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Making much of good medicine

I write to compliment the superb feature “Good medicine” by Brian Charles Clark.

Thank you for choosing the topic, one that deserves attention, but receives little in my experience. What the staff is doing to truly include Native people and their culture in the work of the new medical school is admirable. And Brian’s writing was quite extraordinary.

Robbie Paul’s stories from her father will stay with me. “We need to learn to listen, and to listen to learn.” If future health-care practitioners from WSU can learn to listen quietly, they will have a much-needed positive impact in our state and beyond.

I am, once again, proud of the University for this initiative and for highlighting it in this magazine.

CHERRY L. TINKER ‘67

Like we were never apart

On September 16, 2019, Cougs who lived in Neill Hall in 1979 reunited on campus. (Now an academic building, Neill Hall previously housed students.) You can read Cathy Higgins’s full letter at magazine.wsu.edu.

We marvel at the incredible college experiences we had while we lived in Neill Hall, and the fact that we have all remained close friends for 40 years.

Our group arrived as students to WSU and Neill Hall in different ways. Most of us came to WSU intentionally, but a few enrolled thinking they would be attending school in different parts of the country. One thought he was going to a school in the Washington, D.C. area, and you can imagine his surprise when he arrived in Pullman, Washington, from New Delhi, India. Another came from Saginaw, Michigan, thinking Pullman was a suburb of Seattle. I can’t speak to all the reasons everyone decided to stay in Pullman, but stay they did, and for this I am forever grateful.

Most of us knew we were coming to school in Pullman, but many of us were freshmen and didn’t expect to be placed into Neill Hall. Little did we know how lucky we were that 1979 was a year with a very large freshman class. To make room for so many new freshmen, we were placed into Neill Hall, which was a dorm for upperclassmen. We were also lucky that Neill Hall had been designated as an international dorm. If that had not been the case, we might not have met Pam from Alberta, Canada; Arjun from India; Gabriel from Chile; and so many other international students.

We are spread across North America, and yet the geographic distance between us does not dim our personal closeness. Some of us vacation together and see each other often. Some of our children (now grown!) grew up together and remain close friends. Some of us only see each others once a year. Some of us only see other every few years. Here’s the great thing…it doesn’t matter. When we come together, it’s family. We fall together like we were never apart.

CATHY HIGGINS ‘83 PSYCH.

Remembering a remarkable mentor and man

Jack Carloye’s passing ought not go unremarked. I took Professor Carloye’s classes in the mid-1970s, when WSU offered an M.A. in philosophy. He was, most of all, a kind and gentle man; he was also a smart and effective professor. I can say for certain that he prepared his students for a life of thought and reason.

RICHARD J. MCGOWAN, ’76 MA PHIL.

Note: Jack Carloye, WSU philosophy professor from 1962–1992, passed away August 29, 2019, in Pullman. He was 92.

CORRECTION

An erroneous version of the article “Power of language” was printed in the Winter 2019 issue. You can read the correct version online at magazine.wsu.edu/2019/11/01/power-of-language.
Yoni Rodriguez saw environmental problems up close when he was exposed to pesticides as a teenager.

The WSU biochemistry student—first in his family to go to college—helped develop air quality sensors and a low-cost air filtration system to screen wildfire smoke pollutants.

Changing the world is the Cougar way.
The legalization of recreational cannabis in Washington state and Colorado in 2012 opened a box full of questions and debates about the drug and its related crop, hemp.

What is the effect on youth? Will crime go up? How does cannabis interact with other drugs and medicines? What health claims are accurate? How does the potency of cannabis affect mental health? These gaps, and many others, in our knowledge—combined with unverified claims by both proponents and opponents of legalized cannabis—make it difficult to find the best ways to regulate and manage the substance.

To answer the call, almost 100 Washington State University researchers have begun applying scientific rigor to explore the questions, clear up misconceptions and questionable claims, and help the state navigate the legalization of cannabis.

Michael McDonell, associate professor at the Elson S. Floyd College of Medicine, is chair of WSU’s Collaboration for Cannabis Policy, Research, and Outreach (CCPRO). He testified to the Commerce and Gaming Committee of the state House of Representatives last September that WSU is aiming to be “the nexus for cannabis scholarship, policy, outreach, and community engagement” in the state.

McDonell notes that WSU has four priority areas for CCPRO: health and well-being, public policy and safety, economics, and agricultural research. Some research has already borne fruit in these areas.

For example, on health issues, inhaled cannabis reduces self-reported headache and migraine severity by nearly half, according to a study led by Carrie Cuttler, assistant professor of psychology. The study, published online recently in the Journal of Pain, is the first to use big data from headache and migraine patients using cannabis in real time.

On public policy, a Department of Justice study completed by WSU criminal justice researchers, led by Professor Mary Stohr, showed that racial disparities in marijuana-related arrests continue even though marijuana arrests overall went down after legalization. African Americans are still twice as likely to get arrested as white offenders.

Still, much of the research is ongoing, from the economics of hemp, to banking, taxation, and the genomic characteristics of cannabis. For example, Celestina Barbosa-Leiker in the College of Nursing leads a team that’s assessing better care for women who use cannabis during pregnancy and postpartum. In the Department of Chemistry, Brian Clowers researches the trace detection of cannabinoids in order to develop a portable, sensitive instrument capable of assessing recent consumption of marijuana.

It’s not an easy area to research. WSU began by establishing its own policies in 2012, due to the federal status of cannabis as a Schedule 1 drug. As McDonell says, “When the initiative passed, we thought, ‘Woah, we better have rules around this.’”

Due to the need to stay in compliance with federal law, the University set up innovative collaborations with industry partners to support cannabis studies. The Puyallup Tribe, for instance, approached WSU to evaluate whether medicinal cannabis reduces opioid use and pain, and if it improves the physical and mental health of clients at the Tribe’s Qwibil Natural Healing and Research Center.

McDonell says WSU continues to engage with the state Liquor and Cannabis Board and other state agencies, and collaborates with the University of Washington on prevention research and practice to curb youth abuse of cannabis.

There’s a pressing need to answer the big cannabis questions in a definitive way, says McDonell, which will require financial commitment, focus, and more partnerships.

The following stories delve deeper into a few of those big questions, highlighting some WSU studies and providing some facts around cannabis use, to help us achieve clarity in this mostly unexplored area.
The sky isn’t falling

BY REBECCA PHILLIPS

“More than a few citizens held their breath when Washington legalized recreational cannabis in 2012.

“There were many who believed it would trigger a massive increase in youth use and marijuana-related traffic collisions and fatalities,” says Clay Mosher, sociology professor at Washington State University Vancouver.

“But in the five years since sales began, those increases in youth use have not manifested, and while there have been some spikes in polydrug driving, they aren’t as significant as predicted.”

That hopeful trend is echoed by a recent criminology study which found little change in violent or property crime rates since legalization.

Mosher, who wrote a retrospective on cannabis called In the Weeds, says much of the success is due to the fact that “Washington did legalization right.”

Unlike Colorado or Oregon, for example, the Washington legislature initially limited the number of retail licenses available for dispensaries to 335. They also made personal cannabis cultivation a felony offense except for those with a medical marijuana card.

To discourage corporate monopolies and Big Marijuana, Mosher says the legislature likewise prohibited vertical integration. “No one could hold all three licenses: producer, processor, and retail. You could hold two but not all three.”

Such protective barriers along with strict monitoring of producers have helped control the nascent cannabis industry as well as prevent black-market diversion—something that’s had an impact on children.

According to the recently published Washington State Healthy Youth Survey, cannabis use in high school students showed no significant increase since legalization and even declined in some groups.

A 2019 JAMA Pediatrics study suggests that decline is tied to the difficulty of obtaining marijuana from drug dealers now that they are being replaced by licensed dispensaries that require proof of age.

On the other hand, the number of teens who said marijuana poses a health risk also declined, a trend Mosher says began well before legalization.

As for collisions and traffic fatalities, a 2017 study published in the American Journal of Public Health found that, “three years after recreational marijuana legalization, changes in motor vehicle crash fatality rates for Washington and Colorado were not significantly different from states without legalization.”

The Washington Traffic Safety Commission followed with a 2018 report stating that, while the number of THC-only incidents has remained stable, there was an increase in polydrug-driving accidents, most involving cannabis plus alcohol. Notably, collisions due to texting and other distractions were higher than all drug categories combined.

“Although I would say there’s an increase in marijuana-related driving, we don’t know if it’s actually marijuana-impaired driving as we only know they have THC in their blood, but not the level,” Mosher says. “Without a THC breathalyzer, you can’t compare it, say, to an alcohol level of 0.08.

“While not without problems, I do think Washington state’s legalization of recreational cannabis has largely been a success,” he says. “Marijuana has been legalized, and the sky has not fallen.”

That conclusion is backed by Dale Willits, WSU assistant professor in criminal justice and criminology, who took part in a wide-ranging study published last October in the journal Justice Quarterly. The paper compares crime in Washington and Colorado to that in states which outlaw cannabis in any form.

Using statistics gathered by the FBI from 1999 to 2016, the researchers analyzed incidents of violent crime including homicide, rape, aggravated assault, and robbery, as well as property crimes like auto theft, burglary, and larceny.

“Overall, we found there were no big shifts in either violent or property crime rates that coincided with legalization of cannabis,” Willits says. “In some cases, there was an initial short-term jump that faded when retail dispensaries opened, but there was nothing consistent across all models.

“Although serious crime neither skyrocketed nor plummeted, we can’t claim there has been no effect on public safety as it’s only been five years for sales and two years post-sales for our data,” he says.

“When you look at prohibition, it took forty years for alcohol consumption to reach its pre-prohibition rates. So, it may take 20 or 30 years for the full effects of legalization to play out.”
Cannabis and mental health: the peril and promise

BY REBECCA PHILLIPS

Ask around discreetly and you’ll find that cannabis is often used to self-medicate mental health conditions like anxiety, depression, PTSD, and even ADHD. What is less clear, however, is whether that cannabis use provides actual medical benefits. There is also the question of short- and long-term consequences.

“The cannabis industry is so far ahead of us with its marketing—it’s kind of the wild west right now,” says Michael McDonell, associate professor in the Elson S. Floyd College of Medicine at Washington State University Health Sciences Spokane. “There are lots of claims being made that may or may not be true and, in most cases, we don’t have the scientific evidence yet.

“At the same time, researchers have to go through many hoops to do a basic study—to see if the claims they are making are even valid. So, the public doesn’t have the balance of information they need to make an informed decision.”

McDonell is 1 of nearly 100 WSU researchers investigating cannabis since its legalization in Washington state opened the doors for wider study. “We are learning and responding as we go,” he says.

A child psychologist, McDonell works with adolescents who are developing serious mental health problems like schizophrenia, which typically begins in the teens or early twenties. He and other members of his team are evaluating a new program focused on first episode psychosis called New Journeys.

“We want to treat kids when they get their first symptoms of psychosis and are struggling to function—for example, hearing voices or seeing things that aren’t there,” he says. “Instead of waiting until they are hospitalized, jailed, or disabled, we try to intervene with the kids right away.”

Schizophrenia has long been anecdotally linked with cannabis use and there is some evidence for a genetic predisposition and sensitivity to THC.

McDonell says studies show that smoking cannabis worsens symptoms in people with schizophrenia, but it can also lead to psychotic symptoms in those without the disease, especially when using the higher THC products.

“It’s dose dependent,” he says. “The higher the THC dose you get, the worse your psychotic symptoms get.”

In contrast, early evidence suggests that cannabidiol or CBD might help counteract psychosis by regulating certain areas of the brain. In one study, children at high risk for developing psychosis and normal controls were given CBD. In all cases, subsequent brain scans showed the brain areas associated with psychosis were stabilized.

“The bottom line is that we need to fully understand the impacts of THC and CBD on mental health,” McDonell says. “The number of people using cannabis daily is steadily increasing, especially in those of college age.

“In Washington dispensaries, you can buy cannabis products with a THC concentration of 70 percent or more. Using high-potency pot on a daily basis is likely to impair functioning in some way. Also, CBD oil is being promoted as a cure-all but it is not closely regulated by the FDA, so you really don’t know what you’re getting when you buy it.”

McDonell worries that people might turn to cannabis as a solution for mental health problems before they try more conventional treatments. “We have a lot of great evidence-based interventions that work for anxiety and...
WHO'S BUYING WHAT

Cannabis Consumer
IN WASHINGTON STATE

TOTALS $1B IN SALES 2018-2019 06% SPENT BY GEN-Z 51% SPENT BY MILLENNIALS 25% SPENT BY GEN-X 16% SPENT BY BOOMERS 01% SPENT BY THE SILENTS

GEN-Z AGES 23 & YOUNGER 42% BUD
Other Types: Vapor Pens & Concentrates
AVERAGE SPEND PER TRIP: $23

MILLENIALS AGES 24 TO 38 12% BUD
Other Types: Vapor Pens & Concentrates
AVERAGE SPEND PER TRIP: $25

GEN-X AGES 39 TO 54 16% BUD
Other Types: Vapor Pens, Pre-Rolled Joints, & Edibles
AVERAGE SPEND PER TRIP: $28

BABY BOOMERS AGES 54 TO 73 50% BUD
Other Types: Vapor Pens & Edibles
AVERAGE SPEND PER TRIP: $30

THE SILENT GENERATION AGES 74 & OLDER 38% BUD
Other Types: Edibles, Tinctures, & Under-the-Tongue
AVERAGE SPEND PER TRIP: $34
Hemp on the horizon

BY REBECCA PHILLIPS

Washington was one of the first states to legalize recreational cannabis, but it has some catching up to do when it comes to industrial hemp and the lucrative CBD oil market. “We are actually the only state that legalized marijuana before we legalized hemp,” says Randy Fortenbery, economics professor and Thomas B. Mick Endowed Chair at Washington State University. “It took two legislative sessions before we got it passed. Even under the 2014 Farm Bill, hemp had to be part of a scientific experiment affiliated either with a land-grant university or the Washington State Department of Agriculture.”

With the passage of the 2018 Farm Bill, however, the federal government finally removed hemp from the illicit substance list, effectively ending an 80-year prohibition against its cultivation. States are now free to set up their own commercial hemp management systems, including regulations to assure it isn’t being used to disguise marijuana fields.

Last April, Governor Jay Inslee signed further legislation allowing Washington farmers, including WSU researchers, to buy hemp seeds without federal approval. The bill also eliminated a four-mile buffer zone between hemp and marijuana fields—meant to prevent cross-pollination—that had previously kept much of the state off-limits to hemp growers.

As one of the earliest domesticated plants, hemp has provided benefits to humans for 10,000 years. Before fears of “reefer madness” led the U.S. government to shut down production with the Marihuana Tax Act of 1937, hemp was prized for its fiber, seeds, oil, and wide array of byproducts ranging from clothing, rope, and cosmetics, to paper and fuel. The plant’s checkered history is mainly due to its similarity to marijuana.

According to Fortenbery, both hemp and marijuana belong to the genus Cannabis and are typically of the varieties C. sativa or C. indica. Depending on growing conditions,
either of these varieties can produce high levels of THC, or tetrahydrocannabinol, the psychoactive chemical that creates a high.

It’s the concentration of THC in a cannabis plant that determines whether it is called hemp or marijuana. A plant containing more than 0.3 percent THC is considered to be marijuana, a Schedule I federally controlled substance under the U.S. Drug Enforcement Administration. Cannabis plants with 0.3 percent THC or less are classified as hemp.

“When both plants are growing in the wild, you can’t tell them apart,” says Fortenbery. “But you can tell the fields apart. It’s the management practices of the farm that differentiate whether cannabis is being grown as industrial hemp or marijuana.

“If I’m growing for marijuana, I will maximize production of leaves, flowers, and buds, the parts of the plant with the largest concentrations of THC,” he says. “For industrial hemp, I’ll grow for the stalk and seeds, which are grown close together to increase height and discourage flowering.”

Fortenbery says another phytochemical called cannabidiol or CBD is also present in all cannabis plants in varying levels. CBD, credited with a wide array of health benefits, is an essential component of many medical marijuana products and does not cause a high.

“Hemp grows very fast,” he says. “When we harvested the plots in August, the average height was four feet tall. I was concerned about our late start, but we got the experiment established, herbicides applied, and the data we needed.

“I think we learned a lot,” says Waters. “Next time, we might try feminized seed like commercial CBD growers use. We had both male and female seed this time but the male plants aged out much faster than the females, which stayed green and vigorous longer.”

As for the future, Waters and Fortenbery agree there are potential markets for hemp in Washington, but it will depend on supply and demand, the value of CBD oil, and how much is produced in other more established areas.

“Hemp will certainly grow here,” Fortenbery says. “The question is, can we be competitive? That will depend on the varieties we develop that take advantage of our local environmental characteristics.

“And, despite all the excitement about CBD oil and its possible uses, a lot of medical research hasn’t been done,” he says. “The size of that total market is uncertain as we don’t yet know CBD oil’s true functionality in the health-care system.

“The cosmetic and food markets are also very high-end and high-price markets but too much production could overrun those markets and trigger a price collapse.

“So, there’s still a lot of uncertainty on where this hemp market goes longer term.”

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the genetics of cannabis: magazine.wsu.edu/extra/cannabis-genetics

SEATS IN BRYAN HALL THEATRE. BRYAN HALL IS NAMED FOR Enoch A. Bryan, President of WSU from 1893 to 1916. He died in Pullman in 1941 at age 86. Today, the 1909 building is said to be haunted by his ghost.

NUMBER OF YEARS OF GROUND-BREAKING SURVEY RESEARCH DON DILLMAN PROVIDED TO WSU—AN INTERNATIONALLY RENOWNED SURVEY METHODOLOGIST KNOWN FOR HIS DEEP UNDERSTANDING OF HOW HIGH-QUALITY SURVEYS CAN HELP NATIONS AND COMMUNITIES FIND SOLUTIONS TO PRESSING PROBLEMS.

NUMBER OF HEMP LINES IN THE RIGGING SYSTEM AT BRYAN HALL THEATRE: 10
A rare solution

BY BRIAN CHARLES CLARK

“The thing about rare earths is that they’re not actually rare—but they might as well be,” says Aaron Feaver, director of JCDREAM, the Joint Center for Deployment and Research in Earth-Abundant Materials at Washington State University.

Along with critical elements such as cobalt, lithium, and indium, rare earth elements are essential to our smart device-rich lives. But those devices come at a cost.

“Rare earth elements aren’t concentrated enough to be easy to mine,” Feaver says. “They have similarities in electronic structure, making them very useful but also very difficult to differentiate from each other and hence extract. You end up with a mixture of a whole bunch of rare earth elements and have to use a solvent-laden and energy-and waste-intensive processes to separate them.”

That’s why, Feaver says, a bipartisan group of Washington legislators “sponsored a visionary bill” that created JCDREAM in 2015. Using seed grants and larger capital investments, JCDREAM’s goal is “to accelerate the development of next generation clean energy and transportation technologies in Washington.”

Feaver says that, as far as he knows, JCDREAM is unique: Washington is the first state looking to ensure an economically stable and environmentally sustainable high-tech future through research on earth abundant alternatives for critical materials and rare earths.

Critical materials pop up everywhere, from computer memory and catalytic converters to fluorescent lights and cell phones. Rare earth mining and processing is dominated by China and is used as leverage against the United States in ongoing trade disputes.

As for cobalt, Feaver says, “We used to talk about blood diamonds but now we have blood batteries.” Cobalt is used in the cathodes of phone batteries. Children mine the metal in the Democratic Republic of Congo (DRC). Miners reduce ores of copper and nickel by hand to get at the cobalt. They inhale toxic dust so thick they can asphyxiate in the 100-meter-deep pit mines.

Lithium is also a component in batteries of portable electronics and electric vehicles. A major source of lithium is the Atacama Desert in the Andes, where mining threatens the water supply of farmers and flamingoes.

This is no way to run a stable and sustainable global economy, dependent on metals mined under dubious circumstances. Huge spikes in, for instance, the price of cobalt in recent years have manufacturers jittery while uncertain relationships with key mineral suppliers, like China and the DRC, only add to the unease.

The keys to stability, Feaver says, include finding earth-abundant replacements for some of these materials, as well as souped-up recycling efforts and simply using less of a critical material to begin with.

Feaver says that “a clean energy transformation is coming.” He points to a couple of indicators: “Solar, for example, is now vastly cheaper to deploy on the grid than coal. It’s cheaper to drive a Tesla than a Camry. We’re here to help ensure that our next generation of clean energy and transportation are built on a sustainable supply chain of materials that are not focused on critical elements.”

Holding up his iPhone, Feaver says it’s “a microcosm of the technologies being used to deploy clean energy and green transportation infrastructure.”

Take the touch screen, for instance, which is coated with a very thin layer of ITO, indium tin oxide. While indium isn’t exactly rare, it is a byproduct of other forms of mining and, like other critical materials, China is a major supplier. Using funds from JCDREAM, researchers at the University of Washington developed the first ink-jet printer capable of printing a sub-micro copper grid that can replace ITO in touch screens. The grid is not only more transparent but also more conductive. And copper is fairly abundant, with major deposits scattered around the globe, including the United States.

3D printing metal offers some intriguing possibilities for reducing use of materials. Feaver explains that most metal parts are toolled from solid ingots of an alloy. With 3D printing, though, the deposition of materials can be precisely controlled. A jet engine strut, for example, that needs to be heat-resistant could contain ceramic at one end and stainless...
steel at the other to protect it from corrosion. You still might use critical materials, he says, but you’d use much less as you print a part layer by layer instead of tooling away the unwanted material from an ingot.

Recycling could reduce the use of critical materials, too. Feaver says American Magnesium has developed a process to recycle batteries, resulting in a product that “battery manufacturers can drop right in to their supply chain.” That technology is currently being scaled up for commercial use.

Before coming to WSU, Feaver researched and developed the use of highly abundant carbon and silicon for use in batteries. Both technologies were spun off as successful companies.

And storage, whether in batteries or some other technology, is the big challenge in getting renewable energy on the grid reliably. Solar may be cheap to deploy, but if the power is on only when the sun shines, it’s not very useful. Energy demand typically surges, especially in the northern latitudes, when the sun isn’t shining, early in the morning and in the evening. And once the grid gets to about 40 percent renewable, he says, it becomes unstable.

Our grid storage capacity is a fraction of what we use every day, Feaver says. With our current petroleum-based energy economy, “we don’t need storage, we just turn on turbines when we need more electricity.” Those turbines might burn non-renewable natural gas or be powered by water, although hydropower also has serious environmental costs.

“Your storage is the pile of coal, the natural gas supply, or the gas tank—the energy is stored as chemical energy. And fossil fuels are very efficient, which is why it is hard to compete with the energy density of gasoline.”

But energy density is not destiny. JCDREAM is funding projects at WSU Pullman and elsewhere that Feaver describes as “phenomenal battery research.” Substituting earth-abundant materials for conflict and critical ones might mean an individual battery doesn’t carry as much energy but its production is less fraught with environmental and social concerns and is easier to recycle.

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Stones unturned

BY SIDDHARTH VODNALA ’19 MS

Growing up in a small mining community in Michigan, Travis Olds descended from a family where mining was the lifeblood for many generations.

As a boy, Olds was fascinated by the rocks and crystals that his dad would bring home in his lunch pail from the mines. He spent hours hunting for rare and striking specimens.

“I became obsessed with digging for strange and pretty crystals, and Michigan’s Upper Peninsula is a great place for a fledgling collector because there are hundreds of mines there,” he says.

As a postdoctoral scholar at Washington State University, Olds built a career from his childhood love of finding unusual minerals. He discovered and named 18 new minerals, many of which contain uranium. He’s hunted underground for them all over the world from the Czech Republic to the deserts of Southern Utah, and even the drawers of very old mineral collections, where sometimes new minerals can be found hiding.

If Olds suspects that he has found a previously unknown mineral, he tries to isolate a pure crystal of it and determine the structure. If the structure doesn’t match that of any previously known mineral, then it is “new,” and can be given a unique name. A commission at the International Mineralogical Association then votes on the name and soundness of the classification.

Olds has named minerals he discovered after the physicist Richard Feynman—feynmanite—and for the unique paddle wheels found in the structure of paddlewheelite. He also named the mineral redcanyonite after Red Canyon in Utah, the site of an ancient ocean where Olds and his colleagues have made multiple mineral discoveries.

Olds also worked with John McCloy, a professor in the School of Mechanical and Materials Engineering, looking at ways to safely store and dispose of nuclear waste.

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PHOTO SHELLY HANKS

PHOTO SHELLEY HANKS
From recycled materials, really

The world is full of garbage. Some of it is reusable. Let’s make athletic gear out of it.

Jeff Bradbury (’88 Hosp. Busi. Mgmt.) didn’t come to this conclusion in an instant. It took a lifetime of hiking and snowboarding in his native Pacific Northwest, playing beach volleyball, traveling the world with a backpack, and meeting innovators in Asia and Europe to make the connections. He became a designer of eco-friendly textiles and apparel, specializing in outerwear and technical clothing for athletes and fitness buffs.

In 2016, he and his daughter, Brooklynn Gould-Bradbury, a collegiate volleyball player, and their friend, Allison Wood, started Five12 Apparel, named for the 512 Highway between Tacoma and Puyallup. Now based in Sumner, they make clothing and accessories using coffee grounds, the discarded inner parts of windshields and, beginning this spring, fishing nets.

They started with coffee because, well, it’s so Northwest. Plus, it has wonderful natural properties of absorbing odors, drying quickly, and protecting from harmful UV rays.

In his world travels, Bradbury made friends with Jason and Amy Chen, who manufacture S.cafe fabric in Taiwan. Four years of research and trial and error taught the Chens how to extract the oils from coffee grounds discarded by local Starbucks and other coffee houses, leaving a fine, dry powder. They remove labels and caps from used plastic bottles, clean and crush them, grind them into flakes, then melt them into pellets. The coffee pellets and plastic pellets are melted together to make yarns and fabrics. Bradbury orders the cloth with the right weights and stretchability for the clothing he designs.

Some clothing labeled “from recycled materials” actually may not be, Bradbury says. Sometimes, the plastic is manufactured specifically to be melted down. At Five12, he says, “everything we use is post-consumer,” meaning the plastic bottles are actually used, then recycled. “[Chen’s] patent is not burning anything in making the fabric. He even makes soaps and shampoos out of the coffee oil he extracts.”

Bradbury’s next discovery was a Chinese glass-recycling company that separates the polyvinyl butyl (PVB) film from the center of discarded glass windshields. The PVB film gives the glass resistance to flying projectiles and provides UV protection. It’s chipped and melted to make a thick, waterproof fabric. While not suitable for clothing, it makes tough water-resistant bags. Bradbury admits that hiking and playing sports in the Pacific Northwest makes him prioritize products that stand up to weather.

Five12 has just introduced a new product: hoodies made from old fishing nets. Bradbury is distressed by the amount of discarded and abandoned fishing nets in the ocean—640,000 tons annually, according to the nonprofit World Animal Protection. An Italian company, Aquafil, reprocesses used fishing nets into a tough nylon yarn called Econyl, which is catching on with a variety of companies, including Burberry and Speedo.

Ten percent of Five12’s sales of the new Huntington Tech Hoody and other apparel made from Econyl will be donated to The Ocean Cleanup, a nonprofit launched by Dutch inventor Boyan Slat to round up plastics and other debris from the seas.

Spreading out a variety of merchandise, Bradbury talks about how even the zippers, cords, and other pieces of trim on the company’s garments are made from recyclable materials.

“It does cost more to use truly recycled fabric and materials,” Bradbury says. “But our overall goal is a sustainable, active life.”
Zapping the tax zappers

Something fishy was going on at a popular Bellevue restaurant, and it wasn’t related to the seafood specials.

During a routine audit, Washington Department of Revenue officials noticed that Facing East Restaurant was reporting a suspiciously low volume of cash sales. Seven percent of customers were paying for their meals with cash, according to Facing East, compared to the industry average of 22 to 30 percent for dine-in restaurants.

State auditors found something else suspect: At night, the amount of cash taken out of the register to pay the servers’ tips often exceeded the restaurant’s daily cash sales. The state’s subsequent investigation led to the first conviction for “tax zapping” in Washington in 2016.

Officials say tax zapping costs Washington state millions of dollars annually in lost revenue. It occurs when retailers use software to delete cash sales from the register’s running total—hiding a portion of their sales from the state Department of Revenue and pocketing part of the sales tax owed to the state.

“This is a way that businesses evade paying taxes, and it’s obviously illegal,” says Jon Lee, a doctoral student at Washington State University’s Carson College of Business and a fellow at the college’s Hoops Institute of Taxation and Research Policy.

Lee is researching ways Washington can combat tax zapping through strategies that encourage businesses to stay on the correct side of the law. The research, which is part of his doctoral dissertation, grew out of cooperative efforts between the Hoops Tax Institute and the state.

The institute was established in 2012 by the late Howard (50 Hosp. Mgmt.) and Billie Hoops to increase public awareness of tax issues. During the years Howard Hoops worked for the American Red Cross, the couple traveled extensively, and Hoops noticed that few people understood taxes or their role in government.

“Part of his vision was to create a place where students would work on solutions to real-world tax issues,” says Jeff Gramlich, accounting professor and director of the Hoops Tax Institute.

When Gramlich heard about tax zapping, he figured it would be a rich area for academic study. Mike Chertude, who manages the Department of Revenue’s Computer-Assisted Audit Program, agreed.

One national expert estimates that tax zapping could be costing Washington more than $400 million annually. While no one knows the extent of the problem, tax zapping siphons away revenue the state depends on to pay for essential services like public safety and parks, Chertude says.

**TAX-ZAPPING SOFTWARE** is believed to have originated in Europe, where residents pay a hefty 20 percent value-added tax on many goods.

Chertude was dubious when he first heard about tax zapping—it sounded too brazen to be real. But a series of high-profile cases in Canada during the 1990s revealed how pervasive use of the software is. The phrase “tax zapping” came from a confiscated floppy disc, which had the word “zapper” written on it.

In the case of the Bellevue restaurant, the owner showed state employees how she plugged a USB drive into her point-of-sales system at the end of each month. When she ran the software, a pop-up window asked her to select how much in cash sales to delete from the daily transaction record.

Yu-Ling Wong, Facing East’s owner, pled guilty to first-degree theft and unlawful use of sales suppression software. She was ordered to pay $300,000 in restitution and to comply with five years of court-order monitoring.

Thirty-three states have laws specifically prohibiting the use of tax zapping features, which can also be built directly into point-of-sale systems or used in cloud-based sales reporting. In Washington, possession of the software itself is illegal. But tax zapping remains difficult to detect and prosecute.

“Don’t assume there’s no way to do it. If you believe your product is missing, you need to look hard,” Chertude says.

In some cases, Department of Revenue employees ate at restaurants that were being investigated, paid for their meals with cash, and later checked to see if their purchase showed up in the cash register’s tally.

Although several high-profile prosecutions have involved restaurants, Chertude says tax zapping extends beyond the hospitality industry. He suspects the practice is prevalent in other retail industries and also in the sales of personal services, some of which are subject to Washington’s sales tax.

**AT THE HOOPS TAX INSTITUTE**, Lee researches “behavioral nudges” that help keep businesses in compliance with the law.

In an earlier survey conducted by Lee and a WSU faculty member, people were asked to assume the role of a sole proprietor for a lawn care company where many customers paid in cash. About a quarter of the survey respondents were self-employed.

Half of the respondents reported their sales to the government in a lump sum. The other half broke out cash sales from credit and debit card sales.

Survey respondents who listed cash sales separately from electronic sales reported higher income—and thus paid higher taxes—than the other group.

The study demonstrates that “simple steps like reporting cash sales separately could encourage business owners to report their full income to the state,” Lee says.

As part of his research, Lee also is evaluating the effectiveness of campaigns to alert business owners to the penalties for tax zapping and offer amnesty programs to companies that self-report violations. “It’s the carrot and stick approach,” Lee says. Without an amnesty program, offenders might not be willing to come forward.

Chertude is eager to see the results of Lee’s research. Given the time it takes to investigate a case of suspected tax zapping, he’s interested in knowing what else might work.

“It could be as simple as encouraging customers to keep their sales receipts and providing an incentive for them to send those sales receipts to the state,” Chertude says. “If the business owner knew there was a copy of that transaction, they might be less likely to stray.”

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**BY BECKY KRAMER**
BAM! The Black Arts Movement in Chicago

When Earth, Wind and Fire’s Maurice White took to the stage playing an electric kalimba in the 1970s, he was drawing on a deep well of inspiration. The iconic African instrument, sometimes called a thumb piano, had first been electrified in the 1950s by Phil Cohran, a pioneering musician who called his kalimba a “frankiphone.”

Cohran had been the trumpet player for Sun Ra Arkestra, a big band the likes of which no one had heard—or seen—before. Sun Ra was a self-ascribed cosmic philosopher and, for his fans, he brought to Earth the music of the spheres. Cohran left the Arkestra to return to Chicago, where he founded the Artistic Heritage Ensemble and worked with other musicians, artists, dancers, poets, and writers in the vast collaboration known as the Black Arts Movement.

The Black Arts Movement of Chicago is the subject of a film by two Washington State University Vancouver associate professors of English, Thabiti Lewis and Pavithra Narayanan. The 50-minute documentary took four years to make. It’s quick-cut style keeps viewers riveted and hungry to learn more about a period of American history that birthed a rich aesthetic based on Black American experience.

The Black Arts Movement (BAM) of the ’60s laid foundations, says Lewis, for the funk of Parliament/Funkadelic and Kool and the Gang; the soul of Earth, Wind and Fire; and contemporary styles like hip-hop (which is based on the collaborative aesthetic of sampling) and the Afrofuturism of Bootsy Collins and contemporary science fiction.

But it’s not just music, Lewis points out, that makes the BAM such a powerful force in American culture. When Gwendolyn Brooks became, in 1950, the first African American to win the Pulitzer Prize, she was performing on the streets, in bars, prisons, and wherever she could learn about what other Black people were experiencing. Brooks, and other Black poets, fearlessly experimented with the rhythms and syntax of language, bringing legitimacy and a heightened aesthetic to Black Vernacular English.

As Lewis says of his undergraduate years, “Whenever I had the chance to read BAM writers, I did so. Sonia Sanchez, Amiri Baraka, Eugene Redman, Nikki Giovanni—I took up that moment because what they were doing with language was challenging notions of universality. This was really fascinating to me and made me want to become a literature scholar.”

BAM created a lot of art but also, Lewis says, a lot of institutions that continue to thrive in Chicago and other cities. Schools and museums that teach and celebrate African heritage inspire young Chicagoans to this day. Haki Madhubuti founded Third World Press as not only a publishing house, but a workshop for aspiring writers. Muralists democratized art by painting, among others, a Wall of Respect which beautified a neighborhood and “not just an elite gallery.”

John Johnson, the owner/publisher of Jet and Ebony, teamed up with Hoyt Fuller to publish Black World, a journal that pushed Black writers to think deeply, read widely, and arguably, laid the foundations for Black studies and other ethnic studies programs taught in universities around the world.

With such vast contributions to American culture, it’s no wonder Lewis and Narayanan are pushing ahead with a book-length account of the movement. Based in part on his own experience, on the interviews he and Narayanan conducted for their documentary, as well as on contributions by other collaborators, Lewis aims to show that Chicago was a “matrix, an intellectual and cultural center” that was “an infectious source” of spiritual and revolutionary inspiration for multiple generations of Americans of all colors.

Clockwise, from top: Three Queens, 1971, Wadsworth Aikens Jarrell, courtesy Detroit Institute of Arts; Pavithra Narayanan; Thabiti Lewis. (Photos courtesy WSU CAS)
SideLines

One kickin’ season

By Larry Clark

The Cougars celebrate a goal against North Carolina in the College Cup. Photo Robert Hubner

The Winningest Team in WSU women’s soccer history climbed onto a plane to San Jose in the first week of December, but not for a vacation. They were bound for the first time to the College Cup, a contest of the top four college soccer teams in the country, to face top-seeded North Carolina.

The unprecedented road to the College Cup was filled with breakout seasons for several Cougar players, new records, and a lot of moxie. Coach Todd Schulenberger’s team finished the regular season 12–6–1 overall.

The team headed into the postseason for the third-straight season and eighth time in nine years after being selected for an at-large bid to the 2019 NCAA Tournament in November. They faced a tough challenge right away versus the Memphis Tigers.

The Cougars hit their tournament stride when Makamae Gomera-Stevens, with an assist from Averie Collins, knocked it just inside the post for a 1–0 win over Memphis.

In the second round of the tournament, WSU grabbed the biggest upset in program history, defeating top seed Virginia, 3–2, in a high-scoring match.

The momentum carried into the third round, where the Cougars notched another shutout with 3–0 against West Virginia. The Elite Eight saw a staunch defensive battle against number two seed South Carolina, ending 1–0 in overtime when defender Mykiaa Minniss nailed it to the back of the goal.

With that strike, Minniss became the twelfth Cougar to score on the year and the tenth to score a game-winner.

It was a team effort all season, and Minniss was one of a number of players who stood out. Star forward and All-American senior Morgan Weaver tied a single-game record with four goals against Colorado in the home regular season finale. For her career, Weaver hit 43 goals—second most in Cougar history—after recording a personal-best 15 goals in 2019.

Senior goalkeeper Ella Dederick extended her program record with 53 career wins while picking up 29 career shutouts.

Junior midfielder Gomera-Stevens also stepped up in crunch time. The native Hawaiian scored four of her team-best five game-winning goals against top teams, including two in the NCAA tournament.

The Cougars couldn’t keep the magic going when they faced top team North Carolina in the College Cup. Although they lost 2–1 against the Tarheels, nothing would erase the greatest season in WSU soccer history.

The team’s season ended there, but Weaver and Gomera-Stevens joined the senior U.S. national team camp in Bradenton, Florida, while Minniss played in the 2019 Nike International Friendlies with the U-20 team in Lakewood Ranch, Florida.

Weaver and Gomera-Stevens became the first Cougars to be called into camp with the top team in the United States.
Wild things

BY A D R I A N A  J A N O V I C H

Whatever you do, don’t touch them. Stinging nettles will give you a painful, poison-ivy-like rash. Instead, consider eating this moisture-loving weed.

Rich in vitamin A, calcium, fiber, and more, stinging nettles, or *Urtica dioica*, are actually very good for you—as long as you don’t directly handle them while they’re uncooked.

Nettles are among the first wild leafy greens of spring. And they grow in abundance in the Pacific Northwest, home to many wild edible greens—from dandelions to watercress.

Be sure to wear gloves if you harvest nettles yourself. If you buy already-bagged nettles at a local farmers market, you can drop the contents right into a pot for steaming or boiling. Cooking destroys the hard-to-see hairs fraught with irritating chemicals on their leaves and stems. After that, you can treat nettles like cooked spinach. Puree them into soups or pesto. Make nettle tea.

Like most wild spring greens, nettles are best early in the season—when they’re most tender and mild. “Later in the season, you don’t want to eat the older leaves,” says Jim Freed, an Olympia-based Washington State University regional extension specialist emeritus of special forest products. “They’re very bitter.” In general, wild greens “aren’t bland. They all have distinct flavors—everything from lemony to very bitter and earthy.”

Before retiring three years ago, Freed used horticultural techniques to help landowners manage forest plants and also developed agroforestry practices with indigenous people around the world. Today, he advises foragers to consider their location before collecting wild greens.

“I tell people not to pick cattails where people are walking,” Freed says. “Find a nice, fresh site somewhere, and go to where the newer growth is, the young shoots. Also, avoid ditches that might have agricultural run-off. You don’t want to pick watercress, for example, where there’s run-off from the road or pesticides or herbicides.”

Ken Mudge (’80 PhD Hort.), professor emeritus of horticulture at Cornell University’s School of Integrative Plant Science, Section of Horticulture, and co-author of *Farming the Woods*, cautions against over-harvesting. “Some collectors will go into an area and strip it clean. They will pick all the plants of a particular species, slowing down generations of that plant in that area for years and years. Someone who has respect for the forest is going to harvest much less. You can really only pick five percent in a given area, in general, if you expect the plant population to be stable.”

Wild spring greens don’t keep long and are best as fresh as you can eat them. “They’re rather delicate,” Freed says. “They’re not like spinach or kale or chard, which can be stored...
and handled and shipped. These, once you pick them, often within a couple hours they don’t look very palatable.”

**Watercress**, or *Nasturtium officinale*, is often associated with high tea and crustless sandwiches. Don’t let its dainty leaves fool you; they pack a peppery punch. They’re also rich in vitamins A, C, and K. Look for watercress near ponds, shallow lakes, and slow-moving streams—and bring a zip-top bag. Freed suggests placing freshly cut stems in three or four ounces of water while continuing to forage. “They will last longer that way,” he says.

**Miner’s lettuce**, or *Claytonia perfoliata*, is as pretty as it is nutritious. A slender stem in the center of each leaf supports a spray of small, white flowers. Packed with vitamins A and C as well as iron, miner’s lettuce grows in abundance in California where it helped Forty-Niners stave off scurvy during the Gold Rush. It can also be found along mountain streams and moist, woodsy spots on either side of the Cascade Range. “You’ll find it growing under trees in the northeast corner of the state, where Idaho and Washington and Canada come together,” Freed says. “If you get it before it starts to bloom, there’s no bitterness to it; it’s almost lemony. It makes a fantastic salad mix with spring greens.”

**Purslane**, or *Portulaca oleracea*, is so hardy it can be found growing in cracks in sidewalks. Its stalks and fleshy leaves, reminiscient of a young jade plant, are packed with omega-3 fatty acids and vitamins A and C. *Verdolagas* in Spanish, purslane is commonly paired with pork in Mexico, where it also often complements soups, stews, salsas, and salads. Raw purslane provides a crunchy, lemony tartness. Cooked, it makes for a simple side. Sauté it with garlic, olive oil, salt, and pepper, and finish it with a splash of fresh citrus.

**Cattails**, or *Typha latifolia*, grow where it’s wet—near ponds, marshes, lakes, rivers—and can help you survive in the wilderness. Dry stalks can be used to build a fire as well as shelter. The cigar-shaped heads can be used as torches. Parts of the plant are palatable, too. Just be sure to peel away the older plant material, “or it’s like eating cardboard,” Freed says.

The insides of fresh shoots can be sautéed and tossed with pasta or rice and other vegetables, or added to a stir-fry, pickled, or put into soups. While they’re still young and green, their corn dog-like flowers can be cooked for a sort of marshy version of corn on the cob. Their rhizomes can be processed into flour or roasted like a potato. “They take on the flavor of the soil in the area where they grow, and they grow in highly organic material. I always wash and scrape them before roasting them. Don’t leave any dirt on them,” Freed warns, “or they’ll taste like rotten mud.”

Of course, he notes, “if you add the right stuff to it”—butter, salt, pepper, WSU Everything Seasoning—“it all tastes good.”

Recipes for wild greens: [magazine.wsu.edu/extra/wild-things](http://magazine.wsu.edu/extra/wild-things)
Visit any construction site, whether it’s a house or a 50-story skyscraper, and it’s easy to marvel as a structure goes up.

But look back at the ground level. Piles or bins of wood pieces, asphalt shingles, bricks, concrete, and drywall wait to be moved to a landfill or recycled. The amount of waste is even more pronounced at demolition sites.

And that amount is huge—and growing. Some 40 to 50 percent of the world’s solid waste is estimated to be construction materials. According to a 2018 study, the annual volume of construction waste will double by 2025.

Landfills are getting clogged with all that debris, with additional impacts to groundwater and odor. It’s also a huge expense for construction companies, exacerbated by the recent recycling crises.

Through all the dust and detritus, though, two Washington State University faculty members see potential and opportunity.

Architecture Professor Taiji Miyasaka and David Drake, Fabrication Labs manager and adjunct professor in the School of Design and Construction, took a look at one common type of waste—gypsum drywall—and developed a way to convert it into a construction block.

Drywall, also called sheetrock or wallboard, covers walls and ceilings in many buildings, especially in North America. It makes up nearly 10 percent of unrecycled construction waste, with as much as 10 million tons going to landfills in the United States each year.

“Now there’s no use for drywall waste from demolition, which is about three-quarters of all the drywall waste. So, you have contractors who don’t have a choice but to dump the drywall waste from demolition at about three times what they’d be paying if a recycler would take it,” Drake says.

Recycling causes other issues. Gypsum contaminates concrete, so it cannot be added as fill. Although there are proprietary methods to deal with waste drywall, the process requires removing the paper.

“Drywall manufacturers want pure gypsum so there’s some difficulty to recycle drywall,” says Miyasaka.
King County and Pierce County have both banned disposal of drywall scrap from new construction in local landfills, so most of the excess drywall, particularly from the west side of Washington state with its larger construction industry, ships to distant landfills in Boardman, Oregon, or just across the Columbia River in Washington.

BUILDING A BLOCK

Miyasaka has a deep background in architecture and teaches studio classes at WSU. He also has a long interest in ecological building and teaches studio classes at WSU. He also has a long interest in ecological building design approaches in architecture.

Miyasaka’s expertise pairs nicely with Drake’s extensive experience in the building trades and sculpture.

The two men say building materials from recycled gypsum wallboard was originally a response to a materials innovation challenge. They developed it first as a concept and then decided to see how far they could push it as an actual product.

“As far as we know, there’s been actually very little work done on drywall waste. When we first started looking at this, we found a number of recent papers by people who were sort of working with drywall waste,” Drake says. “This seemed to indicate, ‘Okay this is not crazy, this is something that is really a problem.’ But, at the same time, it’s hardly something that’s saturated in terms of research. So, right place at the right time, I suppose.”

Miyasaka nods. “I knew that gypsum has been a problem, but I didn’t know a lot of information,” he says. “So, we talked about it and David said, ‘Well, in South America, people make adobe blocks.’”

Drake says their drywall waste block reimagines compressed earth blocks developed in Central and South America back in the 1950s. However, unlike earth-building traditions, drywall waste blocks divert waste from landfills instead of excavating soil, and are higher performance blocks better suited to colder climates.

The WSU drywall block experiment began in the basement of a building on the edge of the Pullman campus, where Drake and Miyasaka show off their simple, yet elegant, process in what looks like a converted truck bay. At first, they adapted surplus equipment or Drake welded it himself. With additional funding, they’ve been able to design custom machinery fabricated by the Voiland College of Engineering and Architecture’s tech shops.

Using gypsum drywall waste from projects such as the new plant sciences building at WSU Pullman, they grind up everything in a hammer mill, which Drake compares to a leaf shredder.

“One of the things about our process, which is different from every other process we know of for recycling drywall waste, is we don’t separate the gypsum core from the paper. We grind it all up together, and paper facing and backing layers are incorporated into the blocks. It’s giving us a fair amount of strength from the paper fibers reinforcing it, and we believe that’s also part of what’s giving us the high insulation value,” Drake says.

It doesn’t discriminate between types of wallboard either, alleviating the need for sorting.

The ground-up material drops into a barrel and then to a surplus USDA seed coater to receive a minimal amount of water. The damp material is combined with a binder—waste slag from blast furnaces—and moved to a press.

Miyasaka and Drake are on their third-generation block press. “The first one was made out of wood, and took about 15 minutes to make a block. I think we managed to make about 50 blocks or so on the wood press before it completely broke apart,” recalls Drake.

The latest press runs off a hydraulic power unit and makes about a block a minute. Drake estimates that, with automation, it could make up to six blocks a minute.

Miyasaka points to a pallet of blocks covered in plastic, where the drywall waste blocks (DWB) cure for 28 days. They have also successfully tested a low-pressure steam process used by the concrete block industry, which reduces curing time to 24 hours.

The result: a masonry block that looks very similar to a concrete or cinder block, but lighter. It has high insulation value and slightly less compressive strength than concrete blocks. It can accept fasteners such as screws and nails, be cut with ordinary woodworking tools, and absorbs dyes and color similar to concrete.

The process is really simple, say Drake and Miyasaka, and for on-site production, all of the equipment would fit on the back of a pickup or a flatbed trailer.

“We’re trying to compete with concrete blocks that sell for a buck at Home Depot,” Drake says.

They also built a hotbox testing apparatus, essentially a wood box divided in half by a wall of their drywall waste blocks, to simulate an interior room on one side and the outdoors on the other. They keep one “indoor” side at ambient temperature and cool the “exterior,” in order to measure the insulating value of the blocks.

Students in mechanical engineering faculty Roland Chen and Chuck Pezeshki’s capstone class designed the cooling system. Another group of mechanical engineering students designed a hopper for the future automated block press.

The tests were positive. “These are about half the density of a concrete block, and ten...
times the insulation value,” says Drake. “We think that a commercial building, for example, nonresidential, you might be able to avoid additional insulation completely. We expect the blocks to be highly fire resistant and have good acoustic performance, too.”

Says Miyasaka, “I was surprised we were able to make a block which performs quite well.”

Drake nods. “It’s one of those few times that it was a good idea and no one ever really had it before.”

BLOC OF SUPPORT

Others soon began to take notice of the DWB. In 2018, the researchers received an Amazon Catalyst grant, which encourages people to find innovative solutions to real-world problems.

In addition to the grant, WSU’s Office of Commercialization connected Miyasaka and Drake with industry contacts interested in their product. They met with King County officials in Seattle to see if the blocks would be a viable option for construction of several tiny home communities to house the city’s growing homeless population.

Drake and Miyasaka have also visited with construction companies about the drywall waste block and its potential. “Their responses to our product have helped inform our research, as we continue to look for ways to solve an industry need,” says Miyasaka.

The researchers participated in WSU’s I-Corps entrepreneurial program and received Commercialization Gap Fund support through WSU. They also garnered some initial funding from the American Institute of Architects.

Drake says that by the standards of engineering, though, their funding is really modest at just around $100,000.

Last July, the drywall waste blocks received an American Institute of Architects R & D award, which recognizes innovation in architectural technology. The award was announced in Architect Magazine and is one of eight awarded nationally.

“This is radically useful and radically simple at a time when so many products are trying to call attention to themselves by being unusual,” juror James Garrett Jr. told Architect Magazine.

Craig Curtis (’83 Arch., ’84 Const. Mgmt.), one of the other jurors for the award, told Architect Magazine that the project compares to “the introduction of fly ash into concrete, which now is commonplace. ... I honestly think this could become a commodity product.”

While discussions are still ongoing, the blocks could soon have niche uses, such as patio pavers, planters, or landscape walls. It’ll take more testing, possibly over a decade, to receive certification to use the drywall waste blocks as load-bearing walls.

NOT JUST A BLOCK

Miyasaka and Drake aren’t waiting around for 10 years. They’re already thinking about other possibilities for drywall waste.

Back in the lab, on a worktable next to shelves full of DWB samples, a cross-section of a wall shows the thick plastic foam that serves as a common building insulation. Drake notes that the plastic product works well on many levels: high R-value for insulating, fairly inexpensive, doesn’t absorb water, and fairly easy to install. However, even if you add fire retardants, it’s still flammable.

In a building fire, like the horrific 2017 Grenfell Tower fire in London, the foam insulation burns fast and intensely. In the Grenfell Tower case, which killed 72 people, a high-performing foam insulation even released deadly hydrogen cyanide.

Drake and Miyasaka grab a thin panel from next to the wall model. It’s an insulation panel, about one-inch thick, made from
drywall waste. They realized the panel could have good potential due to gypsum’s natural fire resistance.

Drake fires up a blowtorch and aims the flame directly onto the panel. When the back of the panel is touched, it’s barely warm.

“We could sit here for an hour or so but it still wouldn’t burn through,” Drake says.

They aren’t looking necessarily to replace insulating foam, but the drywall waste panel could add more insulation while serving as a fire break.

The drywall waste insulation and blocks are just a couple of the products the pair are considering, but always with an eye to the practical.

“In a back-of-the-envelope way for two guys who are not engineers, not chemists, and not economists, we try to figure out, ‘Are we making something that could be produced cheaper? Higher performance?’” says Drake.

It look like there’s no end to supply either. As Drake notes, drywall waste has negative value for companies that pay to have it hauled away, so they’re ready to find a better way to get rid of it.

“The usage of gypsum has been growing radically, particularly in Asia,” says Miyasaka. “The market for drywall, or the use of drywall, is increasing in China and India three times faster than it’s increasing in the U.S.”

Drake adds that the growing Asian market may be really fortuitous for their drywall waste block, because some of those countries have a much stronger masonry building tradition, especially for residential construction. “That could be a really nice symbiotic relationship,” he says.

The drywall waste blocks will continue to go through testing as discussions on commercialization take place.

As the drywall waste products evolve, Miyasaka and Drake also hope they raise awareness of the construction and demolition waste issue, at least for drywall.

“Everybody knows about plastic and knows that there’s a big plastic garbage patch somewhere in the Pacific,” Drake says. “No one knows about drywall. And yet, we’re surrounded by it because it’s an easy-to-install building material. We just need a market for the recycled waste.”

POWER timber

Small or diseased timber in forests can create fire risk unless it’s thinned out, but what can be done with it then? One solution is an environmentally friendly product called cross-laminated timber, an engineered wood panel made by compressing and gluing boards into layers.

About a decade ago, the Composite Materials and Engineering Center (CMEC) researchers at Washington State University began looking at developing a cross-laminated timber (CLT) industry in Washington.

“CLT is really at the confluence of green building, forest health, and job creation,” says Don Bender, Weyerhaeuser Distinguished Professor of Civil and Environmental Engineering and CMEC’s director. “What drove interest in it was the possibility of helping to spur rural economic development and to mitigate wildfire risk by reducing fuel loads in the national forest.”

For more than a half century, CMEC has conducted research in wood and composite materials that have changed industries and economies in the state and country. They began working with companies and economic development groups to improve CLT performance and manufacturing, including analyzing its cost effectiveness and supply chain logistics.

WSU faculty analyzed and designed a pilot CLT supply chain with a 2013 USDA grant, along with industry partners that included a lumber mill in Colville, a CLT manufacturer in Columbia Falls, Montana, and an advanced systems manufacturer in Spokane.

It was a day of celebration last fall when California-based Katerra opened a new 270,000-square-foot CLT factory in Spokane. The facility will bring 105 manufacturing jobs while producing 11 million square feet of the material.

WSU became a key partner with the company to study supply chains, test, and refine manufacturing methods. They will work to ensure that CLT resins, processing parameters, and timber materials meet professional standards. The partnership includes Katerra colleagues with close ties to WSU, including Craig Curtis (’83 Arch., ’84 Const. Mgmt.), the company’s chief architect, and Todd Beyreuther, Katerra’s senior director of advanced building materials and a WSU adjunct professor.

“WSU has a long history of working side-by-side with companies in testing and evaluating manufacturing processes, such as those being used by Katerra,” says Bender. “We help close technology gaps so that Katerra has the most durable and safe product for its customers.”

This semester, WSU architecture and engineering students in the School of Design and Construction, as well as University of Idaho students, are working with Katerra on a studio design experience. They are developing ideas for a student housing project in Spokane’s University District while they study commercial wood construction.

“Our future architects and engineers will need skills in the design and construction with mass timber to meet the demands for carbon-free building of the future,” says Ryan Smith, director of the School of Design and Construction. “We’re excited about exploring the possibilities of using this material.”
The ascent of using CLT

Small-diameter or diseased timber thinned from forests improve forest health and reduce fire risk.

Low-quality boards from that timber compressed and glued into layers make CROSS-LAMINATED TIMBER (CLT), also called mass timber, a building product developed in Austria in the 1990s.

When glued together, CLT is comparable in strength to steel and concrete.

It also requires much less energy to manufacture and transport than steel or concrete.

CLT is a carbon sink: Instead of having the wood degrade or burn in the forest, using it for buildings locks up carbon that contribute to climate change.

Due to its strength, CLT can be used for the structural components of a building.

Researchers assessed the material’s seismic performance, an important consideration for buildings in the Pacific Northwest.

The roof of Pullman’s Brelsford WSU Visitor Center, opened in 2013, is made of CLT—the first university building to use the material in the United States.

PACCAR Environmental Technology Building at WSU Pullman, built in 2016, also includes CLT.

In 2018, Washington became the first state to allow structural use of mass timber in buildings as tall as 18 stories.

OPPOSITE/LEFT AND ABOVE: ATRIUM WITH CLT STAIRS AT THE WSU EVERETT UNIVERSITY CENTER (COURTESY SRG PARTNERSHIP/PHOTOS BENJAMIN BENSCHNEIDER)
Cultural constraints and biases keep women and people of color from entering and remaining in science, technology, engineering, and math. Washington State University and other national universities are working to increase the participation of these underrepresented minorities.

When she was an undergraduate studying mathematics at Vassar College, 19-year-old Molly Kelton applied to a National Science Foundation-funded program called Research Experiences for Undergraduates. A phone interview ensued with a male professor who, seemingly out of the blue, asked Kelton if she had a boyfriend.

“Why?” she asked, taken aback by such a personal question.

“Because,” the professor responded, “girls who come here and have boyfriends can’t focus on the research. And that’s a problem because, in general, girls are already worse at mathematics.”

Stunned, Kelton says she didn’t know what hit her. She shared the incident with one of her Vassar professors, who was horrified and said she should report it.

“I don’t think anything ever came of it,” she says. She got a different REU position and, out of the research she conducted, wrote and published a paper, launching her academic career. Now an assistant professor of mathematics education at Washington State University, Kelton says that ugly interview got her thinking about the problem of inclusion.

Who gets to be a mathematician? Or a scientist, an engineer, or a computer programmer? Time was, the majority of programmers were women but the number of women in computer science has declined since 1991. After decades of effort and millions of dollars spent, the participation of women in engineering is still flatlined at around 20 percent of the workforce.

Women, as well as other underrepresented minorities in STEM—science, technology, engineering, and math—often face issues of bias, both conscious and not, which manifests as microaggressions or worse. Media and other stereotypes are constantly reinforcing the notion that they don’t belong in STEM and are better at other things.

Kelton is far from alone in working to counter the cultural constraints and biases that keep women and people of color from entering and remaining in STEM fields. Professor and Voiland College of Engineering and Architecture Dean Emeritus Candis Claiborn is working on a project to understand why more young women and people of color don’t stay in engineering programs. Sociologist Julie Knec and an international team of collaborators are exploring the reasons why there are more women engineers in some predominantly Muslim countries than there are in the United States. And Kelton herself uses art and movement to disrupt assumptions about what it means to be a mathematician or scientist.
IT STARTS EARLY

Angela Jones (’94 English) is the CEO of Washington STEM, a nonprofit organization that collaborates with communities, businesses, and educators to ensure youth have equitable access to STEM education. They work with ten regional STEM networks across the state to help direct resources and scale successful programs that aim to ensure that there is cradle to career support for STEM skills. This means working to strengthen math skills for the state’s youngest students so they can start kindergarten strong as well as helping identify and work in cross-sector partnership to establish career pathways for local students, which will in turn help meet future economic needs.

Washington ranks second in the nation, she points out, in concentration of STEM jobs: from agriculture to aeronautics to computer science, Washington is a thriving hub of technological innovation.

But, she adds, “we’re in the bottom five in the country of students going on to post-secondary education. These folks are not going to be able to compete for all the jobs that are available” in the state, meaning employers have to bring in qualified workers from other states and countries.

From electricians to rocket scientists, Washington is not alone in suffering a homegrown shortage of skilled STEM workers. Part of the problem, Jones says, starts in a child’s first brush with education.

“When my son was born 13 years ago,” she says, “his dad and I talked and said we’ll never tell him that math and science are hard. As kids, we were always told, ‘It’s OK, math and science are hard.’ But no one says to their kid, ‘You know what, English is hard. It’s OK if you don’t know how to read and write. It’s OK to be illiterate.’ Nobody says that! So why don’t we have that same viewpoint of math?

“We don’t socialize STEM as cool,” Jones continues. “And yet, everyone wants to be able to hold their iPhones” to chat, or check their social media. Someone had to invent the phone and all those apps—and under the hood are mathematics, computer science, and all manner of engineering challenges. She makes the same point about cosmetics, the development of which takes a lot of chemistry. Same with many of the foods we eat, from lattes to chicken nuggets, which require an applied form of chemistry called food science.

“So how do we disrupt that norm about STEM education?” Jones wants to know. “It should be a core part of any curriculum because of the critical thinking and analysis skills you need in any job,” whether STEM-related or not.

Knee points out that “even though we complain about gendered occupations, we teach kids gendered ideas about what they’re good at. Girls are told they’re better at English. We have sex segregated sports,” among many other segregated activities kids participate in. By the time they’re adults, they enter a workforce that is highly gendered.

Kelton collects representations of mathematicians in the media. “In pop culture we see these very narrow and problematic representations of scientists and engineers and mathematicians,” she says. The popular TV show Numbers, for instance, “features a white male mathematician with so much inborn genius that he is unrelatable. That’s the stereotype of a mathematician. And STEM more generally is still very coded as a white male enterprise.”

There are others: John Nash, white, a genius, and mentally ill in A Beautiful Mind. Or take Hidden Figures, which features three African-American women mathematicians who helped put the first astronauts in space. While Hidden Figures was lauded for advancing the visibility of women of color in science, Kelton was dismayed to hear an interview with one of the Black actors who said she had to learn a whole new vocabulary to be able to play the part of a mathematician. Then there’s Beyoncé’s song “1+1,” which has the line “I don’t know much about algebra.”

“It’s normal in our culture to be averse to math,” Kelton sighs. “That’s what people see and hear in the media.”

Like Beyoncé, Kelton says that children develop “discipline-specific identities from a very young age. They say, ‘I’m not a math person,’ or ‘I love science, I hate art.’” She’s interested in getting the anti-science kids to see the world a little differently. “Often we find that there are kids who have anti-science identities but feel very connected to particular arts practices.”

For Kelton, a contributing problem is that our education system is still largely premised on mind-body dualism, the idea that mental phenomena are not physical nor influenced by the body. In fact, though, the motor system affects the way our brains work just as our brains influence how our bodies work. The mind is in the body, not a separate metaphysical entity.

“There’s a long tradition of thinking about math as a transcendental disembodied thing that’s up there,” she says, gesturing vaguely skyward. “And there’s quite a few pedagogical problems with that! It’s a setup for learners’ failure, because it’s this thing you can’t access.” She says there’s a growing body of evidence that thinking is always embodied. “There’s hard-to-see but nevertheless measurable motor engagement when people think about algebra equations.”
Indeed, cognitive neuroscientist Gina Rippon, writes in her recent book, *Gender and Our Brains*, that there’s plenty of research to show that children’s gender-segregated activities account for many of the differences we see between boys and girls. Boys use computers more, and play more video games, research has demonstrated, and such play is “a powerful predictor of certain spatial skills. . . . If being male means that you have much greater experience of constructing things or manipulating complex 3D representations (there is an uncanny similarity between the images used in mental rotation tasks and LEGO instructions), it is very likely that that will show up in your brain. Brains reflect the lives they have lived, not just the sex of their owners.”

Dualism is inhumane, Kelton argues. “I think it’s at the root of why children don’t get to move enough in school.”

As a doctoral student, Kelton led a couple projects that aimed to demonstrate that moving and physically experiencing mathematical concepts is a viable way of teaching kids to enjoy math. In Math Moves, she and her collaborators set up several interactive museum exhibits that got kids (and their adult companions) to experience ratio and proportion by using their bodies. In one, the kid stands in front of a bright light that projects her shadow on a grid on a big wall. As she moves, she begins to detect the pattern of inverse proportion that determines the size of her shadow. Kids had fun while doing math, running around becoming shadow Hulks.

Another project was *Taping Shape*, an interactive exhibit staged at the Fleet Science Center in San Diego. *Taping Shape* was a huge sculpture made, Kelton says, “out of a humble material,” packing tape. “By design, you could walk around the inside of math objects,” like a torus, a donut-shaped object that fascinates geometers. “We strapped head cams on families and studied the video, where we found a lot of really rich engagement. Part of the intent of that is to be more inclusive. Everyone has a body, even if they are differently enabled.”

**DOING GOOD AND DOING WELL**

One of the arguments for greater diversity in STEM education and its associated professions is what Jones calls “the moral imperative:” no matter their gender or skin color or religion, everyone deserves to make a living, whether it’s as an electrician or an electrical engineer.

But diversity results in improved productivity and innovative solutions to challenges—issues such as climate change, food, and energy all benefit from having more eyeballs examining them from a greater number of perspectives.

“The more people who look at a problem, the better the solutions,” Claiborn says. “Taking advantage of the entire population to address global issues, to make sure you get the best solutions—those are reasons enough to embrace diversity in STEM.”

“Degrees that lead to working on health, energy, and the environment, they’re big picture topics of global concern, and I think women are drawn to those,” Claiborn continues. “The Engineering Grand Challenges program started in 2008,” she says, with the idea to develop an army of engineers to address global issues. Although WSU isn’t involved, engineering deans have reported that the program attracts a disproportionate number of women. “And if you look at Engineers without Borders,” a student-run organization at WSU and many other schools, “it’s heavily populated by women and under-represented minorities.”

“If you’re a lawyer or a doctor,” Kmec adds, “you know you helped that client or patient. Engineers probably save more lives, though, by bringing in fresh water, and so forth.” But the United States doesn’t need roads to make a community accessible to the rest of the world, nor do we have especially pressing water distribution issues, potentially making engineering less appealing to women.

Jones, who talks to many professionals to understand their recruitment and retention concerns, says that, “men and women approach STEM differently at times. I was talking to an engineering prof who observed that women want to think in terms of, ‘How will what I’m doing affect my community and my fellow humans?’ A lot of times males approach it from, ‘What’s the issue in front of us, what is the issue we need to resolve?’ When you combine both of those? That’s an incredibly powerful way to problem solve.”

**IMPROVING DIVERSITY THROUGH HEAL**

Kelton says the arts are a tool to engage learners in STEM. By disrupting assumptions about science and math perceptions, STEM studies become more playful and creative. Together with WSU entomologist and artist Jeb Owen and colleagues in WSU Extension, Kelton has a National Institutes of Health grant to “bring science to historically underrepresented and non-dominant communities.”

Working with Latinx communities in central Washington, the HEAL project—short for Health Education through Arts-Based
Learning—focuses “on creating new inroads into STEM,” Kelton says. “The communities we work with are differentially impacted by West Nile Virus; they have higher rates of infection because they are a labor force in agriculture. We are concerned about health outcomes and STEM careers in biomedicine,” and empowering communities to take more direct control of their health-care needs by bringing more underrepresented people into the field.

Just as Latinx ag workers are disproportionately affected by ag-related health issues, so too are they more in need of teaching strategies that let them see themselves in STEM as doctors, engineers, and microbiologists. Kelton’s HEAL project teaches kids to think holistically about, for instance, the gut microbiome.

“Our human microbiome, we don’t just want them to understand microbes and how they work but also how they are connected to human health and all the pathways to that,” she says. Not only do learners get a better sense of the complexity of an issue but they also learn that there are multiple career paths that might enable them to address that issue.

“We’re very careful to not use elitist forms of art. We do comic books with kids, for example. That helps kids find another pathway into science. And then there’s an epiphany: ‘I can use art to engage in something I didn’t think I’d be good at!’”

Whether students take up a career in STEM, or “simply develop a lifelong interest and sense of empowerment in science and math,” the long-term goal is greater engagement. “Shorter term, we are developing what we hope will be a fairly comprehensive curriculum for schools and afterschool programs that support kids in using art to think about complex scientific systems.”

**WOMEN SEEKING BALANCE**

Claiborn and Kmec are both tackling the issue of how to recruit and retain women and underrepresented groups in STEM.

Claiborn has an NSF grant to investigate student engagement, retention, and success among undergraduate engineering students, including women and underrepresented minorities at the undergraduate education level. Working with Olusola Adesope, a WSU professor of educational psychology, and an engineering education professor at Utah State University, they’re hoping to learn why students leave engineering programs—and what might be done to keep them engaged. They are especially interested in retaining women and members of underrepresented groups.

Meanwhile, Kmec and her colleagues have been working on a long-term study of female engineers in predominantly Muslim countries.

Kmec and her collaborators, in their cross-cultural study of engineering education and practice, points out that in the United States there are more “off-ramps: If you fail at math once, that’s it, ‘I’m not good enough.’ And it happens early, before junior high.” She contrasts this with Malaysia, Tunisia, and other countries where women work as engineers at a much higher proportion.

“In Malaysia, there is no expressed conflict between being female and an engineer. The two identities can exist side by side without tension. Engineering aligned well with girls who love math and physics, and they were encouraged to do so from a young age by parents, fathers, and teachers. Remedial classes helped those who needed to get up to speed in math.”

Kmec and her research team just garnered an Amazon Catalyst grant to produce a virtual reality environment that will make use of 3,000 minutes of audio interviews of women in Malaysia and elsewhere.

“Viewers will put on VR goggles and choose a theme like ‘Work and Family’ that shows how women in these other countries dealt with their struggles. No one has ever looked at how a tool like this could be used to help women deal with career, home, and life,” says Kmec. She thinks that eventually the program might be useful to human resource departments to develop strategies that make women and underrepresented people more welcome in the STEM workplace.

Indeed, Jones says, “One of the challenges is, how do we disrupt the norm in the workplace? That environment, where women don’t feel welcome, where they’re asked, ‘Why are you here?’ I’ve heard that said of classrooms, too. That’s a culture that was created over time. I’ve talked to different companies, too, and said, ‘You can change that!’ You have to be intentional about making people feel welcome and valued.” Disruption and change, she says, “have to come from multiple directions. People I talk to really want to see workplace culture change but a lot of times they don’t know how to even start that.”

But that’s precisely why researchers at WSU and elsewhere are investigating this complex situation from multiple perspectives. How to recruit and retain women and underrepresented minorities in STEM fields is not just a good idea: with the challenges we collectively face, our futures may depend on it.
ILLUSTRATION DESIGN

JULIE KMEC
(COURTESY WSU DEPARTMENT OF SOCIOLOGY)
CHERRY BLOSSOMS FRAME JIM DINE’S THE TECHNICOLOR HEART ON A PULLMAN GREENING SPRING DAY (PHOTO SHELLY HANKS)
During his thirty-year career, Karr has worked with some of the biggest names in the music business and collected all kinds of keepsakes—from VIP passes and platinum records to props and guitars signed by the likes of Judas Priest and Slayer’s Kerry King. Exploring Karr’s 1926 Spanish-style home in the Hollywood Hills is like walking through a museum of rock-and-roll’s recent history. From his first-floor studio to his upstairs office, souvenirs tell the story of his work, which he sums up simply: “I just like making cool stuff.”

Karr is known for his bold style and fantastical storytelling. In his 2005 video for Seether’s “Truth,” for example, a cast of characters—from Santa Claus to the Easter Bunny—duke it out in a boxing ring with a surreal vintage vibe. For his 2000 video for “Kryptonite” by Three Doors Down, he “imagined a place where old superheroes go to retire.”

Karr drew on life experience for “No One Knows” by Queens of the Stone Age—hitting a deer on the drive home from Pullman during college—but added a twist. “When I pulled over, I couldn’t find it,” says Karr, who belonged to Tau Kappa Epsilon. “I was morbidly fascinated that he was going to come out of the woods and get revenge”—and that’s exactly what happens in the 2002 video.

Karr’s always been fascinated by the dark and bizarre. Summers during college and for months after graduation, he worked as a groundskeeper at a Seattle cemetery. That experience helped shape his aesthetic. Some of his signature imagery includes dead leaves, snakes, bats, top hats, and vintage masks and microphones. His 1970 “sublime” green Dodge Challenger has even appeared in a few shoots. “I like working with contrasts,” Karr says. “I like working with things that don’t belong. I like contradictions, things that don’t make sense, absurdities, oddities, freaks.”

He started going to rock shows—and photographing them for fun—in high school. At WSU, he took graphic design and photography classes from Francis Ho, who taught in the Department of Fine Arts for 37 years before retiring in 2004—and whom
Karr considers a mentor. “He was always encouraging, honest, and helpful. He taught me to understand composition and was really important in forming my aesthetic.”

Still, “I didn’t really get my act together until I got down here (to California).” Karr moved to L.A. in 1989 to attend the ArtCenter College of Design in Pasadena. But, “I was out every night seeing bands.” He met musicians who introduced him to record label reps who connected him with people in their art departments—and became so busy doing commercial photography that he stopped going to class and eventually got to work with some of the artists he idolized as a teen.

In 1992, he landed what he calls one of his big breakthroughs: photographing the album art for Tool’s “Undertow.” He keeps a copy in his rec room, bookended by a latex likeness of Dave Matthews’s head—a prop from 1998’s video for “Don’t Drink the Water.” Overhead shelves hold Karr’s old cameras, including the Nikon he used from 1994 to 2000 to photograph Matthews, Duran Duran, and more.

Karr’s album images paved his way to video; Karr shot his first in 1994. A year later, he directed Marilyn Manson’s version of “Sweet Dreams (Are Made of This).” The distorted, eerie images caught the attention of other artists and execs, and kicked Karr’s career into high gear. After that, he worked with Cheap Trick, Cypress Hill, Dr. Dre, Damian Marley, Velvet Revolver, Shooter Jennings, Godsmack, Evanescence, Lisa Marie Presley, Stevie Nicks, and others.

He’s directed shoots from Brazil and Mexico to Toronto and Prague—even inside his own home. His videos have been nominated for awards from MTV, Much Music, Billboard, and the Music Video Production Association. And his photographs have been exhibited at the Los Angeles County Museum of Art and on billboards on Sunset Boulevard.

In behind-the-scenes footage for Rolling Stone, Korn’s lead singer, Jonathan Davis, calls Karr “a great and very capable director.” In an email, Tommy Lee says he’s “one of the most creative and attentive guys on the planet!” Karr worked on two solo-album videos for Mötley Crüe’s drummer: 2002’s “Hold Me Down” and 2005’s “Good Times.” Lee writes: “He gets it!!! The music, the feel, and the vision! It’s like he wrote the song and sees images that are on point with the artists.”

Karr considers 2001’s “Rock in Rio” concert film his “opus.” The 18-camera live video shoot included two helicopters and 250,000 Iron Maiden fans, including Karr. “If you know the music like I do, you’re going to get great stuff. You know exactly when the solo’s coming up or that next drum roll.”

Frank Carey, an orchardist and rancher near Yakima at the beginning of the twentieth century, only had a fifth-grade education. But he was forward thinking when it came to college for his children; Carey sent all four of his children, three daughters and a son, to Washington State College.

Elva Carey (’19), Avis Carey (’22), and T. Benton Carey (’30), launched a tradition that spans a century, leading to five generations of Carey’s descendants at Washington State. Elva and Avis were charter members of Kappa Kappa Gamma sorority. Avis married Edward Robert Nolte (’21) and Elva married Chester Worthen (’17 Elec. Eng.).

The three Carey siblings who graduated often told stories of their time at Pullman, such as Elva’s memory of when the college students met the train with the victorious 1916 Rose Bowl team, and wheelbarrowed the football players up the hill to campus from the train station.

At the end of World War II, Avis and Ed’s daughter, Louise, moved to Pullman with her husband, Wallace Gordon Rightmire (’51 DVM). They lived in the hastily constructed South Fairway married student housing, where Louise raised three future Cougars—Richard “Dick” Rightmire (’69 Ag. Ed.), Deborah Rightmire (’71 English Ed.), and Rebecca Rightmire (’73 Elem. Ed.)—while Gordon finished his veterinary degree.

Deborah recalls her parents spoke fondly of their time at Fairway, where “the other families became and remained dear friends up into their 90s.”

The Rightmires eventually settled near Bellingham, where Gordon started a veterinary practice.

Dick married Kathleen Kruse (’69 Home Econ.) at WSU, while turbulence rocked the campus. Deborah, Rebecca,
and Kathleen remember the protests, strict dress codes, basketball games in Bohler Gym—and how WSU President Glenn Terrell made a huge impact on them as students.

Dick returned to northwest Washington and worked as an agricultural educator until his death in 2000. His and Kathleen’s children, Todd (’92 Ag. Ed.) and Kristi (’95 Ag. Comm.), became the fourth generation of Cougs, along with Deborah’s daughter, Katie Granger (’06 Elem. Ed.) and Rebecca’s son, Bryce McGrew (’06 Phys. Ed.).

The family was recognized for their dedication long after graduation. Nominated by his children, Gordon was awarded WSU “Dad of the Year” in 1968. His son Dick was selected “Dad of the Year” in 1992.

Gordon also received the Alumni Achievement Award in 1982, served as president of the Whatcom County Alumni Association, and became the first president of the WSU Veterinary Alumni Association. Dick served as president of the Whatcom County Cougar Club.

The connection continues as Todd, also an agricultural educator in Whatcom County, brings FFA members to the state convention in Pullman each year, sometimes assisted by his sister Kristi.

The Rightmires still travel to Pullman, including homecoming in 2018 and 2019. They also come to visit the fifth generation: Meghan Harting, daughter of Kristi and Mark Harting (’93, ’95 MS Ani. Sci.) and a sophomore studying communication.

“It’s a huge source of pride, being part of this Cougar lineage,” Todd says.

A moving tribute

BY ADRIANA JANOVICH

It was massive. But it had to be moved.

The artwork stretched more than 30 feet wide and stood twelve-and-a-half feet tall. It was also heavy, weighing some 28,000 pounds. And, it was highly breakable.

Transporting something so large and fragile would be an exercise in engineering.

“Our whole job was move it, and don’t break it. It was definitely a challenge,” says Jonathon Waldrip (’14, ’16 MS Civ. Eng.). Then a structural design engineer with KPFF Consulting Engineers, he was on the team that helped orchestrate the mural’s relocation in February 2019.

“The mural illustrates what Washington is all about,” Waldrip says. “And the state wished to preserve that.”

Made out of masonry and glass, the detailed mosaic is adorned with 150,000 small squares, or “tesserae,” of Byzantine glass and stone. Each tile helps create imagery celebrating Washington state’s rich industrial and natural resources. Aerospace engineering. Nuclear science. Cattle ranching. Salmon. Timber.

The artist, Jean Cory Beall, had assembled the mural—commissioned by the State Capitol Committee—in 1959 on a gently curved wall of un-reinforced four-inch masonry with a ceramic coating inside the state’s now-mothballed General Administration Building in Olympia.

“The tiles were pressed into the plaster one by one. We couldn’t cut it up to move it; it had to be moved whole,” says Waldrip, who helped plan the mural’s big move. He designed a steel frame to support and transport the work.

“If you simply picked up the mural from each end, it would flex in the middle and the glass would crack,” he says. “The glass and ceramic parts of the mural were very brittle, so the steel frame had to be very stiff. This was especially difficult because the mural weighed so much and was curved, which put a huge amount of torsion on the frame. Nothing could be welded to stiffen things up because the heat could propagate through the wall and damage the artwork. So everything was bolted and assembled in place like an Erector Set.”

The design took about a month to complete. Prep work took about a week and included heavy shoring of the floor and front of the building. “To extract the mural, we actually had to cut open a large part of the front of the building,” Waldrip says. “The doors were not big enough to get it out.”

Once the frame was installed, the existing support was demolished around it, the frame put on airskates—“sort of like mini hovercrafts,” Waldrip says—then pushed out of the building. Once inside, the front of the frame was cut off, revealing the artwork. The back side of the frame remained in place, permanently anchoring the mural in its new home in Olympia’s 2017 Helen Sommers Building, which also houses the Washington State Patrol, Office of the State Treasurer, and other government agencies.

The move itself took a day. Waldrip, now a structural design engineer at Visser Engineering Co. in Federal Way, wasn’t able to be there. “But it’s really cool to me that the frame accomplished double-duty and is holding the artwork down in its final location.”
In the right place

BY ADRIANA JANOVICH

Annalise Miller saw a worrisome trend among local youths in northern Namibia, where she’s been working to promote financial literacy and entrepreneurship.

“What I noticed is many lack the basic critical thinking and leadership skills that are vital in becoming successful entrepreneurs,” she says. “They are in an economic crisis so job creation is really important.”

To help build their skills, she and her colleagues developed a five-day Exploring Entrepreneurship Kids Camp. The goal: teach 12- to 16-year-olds the basics of starting and running a business, beginning with simple principles—“like don’t spend more than you’re making.” Other focuses include personal strengths, money management, and teamwork.

“The idea was that their creativity and excitement around making things can be turned into something lucrative,” says Miller, a community economic development volunteer at a vocational training center. “It was so fun to see the campers take ownership of the program and be proud of the things they made.”

Miller (’17 Math., Busi.) is one of more than 7,300 volunteers currently serving around the world with Peace Corps. Most are like her: single, young, female, and living and working in Africa.

Women make up 64 percent of Peace Corps volunteers in 62 countries throughout Eastern Europe, Central and East Asia, Central and South America, Africa, the Caribbean, and Pacific Islands. Their average age is 27. Ninety-nine percent are unmarried. Nearly half—46 percent—are in Africa.

In all, more than 235,000 Americans have served in 141 countries since Peace Corps’ inception. Founded 60 years ago next year—President John F. Kennedy created the program by executive order March 1, 1961—Peace Corps has three main aims: help meet the needs of interested countries, help promote a better understanding of people in other countries, and help promote a better understanding of Americans.

Nearly 10,000 volunteers have come from the state of Washington. Of those, about a tenth—1,008 volunteers, to be exact—is made up of WSU alumni. There are 17 WSU alumni currently serving in Peace Corps.

Miller is nearing the end of her service. “When I got to WSU, I wasn’t exactly sure what I wanted to do,” says Miller, who found her calling in international development. The summer after junior year, she traveled to northern Ghana to share best practices for clean water consumption as a field representative for Saha Global. “I really fell in love with the whole experience.”

Senior year, she traveled to Tanzania for her senior capstone project: conducting research on a smart thermometer device to aid in milk pasteurization for Kulé Tech, a company she cofounded with fellow student Victor Charoonsophonsak (’17 Mech. Eng.). They entered their project in the small-business plan competition at WSU’s Center for Entrepreneurial Studies, winning third place overall as well as merit prizes for best social impact and best presentation.

For two years now, Miller’s been working with 18- to 35-year-olds at a trade school in a town of about 6,000 people in northern Namibia, where she teaches financial literacy courses. One of her projects was hosting a business plan competition for students at three regional trade schools. She modeled it after the one she entered at WSU. When she and her colleagues hosted the kids’ entrepreneurship camp last spring, they had room for 30 campers. More than a hundred applied.

That response underscored what she had already been feeling: “I’m in the right place. I’m doing what I should. And I’m getting more from this experience than I could possibly ever give. Everything is based on relationships here. It’s so important to develop relationships with people. That’s basically the pinnacle of the Peace Corps development approach.”

Read about the experiences of four more WSU alums who served with Peace Corps—Zoë Campbell in Tanzania, Anjie Bertramson in Morocco, Denise Bausch in Niger, and Diane Kelly-Riley in the Marshall Islands—at magazine.wsu.edu/extra/Peace-Corps.
A new page for an old chapter

BY VONNAI PHAIR ’20

In last June’s blistering heat, while most WSU Pullman students were away and the Palouse was quiet, Sigma Chi broke ground on a new chapter house. It was the biggest construction project on Greek row and the first entirely new fraternity home in a generation.

The original 1900s-era house stood for almost 90 years until it was torn down in 2003. Now, as Sigma Chi celebrates a century at WSU, a new $6.2 million house will take its place on California Street.

No one has constructed a new fraternity home at WSU for decades. An executive committee appointed Sigma Chi alumnus Jeff Burnside (’89 Comm.) as project director, to use his fundraising, communication, and strategy skills on the campaign.

One of the largest hurdles was finding a bank to support the project, since there was nothing comparable.

Burnside says Spokane Teachers Credit Union believed enough in Sigma Chi and in WSU that “they did not require a signature to secure the loan for the construction.”

Sigma Chi is the first fraternity at WSU and the largest fraternity in the country, committed to create men of good character, Burnside says. “Every fraternity man says their fraternity is different, but in the case of Sigma Chi, it is measurable and demonstrably different.”

Many Sigma Chi men say the new home is long overdue, particularly Val Jensen (’52 Poli. Sci.), 1952 chapter president.

Jensen recalls living in the old house at Washington State College. Adorned with majestic columns, the vintage building housed World War II veterans and recent high school graduates. The veterans’ maturity gave a special character to the fraternity back then, Jensen says.

The cook could use four-letter words like no other and “was held in near reverence by all us—I picture her yet with a cigarette in her mouth dropping ashes into the pancakes on the stove,” Jensen says.

Jensen remembers the third-floor bedrooms, where snow greeted them on their sleeping bags through open windows. The constant need for plumbing, flooring, and wiring fixes spoke to the condition of the old building.

The men of Sigma Chi have a lot to be thankful for, and it doesn’t just include the construction project, current Sigma Chi member Jacob LaRoque says.

“This year, we celebrate 100 years at WSU. We are the oldest active chapter here at WSU—we’ve never been shut down or suspended,” he says. “We intend to keep it that way.”
Every year, WSU grads return to Pullman for their Reunion to reconnect with classmates and learn more about WSU’s research, leadership, and present-day experience.

Celebrate this important milestone with us!

alumni.wsu.edu/reunions
Mao’s Kisses: A novel of June 4, 1989
ALEX KUO
REDBAT BOOKS, 2019

Deng Xiaoping learned to play bridge in the early 1950s. Little did he realize that appropriating state transportation to take him and his team to tournaments would result in the Cultural Revolution of the 1960s and his being transported far from Beijing for reeducation through manual labor.

But Deng wasn’t just a Goren Prize-winning bridge player. He was, after his rehabilitation, China’s paramount leader during a time of civil crisis. The spring of 1989 brought a series of mass demonstrations that resulted in a declaration of martial law—and Tank Man standing down a row of tanks leaving Tiananmen Square the morning after.

Kuo’s latest novel dives down a rabbit hole, sifting through redacted archival materials and interviews WSU emeritus English professor Kuo conducted over many visits to China, to produce—a narrative of “another muddled episode in China’s history.”

The narrator is G—named G at birth in homage to Kafka—himself a strong bridge player and, after he meets Deng at a tournament, the leader’s note taker. While not for the casual reader, Kuo’s novel is rewarding for students of Chinese history and anyone interested in the ebb and flow of social justice movements.

—Brian Charles Clark

To Think Like a Mountain: Environmental challenges in the American West
NIELS SPARRE NOKKENTVED
WSU PRESS: 2019

“Thinking like a mountain” is the name of a short essay from Aldo Leopold’s 1949 book A Sand County Almanac. In it, he reflects on an old wolf he shot and killed as a young hunter and how he came to realize wolves play a critical role between prey, such as deer and elk, and the flora of the forest and other natural habitats. He lamented humans need to learn to think like a mountain, or take a long-term view of ecology, including the value of predators.

This similarly titled volume encourages people to do the same thing—to think like a mountain in terms of environmental concerns—in the specific setting of the modern American West. A quote from Leopold’s now-famous essay sets the tone: “Only the mountain has lived long enough to listen objectively to the howl of a wolf.”

Niels Sparre Nokkentved spent two decades as an environmental and natural resources reporter for newspapers in Washington, Idaho, and Utah, and eight years as a writer, editor, and photographer for the Idaho Department of Fish and Game. His new book of essays explores environmental challenges such as wolf recovery, threats to watersheds by abandoned mines, the lingering effects of grazing private livestock on public lands, overcutting ancient forests, and more.

He writes with the straightforward approach of a former newspaperman, presenting facts, history, policy, and modern milestones. He also includes some of his own photographs as well as short, personal, scene-setting vignettes—from the forests of Washington’s Olympic Peninsula and Pacific waters out past the Grays Harbor bar to Big Smoky Creek in the Soldier Mountains of central Idaho and the foothills of the Jarbridge Mountains in Nevada.

He concludes Mother Nature is losing ground. But, he writes, “When we think like a mountain, we will have clean air and water, forests will thrive, wild salmon will spawn naturally and make thousand-mile journeys to their natal streams, sage grouse will strut their stuff on their leks in the western sagebrush grasslands, and the wild green fire will burn in the eyes of the wolf—and that benefits us all.”

—Adriana Janovich

Bread Lab!
KIM BINCZEWSKI AND BETHANY ECONOPOULY (’18 PHD CROP SCI.) READERS TO EATERS, 2018

Explore the magic—and science—of bread baking in this bright, slim, straightforward, hardbound children’s book, published in cooperation with the Bread Lab at Washington State University in Mount Vernon, and sponsored by the Bread Bakers Guild of America. Aunt Mary, a plant scientist whom young Iris affectionately calls “Plant Mary,” comes over with a Saturday morning mission: “Let’s
turn your kitchen into a bread lab, Iris! They spend the day making whole wheat sourdough bread from scratch with just four ingredients: sourdough starter, whole wheat flour, water, and salt. And they make it seem so easy. Of course, that’s the point.

This volume aims to inspire young bakers and their families to not only bake their own loaves but consider where the wheat was grown and milled. It includes playful illustrations and sensory details—sounds, smells, tastes—to engage young readers.

The character of Aunt Mary, inspired by agriculturalist and coauthor Bethany Econopouly, serves as a conversation starter about women in science. Iris—curious, congenial, and a diligent notetaker (she tracks the process of making bread step-by-step in her notebook)—sports red glasses and a halo of curly hair. She’s biracial, her dad is black, and her mom—and Aunt Mary—are white.

The back of the book features a baker’s dozen of bread facts, plus a diagram of a white flour depicting the bran, germ, and endosperm, as well as an easy-to-follow recipe for whole wheat sourdough bread.

Coauthor Kim Binczewski is the managing director of The Bread Lab. A short “About the Bread Lab” section at the end of the book is written by the director, Stephen S. Jones.

—Adriana Janovich

**Volume 2**

**GIANTS IN THE TREES**

2019

In their simply titled sophomore offering, Giants in the Trees have established their stride. Jillian Raye, Erik Friend, Ray Prestegard, and Krist Novoselic (‘16 Soc. Sci.) have spent more than two years honing their sound—from the old creamery building where they practice to last year’s inaugural Thing festival in Port Townsend. Their second album—heavier, stronger, and tighter than their debut—features 39 minutes of ten varied tracks of moody, melodic, and modern Americana, punctuated with whimsy and, at times, trippy, psychedelic pop.

Novoselic is by far Giants’ most famous member, known as the bassist and co-founder of the iconic grunge band Nirvana. Born in a grange hall in a sylvan setting in southwest Washington, Giants offer their own dynamic and interesting brand of rural Pacific Northwest rock—folksy, fun, funky, dreamy, danceable, rootsy, and all-around approachable.

They emerged from the woods of Wahkiakum County in 2017 with a self-titled album. (Their name comes from the chorus of “Squawatch,” arguably a quintessential PNW anthem, evoking images of towering pines as well as mysterious echoes of avant-garde space rock.) Raye’s haunting, ethereal, sultry, sometimes husky vocals are supported by a trio of seasoned musicians: Friend on percussion, Prestegard on guitar and harmonica, and Novoselic on bass and accordion, a staple in the Croatian-American community in which he grew up. Raye also plays banjo and guitar. They enjoy playing together, and it shows.

Their Volume 2 opener, “Feel You Now,” kicks off with Novoselic’s accordion, which—together with Raye’s soothing vocals, Friend’s slow and steady percussion, and Prestegard’s mastery of strings—sets a mellow, somewhat melancholy, tone. Novoselic’s accordion also features prominently on the last track, the whimsical and waltz-like “Nevermore.” In between, find the funky “Star Machine,” country-esque “Sons and Daughters,” and catchy “Hot Blooded” and “My Name” that—with their repetitive lyrics—will have new listeners singing along in no time.

—Adriana Janovich

**BRIEFLY NOTED**

**Lost Life Recovered: An odyssey**

S.M. GHAZANFAR (‘62, ‘64 MS, ’69 PHD ECON.) 2019

S. M. “‘Ghazi’ Ghazanfar is a survivor. His father died when he was four. At ten, after migrating with his family to Pakistan during the Partition of India, he was abandoned by his abusive stepfather. Despite a tenth-grade overseas education, he was able get into WSU and persevere, becoming a professor of economics at the University of Idaho, founding its International Studies program, and winning a WSU Alumni Achievement Award. His memoir tells the story of an extraordinary life that will resonate with those familiar with or interested in the immigrant experience, rising above childhood circumstances, and confronting an abuser.

**The Girl I Left Behind**

ANDIE NEWTON (‘09 HISTORY) 2019

Set in Germany during World War II, this compelling story of friendship, courage, and coming of age is told from the point of view of Ella, the historical novel’s young heroine who lives in Nuremberg with her aunt, the owner of an antique store. Ella is introduced to the Falcons, a German Resistance group, by her best friend Claudia. Soon, she’s helping hide Jews from the Gestapo in the basement of her aunt’s shop. With a foreboding prologue, Andie Newton’s debut—a quick, dramatic, and suspenseful read—follows Ella as she transforms from a teenage shop girl to a courageous young woman, secretary for the Reich, and spy for the Resistance.

**I Want Everybody to Love Me**

HOLLY E. JONES, (‘02 ENGLISH) 2018

It’s 1992, and Violet Karchefski is trying to make it through middle school. She’s a small-town eighth grader who plays trombone and is learning to navigate complicated feelings about boys in this upbeat, coming-of-age sequel aimed at young readers. It picks up where 2016’s I Want Everybody to Like Me leaves off, following Violet—who’s now two years older—on a band trip to Japan as well as through sticky social situations and disagreements with her parents. Gen X parents might want to read both books right along with their kids; they’ll get the references to Trapper Keepers, Ren & Stimpy, Mike Myers on Saturday Night Live, and C+C Music Factory.
The American Association of Feline Practitioners awarded SALLY LESTER (’67 DVM) for her contributions to the Journal of Feline Medicine and Surgery. She is certified by the American College of Veterinary Pathologists as both a clinical pathologist and an anatomic pathologist. ✪ NANCY DICKAU MOORE (’68 For. Lang. Ed.) has been inducted into the Fairfield High Athletic Hall of Fame.

BRYAN SLINKER (’80 DVM, ’82 PhD Vet. Sci.) was appointed interim provost and executive vice president for Washington State University. He also received a distinguished achievement award from the Washington State Veterinary Medical Association last October. ✪ GARY L. BAKER (’81 Busi.) was recently appointed chair of the WSU Everett Advisory Council. He was also recently elected chair of the national finance committee of the United States Power Squadrons and serves on the board of directors of the Henry M. Jackson Foundation. He lives in Lake Stevens and has practiced law for 33 years.

Catherine Reef (’83 English) has been chosen to receive the 2020 Children’s Book Guild Nonfiction Award, recognizing her body of work as an author of outstanding nonfiction for middle grade and young adult readers. The presentation is May 30 in Washington, D.C.

Steve Ellersick (’83 Elec. Eng.) was elected president of the Pioneer Association of the state of Washington. Obsidian Therapeutics, a biotechnology company pioneering controllable cell and gene therapies, has appointed MELANIE CALL (’85 MBA) as vice president and head of program development. ✪ Major General DENNIS PAUL LEMASTER (’85 Range Mgmt., ’87 Forest Mgmt.) was promoted to his current rank on May 7, 2019. He commands Regional Health Command-Pacific and is stationed at Joint Base Lewis-McChord.

Timothy J. Nichols (’86 Ag., ’93 MA Adult Ed.), dean of South Dakota State University’s Van D. and Barbara B. Fishback Honors College from 2008 to 2016, has been named a National Collegiate Honors Council Fellow.

GARY SWINDLER (’87 Comm.) is the new CEO of Washington State Employees Credit Union. He started at the credit union two years out of college as a loan officer in 1989. More recently, he served as senior vice president and chief operating officer. ✪ Axsome Therapeutics has appointed DAVID MAREK (’87 Bus. Adm.) as chief commercial officer.

CAROL KOWALSKI (’88 Comm.) is the director of planned giving for the YMCA of Pierce and Kitsap Counties.

Michael Horne (’88 Comp. Sci.) has joined Swift Navigation as executive vice president of worldwide sales.

DAVE WHITEHEAD (’89 Elec. Eng.) is the new CEO at Schweitzer Engineering Laboratories.

ERNIE ISEMINGER (’91 Soc. Sci., Ed.) has joined Illinois Institute of Technology as vice president for institutional advancement.

ANN CIASULLO (’94 MA English) won the Spokane YWCA’s Women of Achievement award for education. She helped create the critical racial and ethnic studies minor at Gonzaga University, where she’s a professor and chair of the English department.

MAUREEN JOHNS-GRIFFIN (’94 Comm.) is the new director of marketing and communications for the Granbury Chamber of Commerce in north Texas.

JASON R. WANDLER (’94 Poli. Sci.) is a managing partner at Oles Morrison Rinker & Baker. He also serves on the construction management advisory board for WSU’s School of Design and Construction.

Governor Jay Inslee has appointed ALICIA BURTON (’96 English) to the Pierce County Superior Court. Burton has worked for more than 20 years as an attorney with the Pierce County prosecuting attorney’s office, most recently as a tort litigation attorney in the office’s civil division as well as the legal advisor to juvenile court.

MATT DREW (’97 Comm.) is leading marketing and sales for Montana Craft Malt, a new craft malting operation. He holds several advanced malting certifications and is a Cicerone Certified Beer Server.

London’s 90TEN has hired MAY BACCARI (’99 Comm.) as director of communications. ✪ DEVIN LEWIS (’99 Soc.) has been named captain of the police department in Redmond, Oregon. He previously served as a lieutenant with the Bend Police Department.

MATTHEW COLLEY (’01 MA English) was recently appointed to the board of directors of Catholic Charities of Oregon. He’s a business and litigation attorney at Black Helterline in Portland, Oregon, where he lives with his wife Jessica and their three children.

KREM 2 News has promoted WHITNEY WARD (’01 Comm.) to coanchor of its early evening newscasts.

Irrigation and agriculture engineering specialist JOSE RODRIGUEZ (’03 PhD Eng. Sci.) has joined Dilution Solutions as business development manager.

GLY Construction, an employee-owned general contracting firm in Bellevue, recently named senior project manager TESS WAKASUGI-DON (’06 Const. Mgmt.) as a new shareholder. She is the first female owner in the firm’s 52-year-history as well as a member of the advisory board for the School of Design and Construction at WSU.

DARRIN TRASK (’09 Bio. Eng.), an orthopedic surgeon who specializes in total hip and knee replacement surgeries, has joined Olympia Orthopaedic Associates.

Key Technology has promoted SHAYLA WENTZ (’10 Comm.) to marketing communications manager.

JULIAN REYES (’10, ’18 PhD Civ. Eng.) was recently awarded a science and technology policy fellowship from the American Association for the Advancement of Science. He will work in the State Department’s Office of Global Change, providing technical guidance on climate change and climate science, helping in international negotiations, and working across federal agencies to coordinate climate change research.

Landscape architect JAMES DAVIS (’13 Land. Arch.) has joined Bernardo|Wills Architects in Spokane.

Allflex has hired KODYdee (Easterday) WILLIAMS (’18 Ag. Tech.) as a regional manager, overseeing sales and marketing in Washington, Oregon, and Idaho.
She’s used to the question. She hears it all the time. And she gets it. Her name is unusual.

And the answer is yes. MAJESTIC STORM (’18 Comm.) is her real name.

It’s almost as though she was destined to do the weather.

She’s a forecaster for KHQ and FOX28 in Spokane as well as the morning show “Wake Up Montana” on KULR, KFBB, KWYB, and KTMF.

“I love being able to start someone’s morning off on a positive note, smiling, with lots of energy, lifting them up,” she says. Plus, “People rely on the weather. They use the weather to plan their day.”

She became interested in weather as a girl growing up outside of Spokane. “I remember watching storms light up our back field. And I’ve always loved the changing seasons across the Inland Northwest.”

Storm is actually her middle name. She uses first and middle names on air because they’re shorter and easier to pronounce than her last name: Tschabold-Grant.

“I used to not like my name when I was younger,” she says. “Now I love it.”

Her middle name was inspired by ESPN anchor Hannah Storm. And, “Another perk: She’s off work by 10 a.m.”

Tschabold-Grant first visited KHQ during high school, telling forecaster Blake Jensen (’09 Comm.) of her dream of becoming a meteorologist for a national morning show. He let her go on-air during his weather segment—and she was hooked. She set up a job shadow with him, and he became her mentor, helping her with her senior project and encouraging her to pursue an internship.

She started working at KHQ full-time shortly after graduating from WSU Pullman, where she was a first-generation college student and worked for Murrow News 8 as well as Cable 8 Productions.

Today she does four hours of live TV from Monday through Friday, waking up at 1 a.m. and arriving at the station by 2 a.m. (Most nights she’s in bed by 6 p.m.)

This leads to another oft-asked question. The answer is also yes: She is a morning person.

“I love morning shows,” she says. “We’re drinking our coffee, we’re listening to music, and we’re having fun.”

Another perk: She’s off work by 10 a.m.

BY ADRIANA JANOVICH

online clips: magazine.wsu.edu/extra/Majestic-Storm
Arizona. WILLIAM S. SLIPPERN (‘51 Physics), 90, October 14, 2019, Richland.
HAROLD OLIVER BOSS (‘52 Mech. Eng.), 90, February 6, 2018, Simi Valley, California.
DAVID WAYNE COBURN (‘52 Socio.), 90, August 24, 2019, Spokane.
PATRICIA L. CONLEY (‘52 Home Econ., Kappa Alpha Theta), 86, June 23, 2017, Spokane.
RONALD LYNN KERCHEVAL (‘52 Ag. Eng.), 68, November 10, 2019, Mount Vernon.
ALLEN PICKETT MUNN (‘52 Ani. Sci., Alpha Gamma Rho), 88, April 25, 2019, University Place.
ROBERT CALVIN Saxe (‘52 Pharm.), 88, January 25, 2015, Spokane.
VICTOR CHEW GUNN AUYONG (‘53 Psych.), 93, November 5, 2019, Honolulu, Hawaii.
SANDRA E. THIRTYACRE (‘53 Ed.), 86, July 24, 2018, Medford, Oregon.
NANCY JANE WRIGHT (‘53 Home Econ.), 89, April 12, 2019, Spokane.
MALCOLM L. EDWARDS (‘54 Poli. Sci.), 87, September 14, 2019, Seattle.
MARGERY ROUNDS MUIR (‘54 Home Econ., Kappa Alpha Theta), 86, September 9, 2019, Pullman.
S. LEROY WHITENER (‘54 DVM), 90, November 9, 2019, Moses Lake.
LEALON V. “LEE” CASSELS (‘55 Civ. Eng.), 91, October 30, 2019, Vancouver.
BARRY KENNARD JONES (‘55 Busi.), 86, November 7, 2019, Spokane.
ELIZABETH GILDOW HORTON (‘56 Ed., Delta Gamma), 85, November 7, 2019, Stanwood.
PHILLIS J. SOLOMON (‘56 Gen. St.), 84, August 31, 2019, Moscow, Idaho.
MELVIN L. KLEWENO JR. (‘57 Poli. Sci.), 84, September 2, 2019, Des Moines.
GARRY RAY MILLER (‘57 Chem. Eng.), 83, August 16, 2019, Waco, Texas.
CLARENCE R. “DICK” BRESSON (‘58 PhD Chem.), 93, October 30, 2018, Bartlesville, Oklahoma.
IN memorial

WESLEY DALE MARSHALL ('58 DVM), 85, October 11, 2019, Ekalaka, Montana.
MYRNA LEE OVERSTREET ('58 Ag.), 85, August 14, 2019, Pullman.


BILL BONING ('60 Ag. Eng.), 81, June 8, 2019, Ashburn, Virginia. RICHARD ALAN FUSSELL ('60 DVM), 83, May 29, 2017, Lake Forest, California. LEE DUANE CAREY ('60 Busi.), 83, May 7, 2019, Edmonds.

SANDRA LOU KERR ('60 Busi.), 83, May 7, 2019, Edmonds.

JOHN MARTIN POTTER ('65 Anthro.), 76, November 7, 2019, Puyallup. WILLIAM JOHN BRISKEY ('66 DVM), 84, August 1, 2017, Tacoma.


GEORGE WILLIAM PASSMORE ('59 DVM), 85, September 21, 2019, Kent.


MICHAEW JOHN LUST ('65 DVM), 79, August 26, 2019, Yakima. JAMES BRADLEY JERDE ('66 DVM), 76, May 2, 2019, Edmonds.

LINDA L. HELLER ('68 Acc.), 73, April 20, 2019, Tucson, Arizona.

JOHNNTHOMAS MOSS ('67 Busi., ’70 MBA), 73, April 26, 2018, Snohomish.

JOHN THOMAS MOSS ('67 Busi., ’70 MBA), 73, April 26, 2018, Snohomish.

WILLIAM “BILL” R. STEVENS ('68 Forest & Range Mgmt.), 73, June 10, 2019, Coulee Dam.


WILLIAM H. KITTHEIMER ('58 History), 84, September 5, 2019, Coeur d’Alene, Idaho.

WILLIAM “BILL” R. STEVENS ('68 Forest & Range Mgmt.), 73, June 10, 2019, Coulee Dam.

JOHN MARTIN POTTER ('65 Anthro.), 76, November 7, 2019, Puyallup. WILLIAM JOHN BRISKEY ('66 DVM), 84, August 1, 2017, Tacoma.

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Alumni Association News

Helping Cougs excel in life after college

Learning doesn’t stop after graduation. In some ways, it begins—and, at the very least, continues. However, focusing on post-degree development can be challenging, especially for new graduates. In an effort to support Cougs as they navigate life after college, the WSUAA is dedicated to crafting programming that specifically addresses these struggles.

This spring, the WSUAA is working with BECU to conduct financial literacy training events in Seattle and Spokane, as well as online opportunities for those in other areas. Additional in-person events will be brought to other campuses throughout the coming year. The programming will include relevant tools such as information on managing a budget and student loan payoff, tips for purchasing a house, and other pertinent topics.

Also coming to Seattle this May, the first-ever WSUAA Women’s Summit will focus on helping women achieve success in their chosen profession. Noel Schulz, electrical engineering professor and WSU’s first lady, will be the keynote speaker, joining other highly talented alumnae to guide female Cougs on their paths to greatness.

Available online, the first class in the Cougar Career Academy provided ways in which Cougs could maximize their job search opportunities. This collection of online workshops is designed to provide graduates with the necessary tools for advancement by connecting them with career development professionals and field experts. This spring, additional classes will focus on résumé building, LinkedIn networking, and more to help guide participants professionally.

For those of all ages who are interested in furthering their personal development, the Alumni Learning Network is available year-round for WSUAA members. Individuals may take classes, designed by WSU faculty, without paying tuition or worrying about exams.

The WSUAA has much more to come for those looking to advance their careers. WSUAA chapters around the country will be focused on networking opportunities within each group, in an effort to connect Cougs with one another.

To learn more about WSUAA programs intended to help alumni excel in life after college, visit alumni.wsu.edu/lifeaftercollege.
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Solar energy really gets rolling

Washington State University physicist Brian Collins explores the nanostructures of polymers—large molecules with many repeating units. Most of us know polymers from everyday life as plastics. Because they’re flexible, polymers can be used to make all sorts of electronic devices, such as phones—or solar panels.

Primarily made of carbon, one of the first big success stories for polymers in electronics was the organic LED display. Beautiful images displayed on large, lightweight screens are a result of the exploration of the fundamental properties of polymers.

Instead of projecting light, as OLEDs do, Collins says, “you want to run them backwards,” so the polymer takes light from the sun and creates power, “which is a solar panel.”

Now solar panels, like OLED TVs, can be printed on a roll. Instead of bulky panels that have to be mounted on rooftops or large solar farms, solar panel rolls can be easily installed in all sorts of environments and configurations, such as coverings for windows.

Physics at Washington State turned 100 this year. Watch videos and read about a century of physics research and innovation at WSU:

magazine.wsu.edu/extra/physics-100
College was always in Jessica Santana’s plans; however, in addition to the rigors of studying elementary education, she’s raising a son. Scholarships helped Jessica focus on her studies and attend to her future Coug, while staying on the President’s Honor Roll.

“Scholarships helped me earn a college education and made a difference in the life of my son.”

You have the power to help students like Jessica. Starting at age 70½, you are able to transfer IRA funds directly to the WSU Foundation, which is a tax-smart way to support WSU students. Because of you, Jessica will achieve her goal of becoming a teacher.

Learn more about how you can support students through your Individual Retirement Account: foundation.wsu.edu/ira