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COVER: “PATTERNS OF WINTER” AT BASS LAKE, NORTH BONNEVILLE. PHOTO DARRYL WYATT
LEFT: OVERWINTERING SNOW GEESE ON FIR ISLAND, SKAGIT COUNTY. PHOTO JON MICHAEL
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Now that you’re a grown up, you want to talk to someone about how to take care of the people you love and the causes you believe in well into the future. Through your estate plan, you can become part of building a brighter future at Washington State University. Make a tax-smart decision that also makes a positive and lasting impact on the people and programs you love.

Call the WSU Foundation Gift Planning Office at 800-448-2978 or visit foundation.wsu.edu/estate to learn more.
Instrumental journey

The article written by Wenda Reed on the life of Gladys Jennings was excellent. I graduated in ’96 and had Gladys as an advisor in the Food Science & Human Nutrition Department. I transferred to WSU from the University of Alaska, Anchorage in the fall of ’99, and Gladys was instrumental in that process. After phone conversations and mailings, the transition from U of A to WSU was flawless. She would guide me in my course choices while in Alaska, and told me that these courses would directly transfer. She was instrumental in the success I had as a student at WSU.

ALLAN BORCHARDT R.D. ’92
FOOD SCI. & HUMAN NUTR.
Dietitian

Back in the saddles

(Equestrian Team coach Laura Bagby Moore ’08 received this message about “Back in the saddles,” Fall 2018)

Several years ago, I was disappointed to learn that the Equestrian Team had disbanded, because I had such a great time being on the team when I was in school.

After college, I moved away for several years, but then moved back to Pullman in 2013 where I’ve been working for WSU ever since. I recently read the article in the Washington State Magazine and was thrilled to see that the team was brought back!

Seeing your name and reading the article was a blast from the past, so I wanted to write and say “Thank You” for your help in bringing the team back and providing this opportunity to ride for WSU.

ROBERT SEARFOSS ’73 MED
Atlanta

Going football nuts

Earl J. Ott ’51 (Journalism) came up with this gem of Cougar Football history while going through a 60-year collection at his home in Pullman. It was the passenger list for a College of Pacific football game trip, November 14–16, 1956. Historic! “This is the passenger list for a College of Pacific football game trip, November 14–16, 1956. Historic!” as we used to ask at the old United Press.

Well, for all you Football Filberts out there, this ’58 team was the last football team to play for Washington State College! (The state legislature changed the name to Washington State University in the spring of 1959.) So this game—a 34–0 Cougar win—also, then, was the last football win for Washington State College on the road!

These ’58 Cougs gave Coach Jim Sutherland his best season, 7–3, by beating the Huskies 18–14 in Spokane’s Joe Albi Stadium.

If you’re over 65, I’ll bet you’d remember almost all the team members! Seven of them—Bill Berry, Gail Cogdill, Don Ellingsen, Jack Fanning, Keith Lincoln, Bob Newman, and Bill Steiger, are in the Cougars’ Hall of Fame. (Ottis was assistant manager of the WSC News Bureau when he made this trip. He later served many years as information specialist at WSU’s Puyallup Research Station.)

RICHARD B. FRY
Former WSU Sports Information Director
and News Director

Sign up for the monthly email newsletter to get previews of stories, videos, and more bonus features:
magazine.wsu.edu/email

Leading the way...
Any good strategist knows that an accurate map can win a battle. If your enemy is cancer, a chaotic and elusive foe that changes its behavior and environment, finding a new dimension to examine a tumor can make all the difference when developing treatments.

Like all scientists and doctors looking for ways to defeat cancer, Weimin Li wants to better understand how cancerous tumors grow and adapt. His innovative technology using 3-D tissue culture “scaffolds” delivers a far more relevant environment to research the deadly disease.

It’s a fight that Li has fought on many fronts. He spent seven years practicing oncology in China and witnessed the inconsistencies of cancer treatments. “It was hard. So many patients were dying,” he says.

He was inspired to begin researching new methods of treating cancer, earning medical molecular genetics and biochemistry degrees in Scotland and Switzerland before moving to Wisconsin and then Washington State University’s Spokane campus. Along the way, Li found that the tools used by cancer researchers to model tumors were also inconsistent, often with inconclusive results.

“I realized the importance of using proper disease-modeling systems to study the mechanisms of cancer progression,” says Li. “Biologically and clinically relevant research tools can help us understand fundamental questions of cancer and develop more effective therapeutics to treat human cancer.”

Now an assistant professor in the WSU Elson S. Floyd College of Medicine, Li says that many anticancer drugs fail in clinical trials in part because they’re studied and tested in inappropriate tissue cultures or animal models. The traditional petri dish method sets up tissue cultures in 2-D plastic systems, an artificial model that can’t represent the complex tissue environment, nor show how cells spatially interact at all levels. By creating a 3-D tissue-like scaffold, tumors can form in ways that allow scientists to screen drugs in a setting that’s a lot closer to how native cancer cells grow and invade normal human bodies.

When cancer cells are in human tissues, they interact with other cells and their environment in every direction, secreting enzymes that help the cancer to survive and spread, and even change the environment within the tissue. That can’t be truly replicated in only two dimensions.

The concept of 3-D scaffolds to grow tissue cultures is not a new one, but other 3-D culture models mostly use plastic or synthetic polymers, or they use a single component of the extracellular matrix (ECM) to represent native conditions. “There are complex interactions between cancer cells and other cells within tumors,” says Li. “We can isolate the cells and model tumor development in a way that recapitulates native conditions.”

Li’s innovation has won national awards for its novelty in modeling tissues and tumor development, in part because cancer cells will naturally show how they behave and resist drugs.

“Tissue cells are organized by a protein meshwork—the extracellular matrix (ECM)—which is an essential part of the microenvironment for the cells. ECM not only acts as scaffolding support, but also provides many mechanical and signaling functions. Cancer cells can have pronounced effects on these ECM functions. Therefore, Li is pioneering vivo-mimicking tissue culture systems based on native versus synthetic materials to better understand these deleterious effects.

For now, Li and his team, including postdoctoral colleague Girdhari Rijal, are working on making the technology easier to use and more accessible for researchers. Tissue cells, he stresses, are very different from synthetic or nontissue-specific materials. They respond to drugs in different ways. Some anticancer drugs fail in clinical trials partly because of the 2-D model used to screen them.

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Centering on supplements’ safety

Dietary supplements. Natural remedies. Botanicals. Energy drinks. Wellness boosts. Vitamins. When choosing whether or not to use dietary supplement or other natural products, there are a lot of questions about the value of these products and their benefits. They often claim to be “all natural,” but that doesn’t necessarily make them safe for you. Natural products are not required to go through the same rigorous research and clinical trials as pharmaceuticals prior to marketing, so many potential health dangers are simply unknown.

Researcher Mary Paine, associate professor at Washington State University’s College of Pharmacy and Pharmaceutical Sciences in Spokane and a registered pharmacist, wants to uncover potential interactions that may cause health risks with conventional medications. Interactions between natural products and conventional medications—either prescription or over-the-counter—can lead to adverse interactions.

For example, She’s not’s worth a blooming plant used as an herbal remedy for mild to moderate depression, but has several known drug interactions including some post-organ transplant medications, which renders them ineffective. Adverse health effects could impact anyone looking to use natural products and conventional medications at the same time. According to the CDC, nearly half of the American population in 2016 had used at least one prescription drug in the past 30 days—nearly 158 million prescriptions, not even accounting for people taking multiple medications.

To explore the potential impacts, Paine helped create the Center of Excellence for Natural Product Drug Interaction Research (NaPDI Center) at WSU Spokane. Through a $10 million, five-year grant from the National Institutes of Health National Center for Complementary and Integrative Health, experts in clinical pharmacology, natural products chemistry, health informatics, and health communications will study the interactions between natural products and conventional drugs.

The NaPDI Center will also recommend detailed steps for studying pharmacokinetic interactions between natural products and drugs—how a natural product can alter the absorption, distribution, metabolism, or excretion of a drug. Their work, already published in a number of journals, could help develop policy, regulations, best practices, and the individual adoption and integration of natural products into the medication therapy of patients.

In the future the NaPDI Center hopes to extend its online database to healthcare practitioners to both proliferate quality science and offer useful data for the healthcare community.

Paine and the center is also preparing for the next, and perhaps most challenging, natural product on its research list: cannabis. “The legal and regulatory hoops are substantial, but this is when we need the scientific information to be reliable,” says Paine.

Reliable, high-quality data on clinical interactions between cannabis and pharmaceuticals remains scarce, which makes the NaPDI Center’s recommended approaches to studying natural products important for rigorous study of the plant.

Inside an old yellow craftsman house, sewing machines whir, sketches adorn the walls, underwear and tank tops prototype hang from clothing racks, and a cat wanders through the living room.

Debbie Christel’s childhood home in north Tacoma has transformed into the headquarters of Kade and Vos, a start-up company helping women get the clothes they need.

“We ask women, what do you need to be comfortable?” says company co-founder Christel 08. “Our design process doesn’t go through a weight-biased filter. We don’t take a small pattern and make it bigger. We know that doesn’t work.”

In the United States, 67 percent of women wear a size 14 or larger, while designers typically design for a size four or six. That can make it a real challenge for American women who wear a size 10 to 18 to find something that fits well.

It took just a year for Kade and Vos to launch their first clothing line and it all started with soft, breathable cotton underwear. If the underwear isn’t comfortable or distorts the body, says Christel, then you won’t put it on top of it if it isn’t going to look and feel right.

“We don’t want to further segregate women by size,” Christel says, noting that they offer sizes small to 6XL. “If we don’t offer your size, we will make it for you.”

Christel’s mission to improve clothing fit for curvy women began in graduate school. While working on her thesis project with Nike, she noticed they offered more clothes sizes for men than they did for women. The sizing was even more limited for plus-size women.

“Our culture says everyone needs to be healthy, but the equipment we’re providing for women like it is for men,” she says.

She researched movement and clothing fit, with one study revealing how clothing can derail women from doing something as seemingly simple as taking their kids to the park. She also started to explore the weight bias engrained in U.S. culture—not just in fashion, but other industries that portray larger people in a negative light.

Before launching the start-up, Christel was an assistant professor in Washington State University’s Department of Apparel Design, Merchandising, and Textiles, where she incorporated weight-bias education into her courses. She lacked teaching students how to design for different body types—and how to design with compassion.

Her own research and other studies continue to back the narrative she’s been hearing from women frustrated with comfort, fit, and lack of sizing options. It’s part of the reason she began thinking about starting a business. Since she had a limited background in business, she found support through the WSU Innovation Corps, a National Science Foundation-funded program that helps University staff, students, and faculty more research into the marketplace. They provided the guidance she needed and helped her build a business plan. One of the first things they suggested was finding a business partner.

Enter Kade and Vos co-founder Ashley Scott ’16. Scott and Christel had both volunteered to make costumes at the Regional Theatre of the Palouse, and Scott was a student in Christel’s class for these years. She had worked for seven years in her family’s cherry orchards in Yakima and had a deep understanding of supply chains and small business management. Scott says in the back of her mind she always wanted to make sure curvy women had better clothing options.

Fashion is looked at as something kind of silly, but it’s not silly because everyone wears clothes every day. What you see people wear affects society and how people are viewed,” Scott says. “It’s really important as a fashion designer to be able to dress all people.”

Kade and Vos not only has a different approach to designing for their customers, but also the supply chain. “So much in the fashion industry is dehumanized,” Scott says. “It’s designed on a mannequin, not even a person. That’s one part of it. You don’t see the thousands of people behind any garment you buy and that is important for us to humanize the fashion industry.”

Kade and Vos source cotton from their clothing from a family farm in the Southwest. The cotton biodegrades in two weeks, as opposed to synthetics that can take up to 40 years to decompose in a landfill. The company’s knitter lives in North Carolina, and they work with a veteran-run manufacturing company in Georgia where they go into full production.

Christel and Scott are looking forward to their upcoming pajama line and putting together future collections. But in the end, it’s not just about making clothes. Even the company name Kade and Vos translates from Latin to “The Caretaker and You.” It’s about the social responsibility of fashion designers and caring for people, says Christel.

Beyond just offering clothing, we want women to know they are okay just the way they are, wherever they are, whatever shape or size. “
Days of future past

Rapid global cooling 13,000 years ago challenged early occupants of Alaska to adapt. People used to hunting mammoths and other megafauna with big stone tools suddenly found their weapons sheltering in the cold. Access to the stone they used to make them got buried under snow.

As with any climatic change, the cold resulted in a shift in fauna, requiring new tools. Early Alaskans turned to microblade technology, a technique they’d kept alive for hundreds of years along with their dominant hunting tools. Microliths made efficient use of now-scarce toolstone and met the needs of a changing climate.

Throughout the Holocene, the importance of microlith technology varies, writes Washington State University archaeologist Colin Grier, but it never disappears; it “is embedded when needed to address new and changing ecological circumstance.”

By moving beyond the 30- to 100-year window used in many disciplines into deep time, Grier argues, “paleodata—data derived from past ecological and social systems—reveal factors that were important in successful adaptations but which we may be unable to see from our present vantage point.” Grier calls these “time-sliced” solutions to social and ecological challenges.

A few thousand years ago, the Coast Salish experienced considerable population density increases, so they reorganized themselves to sustainably ramp up food production. Clam gardens, fish weirs, and engineered wetlands were the result of investing in “large scale resource harvesting infrastructure,” made possible by people working together to ensure long-term success.

“Decentralized control was key” to that success, as people closest to the resources owned and managed them, thus promoting “local and intimate monitoring of changing ecological circumstances.” This “diachronous and resource-management change was accomplished by major changes in social structure, from small family-centered groups to larger, multifamily organizations.

“By the way, the data used to make contemporary decisions about policy and resource management has little time depth to it, Grier argues. Both indigenous knowledge, which in the Pacific Northwest goes back at least 10,000 years, and archaeological paleodata bring a great deal to these issues.

Indigenous knowledge offers a model that could easily be adapted to contemporary culture. Crowdsourcing and citizen scientists are examples of contemporary decentralized knowledge bases, but the oral knowledge of indigenous people offers novel ideas from deep time.

“When you’re an archaeologist you have two benefits,” Grier says. “You see the long-term perspective and you see a range of possibilities that people who are embedded in modern technological societies just don’t.”

Scholars from many disciplines, as well as policymakers, are waking up to the fact that archaeological data can and should be put to different uses now that bottom-up innovations to challenges aren’t being addressed through the centralized administration of resources.

“Approaching resource management with a top-down approach, where a guy comes out for three hours with a little clicker to count fish or invasive weed species and then they go back to Washington or Ottawa to make policy—that’s just not working! We have to reshape our institutions” to tap into the wealth of knowledge hidden in plain sight.

And that, Grier says, means looking everywhere for ways to mobilize local knowledge. Everywhere, including in the dirt and the distant past.

Peace for the wounded warrior

Since the earliest days of the republic, Native Americans have stepped up to defend the United States at higher rates than any other ethnic group.

From General Washington’s inclusion of Tuscarora and Onondaga warriors at Valley Forge, through the world wars and Vietnam to today’s conflicts in the Middle East, Native Americans continue to answer their cultural calling to serve.

Traditionally, these soldiers were welcomed home with healing ceremonies that helped integrate them with the tribe and wider society. Compassionate medicine men, and women, used traditional knowledge to mend the emotional, spiritual, and physical trauma of war.

“Unfortunately, the U.S. government banned Native religious ceremonies for many years, which subsequently limited their use in modern PTSD treatment programs,” says Greg Urquhart, Washington State University Counseling psychology doctoral student. Urquhart is a veteran of Operation Iraqi Freedom and descendant of the Eastern band of Cherokee. As a cavalry scout, he developed new treatments for PTSD, which, with sweat lodge and other traditional practices, have since proved successful.

Urquhart says some Native veterans fear that disclosing a PTSD diagnosis will result in being seen as weak or “sitting down the tribe.” Instead, his findings show that most veterans view those with PTSD the same or more favorably than before.

“Historically, there are very few studies directly related to Native veterans and PTSD and most of them have been based on old datasets created in the Vietnam era,” he says. “I’m hoping researchers will take my take, create friendly relationships with tribal governments, and build on it.”

Though still a student, Urquhart has become a national advocate who often consults with professionals and presents research to groups like the Congress of American Indians and the American Psychological Association. He says the tide is slowly changing as VA hospitals and treatment centers expand their programs to include traditional practices like talking circles, vision quests, drumming, guided dances, and more.
At Rosario's Place, food on the shelves comes and goes like a tide. When staff at the Women's Center at Washington State University, which manages Rosario's, puts out a call for donations, stock rises and then falls again as students take what they need to get by.

Rosario's Place has a private entrance on the Pullman campus, and that simple fact, says Women's Center director Amy Sharp, reduces stigma; no one asks who you are or what you are doing. You just come in, take what you need (or leave what you can). In addition to food, Rosario's also stocks baby and toddler supplies and menstrual hygiene products.

Sharp's colleague at the center, Jennifer Murray, recalls one woman from this past summer. The woman in the hijab, she says, was certainly grateful to be able to take a few things so that her family would have food that night. What really touched Murray, though, is when the woman said that having a place to come, a place where people cared regardless of where you are from, meant nearly as much as the provisions.

Murray says that over the summer many international students come to Rosario's. "Their student visas prevent them from working," she explains, and with graduate student stipends on hold during summer, things can get dire.

Whether it's through Rosario's Place in Wilson-Short Hall, or the Campus Pantry on the WSU Spokane campus, or one of the many other pantries located at WSU campuses across the state, Cougs are feeding Cougs, and finding innovative local solutions to gather and distribute food.

While donating food looks like a simple act of kindness, it is, in fact, just the tip of an iceberg, as Murray says that over the summer many international students come to Rosario's. "Their student visas prevent them from working," she explains, and with graduate student stipends on hold during summer, things can get dire.

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And, at about $7,000 or $8,000 each, CoolPups are not out of reach to organizations dealing with rural food distribution. Johnson says that his colleagues on the Olympic Peninsula are also eager to bring the CoolPup to their region.

At first glance, efforts to combat food insecurity appear haphazard. A closer look, though, reveals that there is a patchwork of hyperlocal volunteers and activists all pushing the region in multiple ways: vast fields of wheat grown for a global market are now interspersed with smallholder row crops and animal agriculture.

And, Johnson says, selling that small-farm-grown produce to food pantries and rural schools, hospitals, and markets creates a virtuous cycle that means everyone eats better.

Lazo says that students engaged in the food recovery and other programs gain tools “to be change makers. Whenever they go in the world,” WSU students who have participated will be able “to face these issues with a sense of efficacy, sensitivity, and caring.”

Pork futures

Pig 135 snuffles and grunts inside his pen. Jon Oatley reaches through the bars to pet the more than 500-pound genetically modified animal.

“People here have this image in their head of a pig with deformities, but they’re just normal animals,” says molecular biologist Oatley ’01 M.S., ’04 Ph.D. as he rubs the pig’s ears. The enormous, three-year-old pig is one of a handful bred by Oatley, director of WSU’s Center for Reproductive Biology, and his team to be surrogate fathers. Through genetic tinkering, Pig 135 is able to produce sperm that contains the genetic material of another pig rather than his own. This modification makes it faster and easier to breed pigs with desirable traits.

To modify a pig like Pig 135, it all starts with a single cell. Using a gene editing process called CRISPR-Cas9, Oatley and his team of researchers are able to introduce a change to the DNA in a male pig embryo before it is implanted into a surrogate sow. Cas9, an enzyme that acts like a pair of scissors, is used to cut the DNA at a location of Oatley’s choice. The cell then tries to repair the strand of damaged DNA, either by adding a new sequence or deleting a sequence. In this instance, the change causes the pig to be sterile when it reaches adulthood.

“It’s a mutation that could’ve occurred in nature,” Oatley says. “Nothing foreign was added.”

Mutations like red hair, blue eyes, and freckles in humans, and coat color and stature in dogs were created in a similar fashion, except the genetic changes were driven by environmental pressure and selective breeding rather than the hand of a scientist.

With CRISPR-Cas9, Oatley and his team can speed up these processes to eventually breed food-producing animals that are bigger, more resistant to disease, and require less food and water.

“We can do it in a single generation instead of over thousands,” Oatley says. Once the modified pig reaches adulthood, Oatley’s team can inject it with stem cells from another pig with more desirable traits, allowing the modified pig to produce sperm with the elite pig’s genetic material rather than its own, making it a surrogate father.

Samantha Noll, a bioethicist on Oatley’s team, says animal welfare is the first thing the team focuses on. “During all stages of the research process,” says Noll, “the researchers are discussing ethical and animal welfare implications. They’re working to address these big problems like hunger, security, disease resistance, and they’re also taking the time to ensure that they don’t create other problems during the research process.”

When the research team eventually breeds new animals, Pig 135 and his brethren will be euthanized to make room. But instead of their bodies being used to feed the hungry, they will be incinerated—as is fitting for an animal labeled as a biohazard under current regulations. “He can’t even be composted,” Oatley says. “It’s the fear factor.”

Noll says the label is just a precaution. “We’re following the most stringent requirements now, just in case, that way we don’t have an environmental impact that was unforeseen,” Noll says.

Oatley says there’s no experimental evidence it would be unsafe for humans to eat Pig 135 or others modified like him, but the process still raises ethical issues.

“We’re doing things that Mother Nature never intended us to do, but it has to happen at some point or we won’t be able to persist with the rate that human population expansion is expanding,” Oatley says. “It’s a trade-off.”

As food insecurity continues to be a problem in both developed and developing nations alike, Oatley says he and his team hope that by modifying pigs and other livestock, they can improve access to food for people today and in future generations.
POLES PLANTED AND READY, SEAN HALSTED ’92 WAITS AT THE STARTING GATE FOR THE 15-KILOMETER CROSS-COUNTRY SKIING RACE. It’s March 2018 at the PyeongChang Winter Games and he’s wearing the signature red cap and striped jersey of the U.S. Paralympic team.

Behind sunglasses, Halsted glances at the grandstand filled with thousands of cheering fans, colorful flags, and jangling cowbells. Cameras point in every direction and he catches a glimpse of himself on the jumbotron. Though the Air Force veteran has competed all over the world, the enormity of the event is overwhelming. His eyes turn back to the countdown clock where the seconds creep by until the timer suddenly turns green and begins to beep. With an interna burst of energy, Halsted pushes off.

PyeongChang marks the north Idaho resident’s third Paralympics—Winter Games where he has excelled in Nordic skiing and biathlon since 2010. Throughout his journey, Halsted not only has excelled in Nordic skiing and biathlon since his primary goal today is to create awareness and provide improved accessibility to the ski lodge and more opportunities for adaptive Nordic skiing.

Looking back at his 15K cross-country skiing race in PyeongChang, Halsted says, “I loved my efforts, felt great about the energy I put into it, but like always for me, you can immediately see the results as you cross the finish line,” he says. “The Paralympics is now broadcast on TV and the internet and people can actually see what adaptive Nordic skiing is.”

In Spokane, we have Team St. Luke’s and Parapros Spokane. It’s a great pipeline for kids to get into sports especially wheelchair basketball and back and field. The group is proposing that Eastern Washington University provide scholarships for wheelchair basketball and track and field teams. The group is proposing that Eastern Washington University provide scholarships for wheelchair basketball and track and field teams.

“Over the years, so many civilians have come up to me and said they didn’t even know these sports existed, and they wish they’d known about them before,” he says.

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About 80 of the legendary mammals, known for hardiness and stubbornness, decided to cross the half-mile wide Pend Oreille River in 1994—bulls, cows, and even calves—and all survived the crossing, recalls Ray Entz, natural resources director of the Kalispel Tribe of Indians in northeast Washington.

That same rugged strength of the wooly North American bison—whether you call them bison or buffalo—helped the entire resilient species survive. Although bison are now the national mammal of the United States, they once balanced on the cliff of extinction with fewer than 300 wild animals in the late nineteenth century.

Critical to Plains, Rocky Mountain, and Plateau Native American tribes, bison have powerful spiritual as well as practical purpose. Bison herds continue to grow thanks to the Intertribal Buffalo Cooperative and others, and remain a valuable food source for thousands of years to Native American tribes, and it still remains a great alternative to beef.

RAISING BISON CERTAINLY STILL TAKES SOME MOXIE.

"There’s never any end to the fun with managing a bunch of wild beasts,” says Entz. “We’ve only really ever had one incident in the 25 years I’ve been here. Nobody’s ever been trampled. I’ve seen them run beside the rails.

The bison were rescued thanks to the tireless efforts of mainly five groups, according to Ken Zontek, an environmental historian teaching at WSU Tri-Cities and Yakima Valley Community College. Zontek is the author of the 2007 book Buffalo Nation: American Indian Efforts to Restore Bison, which tells the stories of the frontline environmentalists who rescued bison. President Theodore Roosevelt and others later intervened and praised the Blackfeet Nation for protecting the herd.

RAISING BISON CERTAINLY STILL TAKES SOME MOXIE.

"I was walking the last big bull back,” says Entz. “When the bull saw the pickup trucks, you could just kind of see his eye wasn’t happy. Terrifying. Looking at about 2,200 pounds of buffalo at that point, and he wasn’t happy. ‘The truck, doing about 30, was trying to cut him off. That buffalo at a dead run jumped right over the back of the truck.’"

During breeding season in mid- to late summer, the herds become restless. The bulls start bellowing and quarreling as they compete for females. The cows give birth usually to one calf a year. Buffalo can live about 20 years.

The meat is generally considered very similar to beef in taste, but lower in fat and cholesterol and higher in protein. There’s even kosher buffalo meat available nationwide.

When a vaccine has not yet been developed for malignant catarrhal fever, the ARS and WSU efforts have advanced the effort against a tough disease.

WHERE TO FIND BISON MEAT

Seek out a bison burger at a restaurant, you’re sure to enjoy it. Pit barbecue with roasts,” adds Entz. "The truck, doing about 30, was trying to cut him off.

One of the largest and most bison herds in the world and the largest extant land animal in the Americas.

Of course, the question about the name inevitably arises: Is it bison or buffalo?

The answer’s a little surprising: the European name “bison” precedes “buffalo.” French fur trappers and some explorers referred to the animals as bœufs, which became buffalo in English, around the early 1800s. The name “bison,” meaning ox-like animal in Greek, was first applied in 1774.

Whatever you call them, they’re certainly one of the most important North American animals. Bison originally spread as far south as Mexico and east to the Atlantic, and were seen in North Carolina as late as 1750.

We might not know just how many bison once roamed North America, but estimates range from 30 to 75 million. “The moving multitude . . . darkened the whole plains,” wrote Lewis and Clark, who encountered a plains herd in 1806.

The two species are the smaller plains bison and the larger Rocky Mountain bison. The animals themselves strike an impressive profile. The immense bulls can weigh a ton or more and stand five to six feet high. The cows are not as massive but still imposing. They’re quite agile, with sprint speeds of up to 30 miles per hour.

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Critical to Plains, Rocky Mountain, and Plateau Native American tribes, bison have powerful spiritual as well as practical purpose. Bison herds continue to grow thanks to the Intertribal Buffalo Cooperative and others, and remain a valuable food source for thousands of years to Native American tribes, and it still remains a great alternative to beef.

"The majority of bison are raised for human consumption. The meat is generally considered very similar to beef in taste, but lower in fat and cholesterol and higher in protein. There’s even kosher buffalo meat available nationwide.

At the Kalispel Tribe, Francis Cullisayoh, a tribal elder and Entz’s predecessor who brought in the bison in the 1970s, says the annual August powwow and buffalo barbecue give the Kalispel people a chance to enjoy the meat, along with huckleberries and other traditional foods.

"We usually butcher two animals and do a big traditional pit barbecue with roasts,” adds Entz. "Whether you cook up some bison roasts at home or you seek out a bison burger at a restaurant, you’re sure to enjoy it. Just remember to thank the early conservationists and Native Americans who saved an iconic animal over a century ago, and gave us the chance to relish and respect a truly original food of the continent.’
For thousands of years, humans have relied on the European honey bee to pollinate agricultural crops. Now, wild North American bees are getting a second look.

By Rebecca Phillips

Photos by Zach Mazur
On a hot, mid-June afternoon, I follow a caravan of vehicles as they pull over to the side of a dusty road in Walla Walla County. Opening my car door, I notice a hum like distant traffic yet the fields surrounding us are quiet and sweet with blooming alfalfa. The drone grows louder as farmer Mike Ingham leads us toward a gray patch of ground on a nearby hillside. Within a few steps, we’re engulfed by swarms of alkali bees—hundreds of thousands of iridescent-striped bees, crawling out of holes in the soil, taking flight, and buzzing our ears. I fight an urge to run but he calmly reassures us they’re not aggressive. Look at his bee bed. Like an alien moonscape, the bare ashen soil is rutted from runoff and densely dotted with small holes that lead to the females’ nests, eight to ten inches below ground. The busy insects seem to ignore our presence as they fly in and out, digging little dirt piles, and poking their antennae out the openings.

“This relationship between alkali bees and alfalfa is a novel association—they didn’t co-evolve together,” says Ingham. He is referring to the fact that some North American bee species did evolve unique tactics for pollinating native plants like blueberries, tomatoes, squash, and pumpkins. In the United States, there are more than 4,000 wild bee species, which, along with honey bees, play an important role in pollinating agricultural crops. Unlike honey bees, however, most wild species are solitary and don’t live in communal hives. Seventy percent of these are ground-nesters like the alkali bee, while the other 30 percent prefer cavities such as hollow twigs or holes in wood.

As ancient residents of the Pacific Northwest, alkali bees naturally gather in arid areas with damp, salty soil such as stream banks or salt flats. Once established, the bees will maintain their “neighborhood” for years as long as there is a ready supply of pollen and nectar. And, come each June, the young bees emerge from their holes in pursuit of mates. Once bred, the females have only six weeks to build a new nest, procure pollen, and raise a brood before they die. As it turns out, that six weeks coincides perfectly with the Walla Walla alfalfa bloom.

It wasn’t always this convenient, says Ingham. The farmland, which receives minimal rainfall, was originally ditch-irrigated for wheat and hay production, and provided only a small alfalfa seed crop on the side. The turning point came with the legendary research efforts of Washington State University entomologists Herman Menke and Carl Johansen.

“Honey bees don’t like that, so they learn to chew a hole under the blossoms to suck out the nectar,” he says. “It only takes a honey bee worker one day to learn not to get bopped.”

They also have ordinances for pesticide use and one that limits the number of honey bees allowed on property between June and September. “Honey bees sting nectar and Iod from the alkali bees,” says farmer Mark Wagoner ‘75. “They’re a detriment to alfalfa seed production. They also sting our workers!”

Though honey bees can pollinate alfalfa, they aren’t very good at it, explains Walsh. Alfalfa blossoms have a trip mechanism that bops the bee on the head with pollen. The bee then carries the pollen into the next flower. “Honey bees don’t like that, so they learn to chew a hole under the blossoms to suck out the nectar,” he says. “It only takes a honey bee worker one day to learn not to get bopped.”

Ingham ‘78, third generation alfalfa seed grower and one of only a dozen in the Walla Walla Valley, invites us to take a closer look at his bee bed. Like an alien moonscape, the bare ashen soil is rutted from runoff and densely dotted with small holes that lead to the females’ nests, eight to ten inches below ground. The busy insects seem to ignore our presence as they fly in and out, digging little dirt piles, and poking their antennae out the openings.

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Ingham’s first step was to build an artificial nesting site. Initial attempts were hit and miss—manmade ditches placed at the top of salty slopes to allow water to seep down, or trenches filled with rocks, soil, and water.

Around 1970, Johansen came up with a different approach that more closely mimics the natural groundwater upwelling and alkaline environment the bees prefer. That system helped put the Walla Walla alfalfa seed industry on the map and is still in use today. “In April, we put four to six tons of rock salt out per acres,” Ingham says. “It seals the soil surface and draws up moisture to make an attractive surface for bees to nest in. Then, we have a sub-irrigation system set up with white PVC pipes buried about 20 inches deep.

We pump water into the pipes till around July fourth when runoff from the Blue Mountains dries out.”

Doug Walsh, professor of entomology at WSU Prosser Irrigated Agriculture Research & Extension Center, estimates there are about 40 million alkali bees at work in the Touchet-Lowden-Gardena area each summer. At the area’s fifth successive WSU bee researcher, Walsh proudly carries on the relationship first established with the alfalfa seed growers by Menke nearly 70 years ago.

Over time, he says the farmers have adapted their culture and depend on WSU leadership to help determine the best ways to control pests while also preserving bees during their critical six-week lifecycle.

Working with members of the Washington Alfalfa Seed Commission, for example, Walsh has developed an integrated pest management program for controlling theleggy bug, a harmful insect that infests alfalfa fields at the same time bees are gathering pollen.

Instead of resorting to daytime spraying, growers now apply pesticides only at night when the bees are deep in their holes. And the pesticides they choose are some of the least toxic available. Walsh and graduate student Greta Dupuis are also developing soil temperature sensors to better predict when bees will emerge in the spring, giving farmers a head start on spray reduction.

Studies conducted by Walsh and his predecessors have even influenced state and local laws aimed at protecting the county’s insect partners—especially when the tiny creatures cross roadways. Alkali bees fly low to the ground and can travel up to five miles in search of pollen and nectar, so they are often hit by cars. The faster the speed, the more bees killed.

As a result, Walla Walla County claims to have the only pavement-created speed limit for an insect, says Walsh. The back roads are adorned with orange traffic signs warning: Speed limit 20 MPH, 8 a.m. till 8 p.m., alfalfa bee area.

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To help ensure a fully-pollinated crop, Wagoner instead relies on imported Canadian alfalfa leafcutter bees (Megachile intonsata). A bit smaller than alkali bees, the leafcutters are cavity-nesters and live in a series of white bee huts set on stilts throughout the alfalfa fields. These miniature high-rise hotels are stacked with bee boards filled with bee huts.

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The “bee bed” we’re observing is something absolutely unique to this little corner of southeast Washington—the only place in the world where commercial farmers manage native alkali bees, Nomia melanderi, to pollinate alfalfa. Ingham uses an artificial nesting site for this little corner of southeast Washington—the only place in the world where farmers successfully manage native alkali bees, Nomia melanderi, to pollinate alfalfa. Ingham uses an artificial nesting site for bees to nest in. Then, we have a sub-irrigation system set up with white PVC pipes buried about 20 inches deep.
West of the Cascades, WSU entomologist Dave Crowder and doctoral student Elia Bloom are investigating the role of native pollinators in Seattle’s urban environment. Their Citizen Science Initiative for Bees (CSI Bees) includes the first comprehensive survey of wild bee diversity in the Puget Sound region. In fact, all across the Pacific Northwest, WSU researchers lead the way in pollination ecology and efforts to conserve threatened populations.

By some estimates, pollinators like bees and butterflies produce 20% of the food we eat. During this process, some of the pollen falls off and fertilizes the baskets on their hind legs called corbiculae and fly back to their nest. There, among the vast menagerie of wheat, pea, and lentil— which don’t require insects for pollination—Crowder and Bloom have discovered a unexpected flurry of diversity in the canola fields.

“Plowing up ground and planting huge monocultures may deplete nesting options for ground-dwelling bees. Clearing forests and other vegetation decreases options for cavity nesters.”

So, you’d see a bee hovering over a flower and then land on one that indicates it hasn’t recently been visited by other bees and is more likely to offer a pollen or nectar reward.” Bees also have the help of a floral ultraviolet guidance system. “If you look at a flower under a black light, it shows ultraviolet radiation coming off like landing strips at an airport,” he says. “These lines guide the bee to the nectar and pollen.”

Despite their natural abilities, wild pollinators face an uphill battle against the challenges of climate change, widespread chemical use, and ongoing habitat destruction. “The level of ecological stress has been through the roof,” Crowder says. “Well over 100 citizen scientists are participating in some of our different projects.”

Crowder and Bloom began their efforts in 2013 when they reached out to Bob Redmond, founder of the Seattle nonprofit The Commons, which helps to locate urban gardens for study and introduced them to local farmers. Unlike the east side, western Washington farms are typically smaller and more diverse with a mixture of fruits and vegetables that help support bees, and even a variety of leafcutter bees.

“Bees are covered with fine feather hairs that develop a positive electrical charge as the bee flies,” he says. “When they land on a neglected or heavily-harvested flower, pollen grains will literally jump onto those hairs. The bees then groom their legs and pack the pollen into little baskets on their hind legs called corbiculae and fly back to their nest. During this process, some of the pollen falls off and fertilizes the plant.”

Lawrence says it was recently discovered that when a bee lands on a flower, it reduses the negative charge of that flower, leaving an electrostatic signature that other bees can sense.

“Putting them in a cold, perfectly dark room appears to cause the queens to produce fewer offspring,” he says. “We resubject the species to lethal temperatures and use a microscope. If nothing else, Crowder and Bloom’s efforts have paid off in motivating people.”

“Every year, we put up on multiple field studies and workshops where we teach people to monitor and pollinators the tools they need to augment habitat in their own gardens.”

They’re also hoping to verify that the bees will continue flying out to the crops. “Ultimately, we want bees to increase our food supply. If we provide too nice a habitat for them, there is the risk that they will have no need to search for pollen and nectar in the fields,” Crowder says. “These enhancements take time, labor, and money, so we have to know if the effort pays off for farmers to invest in it.”

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The honey bee can become a more efficient pollinator when wild bees are present.

“The Caucasian honey bee was lost in the U.S. in the 1980s when the main breeder retired,” he says. “So, we resurrected this subspecies with frozen semen and are crossbreeding with other bees. Through artificial insemination, we can create a line that is 99.9 percent pure.”

Maintaining high quality breeding stock is just one of the innovative projects slated for the WSU’s future Honey Bee and Pollinator Research Facility in the College of Agricultural, Human, and Natural Resource Sciences. Funding for the $16 million complex is in progress.

The facility is scheduled to be built next to the U.S. Fish and Wildlife’s Pacific States Cooperative Fish and Wildlife Research Unit, which is currently housed in an older building on campus. The new facility will be a welcome move for research scientists who are currently housed in different buildings scattered across the University.

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A woman lies dying in a hospital bed in an acute care facility in Nevada. She has a common infection induced by a common bacterium, *Klebsiella pneumoniae*. But she’s untreated: her infection is resistant to all 26 of the antibacterial drugs available in the United States capable of treating the bacterium. The infection spreads further, which causes her blood pressure to drop precipitously until she finally succumbs to septic shock.

While death by “superbugs” is still fairly rare, the World Health Organization warns that, if bacteria keep evolving drug resistance at the rate they have been, such bugs will globally cause 10 million deaths per year by 2050. Not all resistant bugs are “super,” as microbes vary in their acquisition of the genetic tools needed to resist the effects of drugs.

These more common drug-resistant microbes already infect over 2 million Americans annually, resulting in 23,000 deaths, according to the Centers for Disease Control and Prevention. Microbes resistant to healthcare’s armamentarium of antibiotics and other antimicrobials are rapidly pushing up the costs and risks of treatment, as doctors must prescribe last-resort drugs that are both expensive and that, when used, risk inducing further resistance.

And while pharmaceutical researchers may be able to develop new antibiotics, bacteria are going to keep evolving, at the rate of one generation every 30 minutes or so, and winning the resistance war. But new research at Washington State University and elsewhere suggests that broad-spectrum antibiotics might be at least partially replaced with a multifield strategy: a variety of more narrowly targeted drugs, including one strategy that exploits the power of the cell being attacked to fight off infection.

Additionally, experts at WSU, along with their colleagues at the Washington State Department of Health, say that one of the main strategies for combating antimicrobial resistance is through stewardship of the current suite of antimicrobials, meaning they must be used much more judiciously. Another is deceptively simple: to improve our personal hygiene and food handling practices and thus block the transmission of infectious bacteria.
A WICKED PROBLEM

WSU pathologist Guy Palmer compares antimicrobial resistance—AMR—to a car wreck. We sit up and notice when a plane crashes, no matter how rare that is, just as we do when a scary disease outbreak, like the 2014-15 Ebola, Johns Americans into awareness about our vulnerability to the spread of infectious diseases. Car crashes, though, while taking far more lives than do planes, barely register on our public health radar.

WSU epidemiologist Margaret Davis (BS '07, PhD '13 Prev. Vet. Sci.) points out, “I think most of us feel distant from that scenario because most of us don’t have infections in the hospital. But if you are talking about hospitalized people, or people with immune systems that are suppressed for whatever reason—there are a lot of people in that situation.”

Doug Call (’87, ’97 PhD Zool.), a microbiologist and a colleague of Palmer’s at WSU’s Paul G. Allen School for Global Animal Health, worries that we don’t do enough public education regarding microbes and their health consequences. Where, he asks, is there room in the public school curriculum to teach kids how to prevent the spread of microbes through such basics as hand washing and safe food handling?

Call, Palmer, Davis, and their public health colleagues in the Washington State Department of Health, all agree that blocking transmission is the essential frontline defense that must be reinforced. And while the CDC funds surveillance and infection prevention programs for public health agencies, the “last mile” problem—how you and I deal with the face of spreading AMR—is much harder to deal with.

And then there’s the fact that we are, like it or not, a global community. What happens in Scotland or Tanzania affects us here—and no borders will ever keep microbes out. They arrive on humans, sure, but also on food and any newly remotely hospitable-to-microbes surface.

It is, as Call says, and others contrasting confirming AMR, say, the very definition of a “wicked” problem: deeply complex and with no simple solution.

AMR is as ancient as microbial life itself. Although humans began consciously using antibiotics to combat infections and diseases less than 100 years ago, microbes have been doing it for billions of years. Fifteen million-year-old microbes with resistance genes have been found in ancient permafrost. In water, soil, and everywhere microbes are found, they’re competing “chemical warfare.”

In addition, efforts to contain AMR are “external.” If you don’t personally pay the direct cost of antibiotic use, you’re not likely to reconsider the way you use them. It’s somebody else’s problem. For example, if I use antibiotics to treat a cold, I’ve done something that promotes the spread of resistance genes—and that’s completely ineffective because of course the common cold is caused by a virus. But I may not have to pay the price; rather, the person in the next hospital bed over may be the one to contract an untreatable infection. Likewise, the use of personal care products containing triclosan, an antibacterial in thousands of products, externalizes the cost of resistance by polluting the commons, the shared resources we all depend on for life.

Yoder is looking for ways to create incentives that will result in people recalculating the way they use antibiotics. Regulation and taxes are two common solutions. As with carbon emissions that contribute to global warming, it might be possible to tax antibiotic use—in essence raising the price of treatment—so they are used less frequently. But, Yoder points out, taxation and regulation are fairly blunt instruments with ethical challenges, especially where access to healthcare is limited. The world is much more complicated.

As Call says, foodborne illness is not a matter of if, but of when. That’s why restaurant workers must be specially trained to handle and prepare food safely—a training that would no doubt benefit everyone who handles and prepares food. “Attention to bacterial transmission is probably orders of magnitude more important in hospitals where the most vulnerable patients are at risk,” he says.

CAR WRECKS IN SLOW MOTION

For most people, AMR is like the car wreck that happens to someone else. Sad, but no reason to change our personal behaviors. Jon Yoder, an economist at WSU, studies exactly that kind of situation as he looks for ways to motivate people to change.

Economists, as Yoder points out, is a science focused on the reasons people do what we do. One of the reasons most of us don’t do much about AMR is because the costs associated with AMR are “external.” If you don’t personally pay the direct cost of antibiotic use, you’re not likely to reconsider the way you use them. It’s somebody else’s problem.

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The take use of antibiotics in Kibera, for instance. Kibera, on the outskirts of Nairobi, Kenya, is one of the world’s largest “informal communities.” “A slug, in other words,” Call says.

He and other WSU researchers have spent time there, trying to get a handle on the microbial situation. With 77,000 people per square kilometer and sharing a very limited number of public toilets, there is often no choice except to dispose of waste in the alleysways between buildings. Such conditions are ideal for promoting disease transmission and ramping up the demand for antibiotics.

In many parts of the world, including Kenya, access to antibiotics is restricted only by cost. But, as Call says, who’s to say that the use of such drugs is inappropriate when your health may depend on them? Taxing or regulating the use of antibiotics in such situations would be inhumane.

As Call stresses, the solution is blocking transmission, making the use of antibiotics unnecessary. And so new antibiotics look for solutions from the Washington State Department of Health, and blocking the transmission of disease-causing microbes in both her work and her passion.

“We’ve really expanded the number and types of healthcare facilities we’re working with. You talk about hope,” she responds when asked about how she sees the future of our col-
down the hall—where the pressure of time may put it out of reach.

Stewardship of antibiotics and surveillance of where AMR-associated infections take place is the purview of Podczervinski’s D3H colleagues Marissa D’Angeli and Kelly Kauber (’08 Ani. Sci., ’11 Biol.).

Stewardship, Kauber says, is an effort to conserve the efficacy of antibiotics by making sure they are only used when really needed. This requires a “one health” approach because, says D’Angeli, “we don’t know whether the biggest problem is coming from antibiotic use in humans, in animals, from pollution, from people throwing their antibiotics down the toilet—but we really want to move the needle in the right direction everywhere antibiotics are used.”

“Everyone has a stake in better use of antibiotics,” D’Angeli continues, “and everyone should play a role. Whether as a prescriber, a farmer, or a parent, or somebody who needs to get back to work and wants an antibiotic because they think it’s going to make them feel better. My experience is that often an antibiotic is prescribed as part of a whole package of things.”

D’Angeli’s prescription is to “take a step back and be more thoughtful about these things.” And, adds Kauber, “Wash your hands.”

**Hazard Level, Urgent** These bacteria are an immediate public health threat requiring emergency actions, C. diff causes 14,000 deaths a year, CRE have become resistant to nearly all available antibiotics, and there are almost a quarter million drug-resistant gonorrhea infections a year.

**Hazard Level, Serious** Less urgent though significant, these bacteria and fungi claim hundreds to thousands of deaths a year (MRSA 12,000+).

**Hazard Level, Concerning** Although antibiotic resistance is either low or multiple therapeutic options exist, these bacterial pathogens can cause illness and demand rapid response. Resistant Shigella causes 14,000 deaths a year, CRE cause 100,000 bloodstream infections a year, and Group A Strep is the fourth most common cause of healthcare-associated bloodstream infections.

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The straight, long rows of tall and thin loblolly pine grow very fast in the South’s flat lands, especially compared to the slow-growing Douglas fir on steep Pacific Northwest slopes.

It’s just one of many differences that Travis Keatley (’99 Forest Mgmt.) has witnessed as he manages more than seven million acres of timber across 11 states for Weyerhaeuser.

As vice president of southern timberlands for the timber, land, and forest products company, Keatley works out of Hot Springs, Arkansas, and travels from Florida to Virginia to Louisiana, and all states in between, as he oversees Weyerhaeuser’s southeastern assets in one of the world’s most abundant sources of timber.

Keatley, who grew up in Castle Rock about 50 miles from Mount St. Helens, was amazed at the rapid tree growth. “The growth rates in the South are really impressive,” he says. “You can almost see the trees grow. We can have five- and six-foot trees in some of our best conditions at year two. In the Pacific Northwest, it takes four or five years to do that.”

Keatley’s road to the South came as a surprise for him. After graduating from Washington State University, he had worked first on a research project in the Colville National Forest, then in silviculture for Weyerhaeuser in Longview. That led to management of tree farms and people near his hometown in southwestern Washington, where his family had lived for four generations.

In 2015, when his supervisor asked about his mobility and career path, Keatley didn’t expect an opportunity in Arkansas. “Weyerhaeuser had merged with Plum Creek, and she asked Keatley about moving there to play a key role in the transition,” he said. “I told her, ‘I don’t know...”
stained blue because of the humidity and the temperature, so the logs have to be processed within three weeks of harvest. “In the middle of summer, if you sever a tree from the stump, in a matter of weeks it’ll get this blue stain color to it from fungus. Nobody wants that discoloration,” he says.

The hot, sticky summers aren’t the only weather obstacle for Keatley and foresters. Tornadoes, hurricanes, and thunderstorms can wreak havoc on the trees and harvest roads. Hurricane Katrina in 2005 leveled about 200,000 acres of Weyerhaeuser forests.

“There was one period since I’ve been here where it rained 31 inches in 40 hours in Louisiana,” says Keatley, noting that the trees can drown without the herbs to prevent water getting to them.

The Southern forests are home to a lot of fauna unfamiliar to Keatley, too. Chiggers and snakes, feral pigs and gopher tortoises and snakes, feral pigs and gopher tortoises are just a few of the creatures Keatley has to keep an eye on. “We decided to think of it as an adventure.”

But even for Keatley, the leap was a real hand wringer for us, ‘It was a real hand wringer for us, but with a strong presence in the machine learning market, Parada and her team are working on machine perception, a key piece of getting self-driving cars safely on the road. Parada is no stranger to the cutting edge of machine learning. When you say ‘OK, Google’ to your Android device, you’re using a technology she helped develop. Now she’s got her sights set on teaching cars to see.

“Many of the things we take for granted, like being able to tell a leafless street tree from a skinny teen standing on the edge of the sidewalk, are not so easy for computers. And once it does learn the difference, a process that involves showing the computer “many, many examples” of both trees and standing people, says Parada, it has to learn that difference in a vast array of contexts, from rain and fog to night and day. And that’s before we even get into road signs and markings, which vary by region and country.

“It’s ‘deep learning’ that enables a computer to learn from vast amounts of data,” she says.

One of the ways that Parada and her team get voice recognition working was by “dogfooding.” As in, eat your own dog food, because you’re then going to be incentized to get it right before you unleash it on millions of customers. She tried the system at home, asking her two daughters to interact with it.

Shira Broschat, is still a friend. Says Parada, “Shira was in Boulder a couple months ago, and she and her husband came over for dinner.”

Parada and her husband also had their two daughters, who were studying at WSU. “I’d had the girls during the breaks,” she says, laughing. “One in summer, one at winter break.”

Parada worked for Broschat for a couple years on computer simulations for bioengineering as well as electromagnetics. And when Parada decided to go on for her master’s degree, she jumped into robotic control systems.

“The mindset of taking risks is critical to the mindset of being an engineer,” Parada says. The mother of two girls adds, “Girls need to be taught to not be afraid to fail and take risks, to push their limits and maybe be a little uncomfortable. Most of the time you’re going to be surprised, because it’s going to work out and you’ll build your confidence over time.”

Parada regularly makes the lists of top women and Latinas in tech, so she says that a passion for experimentation and exploration are key to success, her’s speaking from experience. “Just try it, she says: “This may fail but I’m going to try anyway because I think it’s worth a shot. That’s how you change the world, by trying things you haven’t tried before.”
When an international archaeology team needed to understand how an ancient civilization cared for its horses, they turned to Scott Bender ’95, a veterinarian with the Navajo Nation in Arizona.

Bender will be the first to admit that his career didn’t turn out like he expected—in fact, unforeseen twists are among his favorite parts. This particular turn got him involved in a research project that has changed our understanding of a pivotal point in human history: the emergence of horse domestication for war and transportation.

It started with a surprise phone call. Archaeologist William Taylor was examining horses exhumated from ancient tombs in Mongolia. He needed help differentiating between natural dental conditions and human intervention, and Flint Taylor ’90, former director of the New Mexico veterinary diagnostic lab, had recommended Bender for the job.

He couldn’t visit Mongolia, but the project dovetailed nicely with his longterm interest in archaeology and his veterinary expertise.

“Horses are a big part of life on the Navajo Reservation where he lives and works, Bender explains, having important roles in each work and sport. At times over half of his patients have been horses—and dental health is a major concern in the management of equine health.

As part of his practice, Bender has curated a large library of horse skulls and teeth, many of them with unusual, but natural, dental pathology. He compared photos and samples of the skeletal remains against these specimens to differentiate natural dental conditions and postmortem damage from human intervention such as tooth extraction or bit wear.

His work on the project helped show not only how the advent of equine dentistry helped make horseback riding possible, but also that both developments occurred earlier than previously believed—more than 3,000 years ago.

Bender’s emergence as a veterinary researcher was a bit of a twist in itself. Although he did research with faculty while studying veterinary medicine at WSU, he wasn’t interested in a research career; he was focused on practicing in the field.

“I thought I was going to be a cowboy, cow-vert like Baxter Black,” he says, “or else have a practice like the one in Dr. Alf Wight’s James Herriot stories.”

What he has been instead is a mixed-animal veterinarian, treating pets, livestock, working animals, zoo animals, and wildlife on the vast Navajo reservation in the southwest United States. However, his invariable curiosity and love for exploration (and, he notes, the encouragement of WSU veterinary faculty) pulled him inevitably into research—most of it done on his own time.

He has made important contributions to vaccine development and disease detection and prevention. He’s also adjunct faculty in Navajo Technical University’s veterinary technology program. And as fate would have it, his penchant for research has also connected him to his veterinary idols. A birth control and rabies vaccine project took him to the clinic in Navajo Technical University’s veterinary technology program.

At his birth in 1874, only half the known elements had been discovered. By the time he died in 1883, 113 new elements had been discovered and one of them with unusual, but natural, dental pathology. His work on the project helped show not only how the advent of equine dentistry helped make horseback riding possible, but also that both developments occurred earlier than previously believed—more than 3,000 years ago.

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Eyes Wide Open

JAMIE SHEW ’98 MUSIC
2018

Jamie Shew’s Eyes Wide Open holds something for every vocal jazz enthusiast. With two stellar compositions and eleven superb arrangements of her own, the listener has many delights from which to choose. Although Jamie has had all the skills, passion, intellect, and experience that one could hope for in a career for many years (the wealth of tracks), it was only after her husband lost his fight with cancer that she came to see herself as more of a professional performer—and one who could explore human emotions in the unfolding context of joy and healing.

BRIEFLY NOTED
Freedom’s Racial Frontier: African Americans in the Twentieth-Century West
Edited by HERBERT G. KUPFN & DWYER A. MAAG, PH.D
PHI KAPPIE HUMANITY UNIVERSITY OF OKLAHOMA PRESS: 2018

Between 1940 and 2010, the black population of the American West grew from 710,400 to 7 million. With that explosive growth has come a burgeoning interest in the history of African American West—an interest reflected in the range and depth of the works collected in Freedom’s Racial Frontier that link past, current, and future generations.

“The West is revealed as a place where black Americans have fought—and continue to fight—to make their idea of freedom come up to their expectations of equality,” Mack Carter G. Weldon in African American history and associate professor of History at Berea College, author of numerous articles on African American history, and coeditor of Beginning a Career in Academia: A Guide for Graduate Students of Color.

Girls on Fire: Transformative Heroines in Young Adult Literature
SARAH HENTGES ’06 PHD AMER.
STUDIES
MCFARLANE 2018

Hentges delves into the dystopian imagination portrayed in some 140 young adult novels. By focusing on the intersections of race, gender, class, sexuality, and power, Hentges “girls on fire” inspire transformative change in a variety of tempos. Ballads “Detour Ahead,” “Easy Living,” and “First Song” (for Ruth), though vastly different, are united in Jamie’s easy delivery and the comfort they bring. My favorite interpretation is Jamie’s New Orleans street beat arrangement of “Mountain Greenery” with great interplay between guitar and piano. Saving the best for last, though, Jamie’s composition “Eyes Wide Open” reminds one of a haunting Sondheim ballad that gives the listener an opportunity to examine loss within the confines of beauty and affirmation. All the song’s unexpected directions unite perfectly to create a cohesive, emotional journey, ending the album with “This is love, I choose love.” I still choose to listen to Jamie Shew’s Eyes Wide Open again, and again.

—Kristina Pl greet

CLASSNOTES

In the 1972, the seventh floor of the STEPHENSON SOUTH residence hall housed seven strangers. The part-time student didn’t last, as they soon became fast friends and poker buddies.

Today, those seven friends still meet and play cards, and have done so for the past 30 years.

“We just immediately bonded,” says Marc Anderson.”

Anderson was a sophomore when he lived in Stephenson while the rest of the group were freshmen. The friends hailed from all over Washington. Tomaker, Gig Harbor, Lake Washington, Oak Harbor, and Port Angeles.

Most of the group still lives in the state while one is in Idaho and another in California. Despite the distance, the friends have stayed in touch and had their first gathering in 1982.

Without Facebook or text messages, at first the group would see each other at weddings or send Christmas cards. After a few years, they decided to formalize an event to get together.

During their five-day reunions, which are held in rotating locations, the group kicks off with a weenie roast and catch-up session, followed by outdoor activities like golf and hiking. They also play poker, a game Anderson says the group bonded over in college.

He says funny that they started as strangers. “We’ve become so close it’s hard to believe it was a random pairing at Stephenson South.”

Although the friends have fun every summer, they are also there for each other through life events. Anderson says they’ve supported each other through parent deaths, cancer, weddings, and funerals.

The group has had 100 percent attendance for about 30 years. Anderson says, he had to miss the reunion a few times at first, but now it is the norm for everyone to show up every time.

“We’ve got a commitment to each other, so we make it work,” he says.

It is a lot easier to connect these days with social media, but the group believes they are the longest-running, continuous alumni meetup.

“You gotta keep that Cougar spirit going,” says Anderson.

YASMEEN WAFAI ’18
Recently, the WSU Alumni Association announced its plan to achieve 40,000 members by 2020. The WSUAA calls its membership drive “40by20.” At a time when other alumni associations across the country are shrinking, Washington State Magazine wanted to know more about the association’s bold plan. Editor Larry Clark asked WSUAA 2018–19 President Ashley MacMillan ’05 about 40by20.

Larry: Hi, Ashley. Can you tell me a little more about the 40by20 membership drive? What is it, really?

Ashley: Over the summer, the WSUAA reached 32,628 members—an incredible new record for our organization. We decided to set a new goal for 40,000 members, engaging more Cougs than ever in support of WSU. At 40,000, we will have more than tripled the number of members in the WSUAA since we launched our drive in 2003. While other alumni associations across the country are decreasing in membership, we are excited at the momentum and support from our alumni. Which, in all honesty, does not surprise me because Cougs are the best!

Larry: Cougs do love to overachieve. So, what will the 40by20 campaign do?

Ashley: The 40by20 membership drive will dramatically expand the number of members in support of WSU. History has shown that Alumni Association members are more involved and back WSU at a higher level which really helps our alma mater. Our plan also expands the ways we connect alumni with WSU and with one another. The drive will add more activities including additional programming designed to help recent graduates transition from college to career. Cougs love to help other Cougs succeed, so we are working to leverage that fact to benefit more people who love WSU.

Larry: How can Cougs help?

Ashley: WSU is currently number three in the Pac-12 for the percent of alumni who are members, behind Stanford and Cal. That’s pretty good, but I know we can do better. So, if you are not a member, please join. If you are a member, ask your friends to join the WSUAA. The more alumni and friends we get to join the WSUAA, the closer we get to number one in the Pac-12!

Larry: Is there anything about this membership drive that you’re particularly excited about?

Ashley: Reaching 40,000 members will be beyond exciting! One of our motivations behind this drive is to bring together students, faculty, staff, alumni, and friends in support of WSU. We want to thank them and showcase the impact they have on our University. One thing that I am very excited about, we have created an online mosaic for all members to upload their favorite WSU photographic memories and tell us about their love for our great University as a way for Cougs to share their pride! To upload photos, Cougs can go to wsu40by20.com to get started.

Larry: Is there anything you want to add?

Ashley: Go Cougs!
the state of Oregon. The term will last two years. The Key Technology appointed BRENT LAUREAU (’87 Ag. Eng.) as its new police chief. Laureau not only manages sales in these regions, but also maintains Key Technology’s relationship with PepsiCo’s global business as their major account manager. The Auburn Police Department hired WILLIAM PIERSON (’89 Socio.) as their new police chief. Pierson’s career has spanned 28 years.

LISA RIGGS (’90 English, Ed.) will serve as the assistant superintendent for the Gresham-Barlow School District. In addition to her experience in several administrative roles, Riggs was also a language arts and writing teacher. WARD FLEISCHMANN (’90 Mathematics) is the new general manager at the Chevalier of Everett. Fleischmann has more than 25 years of experience in the car business and was previously the general sales manager at the dealership. TIBRU TRUCK (’93 MEd.) was appointed to the Walla Walla Public Schools Board of Directors.

RACHEL DRAKE (’94 Comm.) is now the human resources director for Waypavers Wood Products Division. BEN FERNEY (’97 Ed., Biol.) became superintendent of the Valley School District in northeastern Washington after spending the previous five years as the principal of Freeman Middle School. His 32 years in education was honored with an Award of Merit by the NE Washington Association of School Administrators. Ferney previously taught and coached at Lewis and Clark High School in Spokane, and served in the Cheney School District administration.

Today’s Dental Center doctors JUDD (’97 Zool.) and SARAH SCHERER (’97 Pro. med.) have hired NATE STEIN (’14 Med. Sci.) as a new associate. The Shermans have been practicing at Today’s Dental Center for 16 years while Stein, who is also a transgender, recently graduated from dentistry school.

Alpha Phi Foundation announced REGGIE ANDREW ZAHATTA (’97 Comm.) and three others to their board of directors. Zahatta, from the Beta Rho chapter of Alpha Phi sorority at WSU, was appointed to a 2018-2020 term on the board.

KARA KAISLER (’98 Hum.) joined the Washington Agriculture and Forestry Foundation as a program manager. Kaizer is a 2016 alumnus of the foundations’ AgLeadership program.

PETRA, Inc. promoted BRETT MYRON (’99 Civ. Eng.) to president. Myron has managed both private and public sector multifamily dollar projects for the construction company since joining as a project manager in 2005.

PrimeLending, a top national lender, has taken on JEREMY BORDNER (’99 Comm.) as the area manager for the Pacific Northwest. Bordner has more than 17 years of mortgage industry experience and has been a part of the PrimeLending team since 2015.

MIKKI ROGERS (’99 Arch.) is back at RJL Architects in Beaverton, Oregon, as senior project manager. Rogers has been in the design and project management field for 13 years.

JENNY RISNER (’01 MEd) took the reins as superintendent of Arvada Community School District in Iowa. She worked most recently as Ocean Beach School District superintendent in Long Beach.

MARGUERITA (UTA) CATCHING (’03 MIN–Human) recently published her first novel, a mystery set in Eastern Oregon titled A State of Grace. First of a series, the book was shortlisted for the 2016 Crime Writers’ Association Debut Dagger Award and its protagonist is a nun.

BRYNNAN SHIPLEY (’04 Human Dev.) is the new athletic director for the Ridgefield School District. Shipley was formerly at the Kalama School District where she was a coach and athletic director. During her time there, Kalama High School has three team state championships for volleyball, football, and boys track and field. In 2018 Shipley was named the District Central 2B Athletic Director of the Year.

INES HANRAHAN (’85 PhD Hort.) was selected as executive director for the Washington Tree Fruit Research Commission. Formerly an active member of the WSU tree fruit Extension team, Hanrahans grew up and studied in Germany. She takes over for MIKE WILLET (’81 ML, ’95 PhD Hort.), who will continue with some projects and transition after almost 40 years in the tree fruit industry.

ENRICO CASTELLA (’66 Comm.) joined RBC Wealth Management, a senior practice management consultant.

Plant pathologist JAIME CUMMINGS (’97 MS Plant Path.) joined the New York State Integrated Pest Management Program at Cornell University as its new field crops and livestock coordinator. A native New Yorker, she previously led Monsanto’s soybean pathology team, and has authored over 40 crop-related publications.

Whitworth University named DAVID FERN (’79 Sport Mgmt.) as its head golf coach. Fern was the 2004 Pacific Northwest Men’s Amateur champion and played on the Gateway Tour and the Southeastern USA mini tour from 2009-10.

RAUL RIVAS, a graduate of WSU’s College of Business and Economics, was recently promoted to a corporate relations position with the United States Army to the rank of major. Major Ayala participated in the Washington State University ROTC program while studying at WSU and was commissioned as a second lieutenant at that time. She now lives in North Carolina with her husband and children.

MOLLY SMITH (’08 Comm.) launched a public relations company based in Seattle, the Good PR Company, focused on elevating female founders in the Seattle area and entrepreneurs who have unique visions. A third-generation Coug, she previously worked in corporate public relations in Manhattan.

Roxanne M. Rich (’09 Nursing) is now a part of the international
let's meet here
150 E. Spring Street, Pullman, WA 99164

What’s on your mind?

A random sample of Washington State Magazine readers will soon receive an email invitation to complete a survey about the magazine. We’d love it if you would take a few minutes and let us know your thoughts.

Even if you don’t receive a survey invitation, we want to know what you think about Washington State Magazine and what great WSU stories we should include in future issues. We look forward to reading your opinions and story ideas.

magazine.wsu.edu/contact
IN MEMORIAM


Kirkland. ('62 MAT Music), 97, December 23, 2016, Kirkland. THOMAS E. MICHAELS (75 Hortic.), 84, August 10, 2018, Oak Harbor.


The January 8, 1919, edition of the Evergreen noted that Copeland delivered the sad news to Pullman. The tribute stated Price was one of the greatest all-around athletes from the school who had “reached the zenith of his remarkable basketball career, and was a potent factor in the winning of both the Northwest and Pacific Coast Conference titles for his team.” It also described Price as a “class of men who would ungrudgingly give his last penny to his friend... and as a result of his unselfish disposition and his spirit of wholehearted friendliness his circle of friends included the entire community.”* Below: 1917 National Champion Basketball Team. Josi Price is at the upper right.
THEY SAY DOGS ARE MAN’S BEST FRIEND. WSU’S KATRINA MEALEY MAY BE DOG’S BEST FRIEND. AS THE RICHARD L. OTT ENDOWED CHAIR IN SMALL ANIMAL MEDICINE AND RESEARCH, KATRINA INVENTED AN INEXPENSIVE TEST TO FIND OUT WHETHER DOGS HAVE THE MDR1 GENE MUTATION, WHICH MAKES THEM SUSCEPTIBLE TO A VIOLENT OR FATAL REACTION TO CERTAIN ANTIPARASITIC DRUGS.

Learn more at foundation.wsu.edu/katrina

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