

Washington State

MAGAZINE

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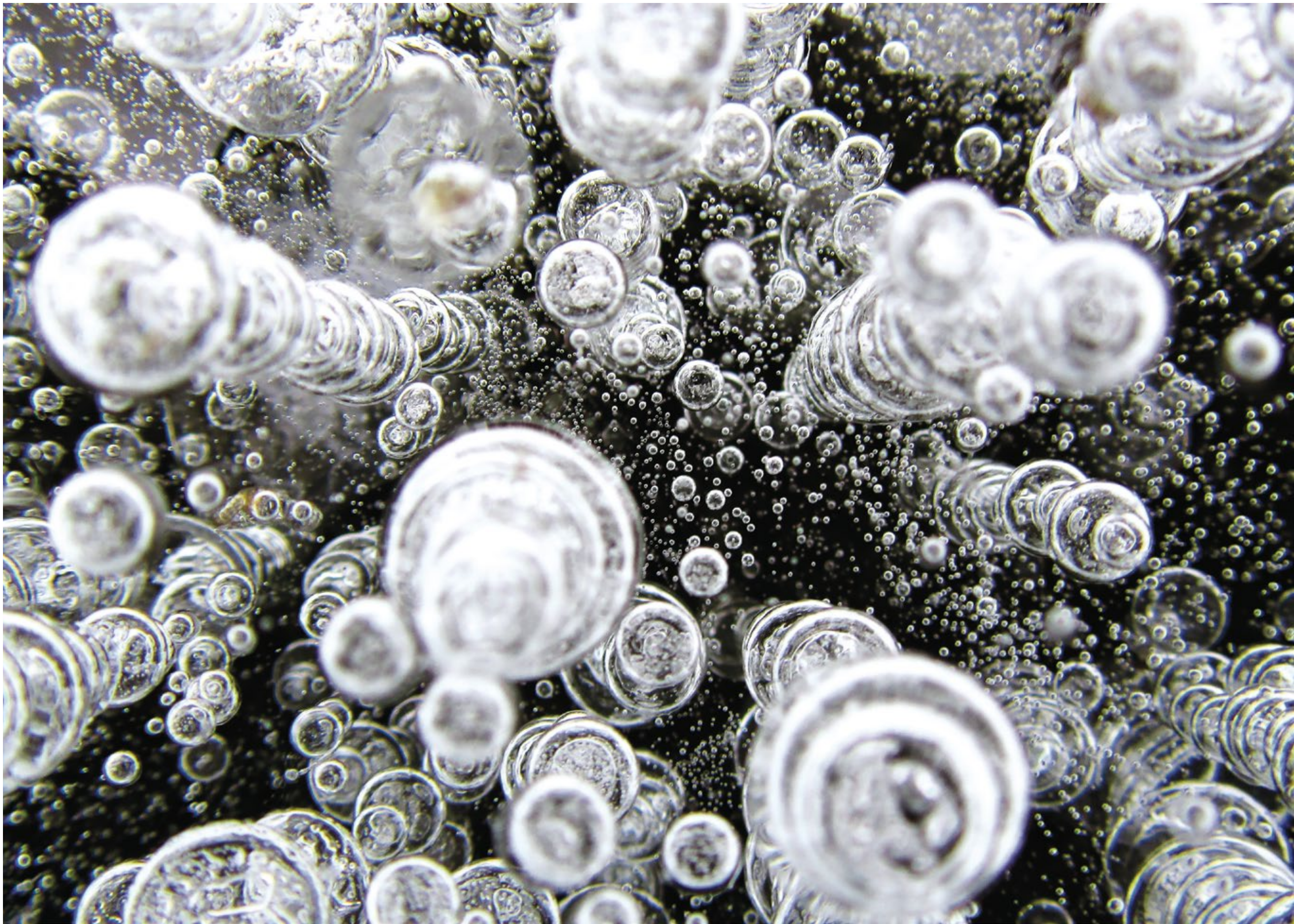
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Jake Sirianni's viral rap video landed him his dream internship on *The Tonight Show Starring Jimmy Fallon*.

With over 200 majors statewide, WSU takes pride in offering students like Jake a premier academic experience and hands-on approach. Here, go-getters work to make their dreams happen.

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— A NEW YEAR IS JUST AROUND THE CORNER —

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FIRSTwords

Reconsidering health. Ancient Greek physician Hippocrates proposed that four basic personalities were driven by excess or lack of bodily fluids, the “humors.” Discredited by biochemistry, we may consider the idea humorous, but Hippocrates’ theories began a centuries-long consideration of temperaments and personality in psychology and philosophy.

Other ideas of human health were first spurned and then accepted. Germ theory, the thought that many diseases are caused by microorganisms, was treated with disdain when it was proposed in the sixteenth century. It didn’t receive its due until nineteenth-century experiments by cholera researcher John Snow and chemist Louis Pasteur, among others, proved germ theory’s validity.

Even today we continue to rethink health on the microscopic level. Nutritionist Shelly McGuire and other Washington State University scientists explore microbiomes and helpful bacteria such as those that live in breast milk, which was previously thought to be sterile.

In the practice of medicine, too, we must strive for new ways to get healthcare to people. The inaugural class of future doctors at the Elson S. Floyd College of Medicine took their Hippocratic Oaths in August, eager to join the mission to improve access to physicians throughout Washington state. The students will work on medical teams and embed in communities, as they learn everything from medical breakthroughs to biomedical ethics.

Those students are studying at WSU Spokane, where scientists, with the help of twins, also work to understand obesity and other public health problems. The Washington Twin Registry now housed at WSU can show us possible differences between genetic and environmental causes for medical issues.

It’s not only human health that can benefit from reconsideration. The study of canine dementia at WSU’s Veterinary Teaching Hospital and beyond sheds light on a little-known problem for our dogs. WSU scientists are also global research leaders on connections between animals with brain-wasting diseases—from cattle and sheep to elk and deer—and strange, resilient proteins called prions.

Sometimes old ideas need a fresh look. That’s the case with a pair of formerly abandoned methods to fight infections: silver and electrical current. The era of miraculous antibiotics is waning as bacteria adapt and resist, so WSU engineers have used silver, a toxic but effective antibiotic, in nanosized amounts that don’t harm human cells. Other engineering faculty found that precise electrical current, assisted by carbon-fiber “bandages,” can kill off persistent bacteria.

We’re many years from Hippocrates but that same spirit of innovation can work to improve healthcare, even as we honor past achievements, as in the words from the Hippocratic Oath: “I will respect the hard-won scientific gains of those physicians in whose steps I walk.”

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TALKback

Olympics and art

The first letter in the [August] "Talkback" on the Olympics struck a special note for me. We live in San Gabriel, and prior to 1984, I'd submitted my name as a volunteer for the Olympics.

Imagine my surprise when I got an acceptance letter and was assigned to Santa Anita track...just 3 miles away! It was one of the most gratifying experiences of my life. I was an asker for the jumping and gated activities.

After I retired from the Pasadena city schools, I became a docent for the Huntington Library, Art Collection, and Botanical Gardens. I took kindergarten and third graders through either the European art galleries or the Scott Gallery for American Art. I served ten years at this magnificent

institution with its fabulous collections, art works, and gardens. And for me, the weekly continuing education. The Huntington gave me much more than I was able to give to it.

WSU continues to give to me in the form of a visit by Andrea Farmer ['02 Comm.] every two years to just chat about WSU. She is a delight and an excellent representative for our school.

HELLOU "HON" DAVIS STEWART '58
San Gabriel, California

Darn magazine

I love the paper. I will share it with people inside the profession as well as others. Really outstanding dedication to doing the right thing. The piece is aesthetically pleasing, hearty, and functional. Kudos.

Your darned magazine causes me excessive heartache toward returning home. Although I was raised in southern California and we might be headed for the Washington or Oregon coast after retirement, the pages of your issues always tug at me, almost unbearably. I so miss the West.

EDWARD LEE LAMOUREUX '80 MA
Peoria, Illinois

Printed apology

Due to problems on press, a few pages in the August issue were especially difficult to read. We apologize, and have made changes with our printer to avoid future problems.

— Editor

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

A COUGAR HOLIDAY
from Washington State Magazine

Gift GUIDE

Our collection of WSU-centric gifts on Pinterest
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SAY HELLO TO YOUR FUTURE DOCTORS.

This fall, the class of 2021 put on their white coats and began their studies.

They're part of Washington's first public medical school east of the Cascades. And together WSU-trained pharmacists, nurses, and now doctors will revitalize healthcare in the state by serving in communities where they're needed most.

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Mary-Kate and
Ashley Olsen twins
dolls by Mattel.
Staff photoillustration

Seeing double

The Washington State Twin Registry is a powerful aid in promoting better health

Glen Duncan is an outlier in an obesogenic environment. While he's fit and trim, two in three Americans carry too much weight for their own good and are largely sedentary during work and leisure time. It would help if he had a twin to compare himself with. As it is, he studies other twins in the hope of teasing out why some people are drawn to healthy behavior, others not.

Duncan has long been a runner, from high school races to weekend 10Ks. For the past ten years he has practiced jiu-jitsu and Muay Thai, a combat sport called the “art of eight limbs”—knees, shins, fists, and elbows, times two.

“I’m one of those people that goes nuts if I’m not active,” says Duncan, a professor in the Elson S. Floyd College of Medicine and chair of the Nutrition and Exercise Physiology program. “At this point I need it physically, psychologically. To me it’s the best possible drug in the world.”

Yet for millions of modern humans, life is a stream of near inertia aided by the technology of cars, cubicles, and computers. If only people could get 150 minutes of moderately intense exercise, a recommended weekly dose of doing more than what Duncan calls “tooling around the neighborhood.”

But when you try to put science to this challenge, it runs into the need for controlled circumstances, and the hard-to-control realities of Life in the Real World. You can learn a lot by rigorously

feeding mice different pellets or giving them various treadmill drills. But you’re still just learning about mice.

And forget about comparing a college professor living in the “walkable” Seattle neighborhood of Greenlake to a programmer who spends hours a week in a slow I-5 commute from Lynnwood. The variables, be they genetic or environmental, are too numerous to calculate, let alone control. So if you wanted to nudge either of their behavior in a more healthy direction, be it through bike lanes or soda bans, you would be hard pressed to gather evidence that meets science’s demand for valid statistical correlations, let alone causes that can be cleanly and clearly tied to effects.

It turns out that twins offer a promising stream of data that can serve up remarkably solid inferences and conclusions. Fraternal twins share half their genetic material. Identical twins share almost all their genetic material. Both groups face many of the same environmental effects. By comparing and contrasting fraternal and identical twins, researchers can tease out genetic and environmental effects on health.

Here’s how twin logic works: If a health condition is genetic, it should be shared by identical twins but not be as common between fraternal twins, who have less genetic information in common. If a health condition is caused by something in the environment, both fraternal and identical twins will be more likely

to have the condition and in near equal measures.

It turns out there are thousands of twins out there and they are easy to find. For years, the state Department of Licensing has asked applicants if they are twins or triplets. Because identification numbers are based on names and birth dates, officials wanted to avoid giving the same numbers to two or more people.

In 1998, Dedra Buchwald, then a professor of medicine at the University of Washington and now at WSU Spokane, realized that Washington twins could be useful for health researchers. Her interest led to the creation of a twin registry, which Duncan took over in 2013 and brought to WSU Spokane when he came two years later.

“We want to do this research that really reflects what happens in the real world,” says Duncan. “But you want to maximize experimental rigor so that

your results actually have some tangible meaning. The twins allow you to do certain things that you wouldn’t otherwise be able to do.”

Let’s imagine you wanted to know if soda consumption leads to a higher body mass index, the relationship between height and weight referred to as BMI. In a world looking for the causes of obesity, soda consumption has become a major target of both critics and policymakers. If soda really is making people unhealthy, policymakers can build a case for some sort of regulatory remedy.

If you look across a group of twins, treating them as unrelated individuals, you’ll see such a relationship exists. But that’s only a correlation. You want to find out if the soda consumption causes the higher BMI. If it does, an identical twin who drinks more soda than his or her sibling should have the higher BMI.

It turns out that Duncan looked for such a link recently and didn’t find it.

“This was contrary to our hypothesis,” says Duncan, “and it certainly would have made our lives much easier if the data had come out like we would have expected. But it didn’t, which throws a little kink in the association there, the causal pathway between soda and BMI.”

For each door that closes, another opens. Lacking a causal relationship between soda consumption and BMI, researchers can now look for something else. Perhaps there is something genetic that influences both soda consumption and increased BMI, says Duncan.

Whatever the reason, Duncan sees twins as a powerful tool for pinpointing the actual causes of healthy and unhealthy behaviors and serving up solid real-world evidence for health-promoting changes in public policy. ✱

A SAMPLING OF COUGAR TWINS: Clockwise below, from top left: Mandy '10 and Haley '10 Parsons (golf team), Kamel x'14 and Kahshan x'14 Greene (football team), Sahar and Sepideh Nesaei (mathematics doctoral students), Ryan '01 and Brandon '00 Pickering ('98 Rose Bowl team), Morgan '14 and Micaela '14 Castain (women's soccer), and Katrina '10 and Kanethia '10 Williams (social sciences). Parsons photo Brian Plonka/The Spokesman-Review; Castains photo Greg Davis. Other photos WSU



Homer on a flash drive

Plato is sitting at the feet of his mentor Socrates, writing down what the old philosopher says. What Socrates is saying, ironically, is that writing is bad for you: *It rots your memory*. Preserved in Plato's *Phaedrus*, Socrates's opinion of the then-emerging technology sounds strange to us now—until you recall that that's pretty much exactly what pundits in the twentieth and twenty-first centuries have been saying about TV, video games, and texting.

Dene Grigar, director of Washington State University Vancouver's program in Creative Media and Digital Culture, laughs and nods. She's also the president of the Electronic Literature Organization, an international team of scholars and artists dedicated to creating, preserving and evangelizing "born-digital" art and literature. After a stint at MIT, the ELO is calling WSU Vancouver home for at least the next five years.

"Remember the fireside chats?" she asks, harkening back to World War II and Roosevelt's cozy, comfort-food style of



DENE GRIGAR IN HER LAB (PHOTO LAURA DUTELLE)

delivering encouragement to a nation at war with fascism.

"Read the reviews," she continues. "People didn't want fireside chats, people didn't embrace them. The president making himself available?" The demonstrative redhead waves her hands, a gesture that says, *Shocking!* "No! You've got to be behind a podium.

"The Industrial Age is a model for us," she continues, tromping up the stairs to her lab. "They were struggling with transitioning from an agricultural economy to a manufacturing one. Mechanizing jobs, the introduction of machines into everyday life." She enters her lab and concludes, "We are struggling through a lot of these issues that we've already struggled through before. But now with different technologies."

Grigar's lab is wall-to-wall Apple IIc. On a floppy disk is *Uncle Roger*, Judy Malloy's interactive, database-driven fiction written originally on The WELL, an early precursor to the web that was started by Whole Earth Catalog's Stewart Brand in 1985. To get at the stories in *Uncle Roger*, the reader enters keywords in the database interface. Depending on the combination of keywords, one of seventy-five "lexia" is displayed. It's a nonlinear narrative with no real beginning or end—and one that has been revised, reacted to, and otherwise treated to the sort of iterations scholars think Homer's poems went through.

"With oral poetry," Grigar says, "there are always many permutations. We think *The Odyssey* was probably sung a million different ways," she says, each performance tailored to a particular audience. She pulls out a floppy disk case from a closet stuffed full of digital media. "I may own the world's largest collection of electronic lit. That's why I own all these," with a sweeping gesture around the room. "It's not because I'm a geek girl."

Actually, Grigar is a geek girl: She codes websites but also writes poetry that she performs as dance. Trained as a Homeric scholar, she says, only half joking, that she jumped straight from 2,600-year-old oral literary traditions to late twentieth-century digital lit—skipping over the printed word.

She's booting up an ancient Apple IIc. On a floppy disk is *Uncle Roger*, Judy Malloy's interactive, database-driven fiction written originally on The WELL, an early precursor to the web that was started by Whole Earth Catalog's Stewart Brand in 1985. To get at the stories in *Uncle Roger*, the reader enters keywords in the database interface. Depending on the combination of keywords, one of seventy-five "lexia" is displayed. It's a nonlinear narrative with no real beginning or end—and one that has been revised, reacted to, and otherwise treated to the sort of iterations scholars think Homer's poems went through.

"The computer likewise 'unfreezes' the book, the canonical and definitive edition, and turns literature into a radically

democratic project. Grigar mentions William Gibson's seminal cyberpunk novel *Neuromancer* as a foundational text that influenced her own thinking, and cites Gibson's digital experiment, *Agrippa*, which encrypted itself as it was accessed and read, as an example of the freedom artists seek from the elite world of publishing houses and art galleries.

And once the web arrived, anyone could become a publisher. Fan fiction sites evolved and a "frozen" work like Stephenie Meyer's *Twilight* is opened up and reimagined as *Fifty Shades of Grey*.

The explosion of voices on the web has certainly created consternation and confusion, and is inciting a reconsideration of the role of free speech in a democracy. Fake news sites, memes, and trolling bots force us to revisit the watershed moments of previous technological upheavals in hopes of gaining perspective—and a handle on how to proceed.

Our current situation is also inspiring a hard look at the process of publishing: Who decides what has merit, what standards of conformity are enforced in traditional publishing, and who benefits from the continuation of an industry that privileges certain voices over those of others?

"We've always had these cautionary tales about technology," Grigar reiterates. "So when people say, 'The world's going to hell in a handbasket because of Twitter,' I say, 'No, we're actually figuring things out.'"

That's why a lot of what Grigar and her electronic literature colleagues are interested in is experimental.

"A lot of it is probably not very commercial," she admits—but that's why she and her colleagues teach their students valuable skills like design and coding. "Commercial is not the brass ring for us. What drives us is the desire to express ourselves and to experiment with this medium. How do you make a work with this," she asks, tapping her laptop, "that is a masterpiece, that is comparable to Homer? That's been my question. Has it happened yet? If not, how do we enable that to happen?" *

Dog gone day

Our boy Mic's symptoms were so subtle and their onset so gradual we didn't initially see them. In fact, our other dogs noticed them first.

Mic, a Pembroke corgi then 12, had always embodied good "dog manners." He'd never met a dog who didn't like him. Suddenly, he was enraging his packmates. We sympathized; his nighttime barking was fraying our nerves, too.

A number of vet visits and lab tests revealed nothing, and Mic continued to decline. But when his spatial perception deteriorated, we realized he was acting like some elderly people and concluded, almost tongue-in-cheek, he had "doggy dementia."

Turns out we were right.

Though many veterinarians and dog owners are unaware of it, canine cognitive dysfunction, or CCD, affects a significant portion of the senior dog population. While CCD has become more apparent as dogs live longer thanks to advances in veterinary medicine and improved owner care, as many as 85 percent of cases are undiagnosed.

"It's a big issue, and there's not much awareness of it, even among vets," says Leticia Fanucchi, a veterinary behaviorist and director of Veterinary Medicine Behavioral Services at Washington State University's Veterinary

Teaching Hospital. "I get that question—'Dogs get dementia?'—even from colleagues."

CCD is an age-related neurobehavioral syndrome leading to a decline in cognitive function. It can be devastating to the pet/owner relationship, with dogs sometimes even forgetting their people.

"CCD is a degenerative process similar to Alzheimer's in humans," explains Fanucchi '15 PhD. "Confusion, affected social relationships, changes in activity level, apathy, increased anxiety, compulsive behaviors, restlessness, fear of familiar objects and people, aggression, and changes in sleep-wake cycle, as well as house soiling and excessive vocalizations, are all symptoms."

As with human dementia, causes of CCD are not well known. But accumulations of sticky proteins called beta-amyloid plaques around neurons, and the breakdown of neurons resulting in so-called neurofibrillary tangles, are considered leading causes. As in humans, both phenomena impact the brain by interrupting nerve impulse transmission.

When we recognized the possibility of dementia in Mic, we discovered Eileen Anderson, whose book, *Remember Me?*, and website, Dog Dementia: Help and Support, are invaluable CCD resources. But it comes with a warning.

"The most important thing to understand is that any apparent CCD symptom could also point to a serious—and perhaps treatable—medical condition," Anderson stresses. The first stop, she emphasizes, is the vet.



MIC (COURTESY SUSAN CAIN)

But when standard tests reveal no medical cause for dementia symptoms, it's time to consider CCD. However, dog owners may find that at least initially they're on their own, as CCD is not yet widely understood in the veterinary community. A good option may be a veterinary behaviorist, such as WSU's Fanucchi.

Canine dementia cannot yet be reversed. However, CCD can be prevented and, failing that, its symptoms minimized.

As with humans, prevention in the form of lifelong holistic care is key. But at some point in every dog's life, routine preventive care must be fine-tuned with the specific aim of preventing CCD.

"It's essential to begin treating CCD before its signs first manifest because CCD's early symptoms are very subtle, almost unnoticeable," stresses Fanucchi. Timing varies depending upon size, as larger dogs tend to live shorter lives.

"Begin giant breeds at age five, small breeds at ten, others in between," explains Fanucchi.

According to Fanucchi, CCD treatment involves management of behavior and environments, enhanced diet, and medication. Its dual goals are slowing the disease's progress and improving quality of life for dogs and their people.

"Behavior can be effectively managed by providing daytime activities and opportunity for play, and structured social interaction for physical and mental stimulation," says Fanucchi. "Exposure to sunlight will help regulate the sleep-wake cycle. If they can't walk anymore, use a wagon or a stroller. Anything to get them sunlight and stimulation."

"Managing the environment is very important," she emphasizes. "Make it more predictable. You pet-proof the house just as you'd toddler-proof it."

Providing adequate toileting opportunities is important, as old dogs can't hold it as they did when they were younger. Diapers and pads can be helpful.

Nutrition options for senior dogs fall into two categories, commercial and natural.

Commercial foods—offered by Hill's, Purina, and Royal Canin—focus on the addition of antioxidants for cellular-level health and medium-chain triglycerides for cognitive improvement.

Dennis Thomas, a holistic veterinarian in Spokane and author of *Whole-Pet Healing*, acknowledges commercial foods' benefits but advises a different course.

"I don't recommend heat-processed food for dogs. I recommend feeding a balanced, wholesome natural diet with the same beneficial supplements added."

The pharmacological approach to CCD treatment focuses on control of oxidation and enhancement of brain function. The antioxidant supplement SAME has proven effective in both preventing CCD and moderating symptoms. Antioxidant nutritional supplements such as Denamarin, Silybin, vitamin E, Cholidin, and omega-3 fatty acids can be added to any diet, as can Solliquin, an amino acid that can reduce CCD-related anxiety. However, no supplement should be added to a dog's diet except under a veterinarian's guidance.

The drug primarily used to treat CCD by improving brain function is selegiline (Anipryl), thought to improve brain chemistry by reducing the removal of dopamine and other neurotransmitters.

"I encourage looking for alternative forms of treatment as well as the conventional," says Thomas. "I prefer to treat this disease with acupuncture and Chinese herbs, supplements, diet modification, and energy medicine."

Judging by Mic, the approaches described here can work. A natural diet augmented by SAME and other supplements improved his cognition. Thanks largely to acupuncture and Chinese herbs, his formerly debilitating physical deficits were controlled. Treatment eliminated his nighttime barking and, under supervision, his packmates tolerated him. He lived nearly two mostly happy and relaxed years after the onset of CCD.

But had Mic's symptoms not improved, we would simply have followed Eileen Anderson's golden rule.

"All that matters," she says to anyone who will listen, "is to love the dog in front of you." ✨



CCD researcher Leticia Fanucchi working with Moli and Mic. Courtesy Susan Cain

BY TINA HILDING

Fighting infection a new, old way

Before antibiotics were invented, people often used silver, a known antimicrobial that can also be toxic, to tackle infections.

Researchers in the early 1900s also noticed a mysterious and inconsistent effect from using a mild electric current to kill nasty microbes.

Both methods were problematic, though, and were quickly abandoned with the advent of antibiotics, which killed bacteria so effectively throughout the twentieth century.

Now, as the efficacy of conventional antibiotics wanes, Washington State University researchers are reinventing old ideas to fight bacterial infection.

At their lab in the School of Mechanical and Materials Engineering, Amit Bandyopadhyay and Susmita Bose have developed a nontoxic way to use tiny amounts of silver to control difficult-to-treat bacterial infections that often occur after orthopedic surgery.

The researchers were able to control infection by carefully affixing nanosized specks of silver onto stainless steel bone implant materials. When they added a nasty and common *Staphylococcus aureus* bacterial infection, the silver-coated implants successfully fought off the infection for as long as nine months—much longer than one could use prophylactic antibiotics. The research, funded by the National Institutes of Health, found that the miniscule number of silver ions that escaped into surrounding tissues did not have any toxic effects.

The engineers also incorporated silver into calcium phosphate ceramics, bone-like materials that are commonly used in jaw and dental surgeries. They were able to slowly release tiny, nontoxic amounts of silver at levels that would be effective for killing bacteria.

"The challenge is to control the release amount and the rate of release," says Bose. "You need to release a small amount to be effective, but not beyond toxicity."



SUSMITA BOSE (PHOTO DEAN HARE)

Meanwhile, another WSU research group is tackling and beating drug-resistant bacterial infections in chronic wounds with another old idea—using a low electric current.

Researchers have tried electrical stimulation as a method to kill bacteria for more than a century, but, with only a poor understanding of how it worked, they had limited success.

Haluk Beyenal, the Paul Hohenschuh Distinguished Professor in the Gene and Linda Voiland School of Chemical Engineering and Bioengineering, and his team determined how to better use an electric current to produce a disinfectant—hydrogen peroxide. They carefully control the current to assure a specific electrochemical reaction at an exact rate.

With improved understanding of the reaction, the researchers developed an "e-scaffold," a sort of electronic bandage made of conductive carbon fabric. With the addition of an antibiotic, the researchers used the e-scaffold to tackle difficult-to-treat "persister cells" that hide in bacterial slime layers known

as biofilms. These subpopulations of cells often survive treatment, grow, and multiply, resulting in chronic infections.

"I didn't expect to kill persister cells using the e-scaffold," says Beyenal. "To verify these unexpected results, we biologically replicated the work multiple times."

The e-scaffold created an electrical current that produced a low and constant concentration of hydrogen peroxide, which disrupted the biofilm matrix and damaged bacteria cell walls and DNA, allowing for effective antibiotic penetration. Their method does not damage surrounding tissue, and the bacteria are unable to develop resistance.

"It turns out that hydrogen peroxide is really hard on biofilms," says Doug Call, an epidemiologist in the Paul G. Allen School for Global Animal Health who is involved in the work.

With their e-scaffold prototype, the researchers were able to kill all of the highly persistent *Pseudomonas aeruginosa* PAO1 bacteria in their samples. ✨



HALUK BEYENAL (PHOTO ROBERT HUBNER)

SHORTsubject

Unraveling a curious killer

In the ghoulish world of infectious disease agents, prions might well be the zombies. Unlike bacteria and viruses, prions have no DNA, yet still manage to replicate. Nearly indestructible themselves, the tiny agents slowly ravage the brains of their victims in an infection that is always fatal.

Prions were the culprit behind the mad cow disease outbreak in the late 1990s and early 2000s. And today, they're driving the epidemic of chronic wasting disease (CWD) spreading rapidly through deer and elk across North America.

For nearly thirty years, Don Knowles '88 PhD has bravely investigated these strange and elusive infectious particles. When asked if he worries, he just shrugs. It doesn't seem to faze him. In fact, he and other scientists at Washington State University find prions intriguing—a frontier science ripe for discovery.

Knowles is research leader for the Animal Disease Research Unit (ADRU) which is run by the U. S. Department of Agriculture and located in the WSU College of Veterinary Medicine.

"The ADRU works hand-in-hand with the college in infectious disease research," he says. It's a relationship that has helped WSU become a leading prion research center for the nation.

In many ways, prions are still a mystery to the scientific community. Unlike run-of-the-mill microbes, prion infections have extremely long incubation periods, which often require equally long research projects. Advances in the field come in frustratingly tiny increments.

According to Knowles, every animal species naturally produces its own type of healthy prion protein. Trouble comes when something causes that protein to change shape.

"If you look back in time, it appears prion disease began with the spontaneous

misfolding of these normal brain proteins," he says.

Studies show that once misfolded, the protein mysteriously forces other healthy proteins to distort. Eventually, these infectious prions clump together into tightly wrapped fibers or amyloid plaques that destroy bits of the brain, making it appear like a sponge. Hence, the disease name: spongiform encephalopathy.

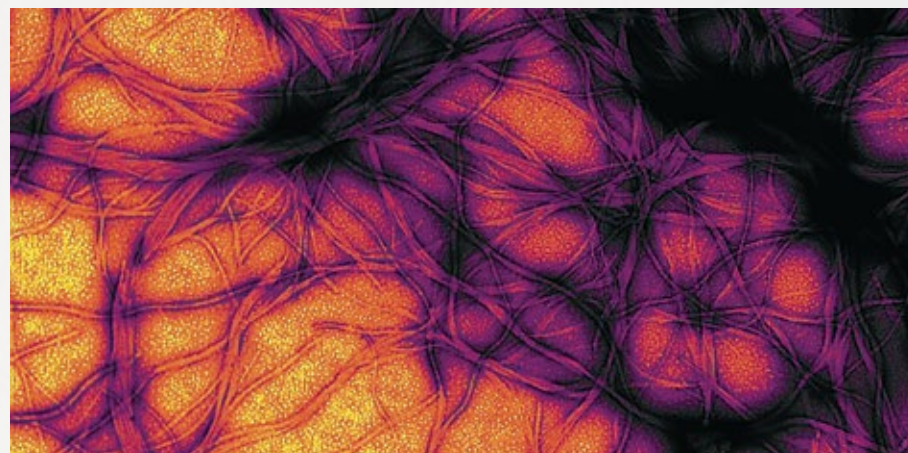
Knowles says there are four naturally occurring types of this disease in animals: sheep scrapie, mink encephalopathy, bovine spongiform encephalopathy (BSE) or mad cow disease, and now chronic wasting disease.

Humans can also develop a spontaneous form of prion misfolding called Creutzfeldt-Jakob Disease (CJD). Though not considered contagious through casual contact, it's possible CJD prions helped fuel the notorious *kuru* outbreak linked to ritual cannibalism in Papua New Guinea.

In the early 1900s, the Fore people adopted the practice of cooking and eating dead relatives. These mortuary feasts, as they were called, were primarily attended by women and small children who had little access to fish or meat.

By 1950, many of the participants were dying of a type of dementia called *kuru*. Villagers blamed it on sorcery as victims would stumble, laugh, and eventually lose all ability to function.

In time, medical investigators concluded it was a type of spongiform encephalopathy caused by prions and spread by touching, preparing, and eating the infected bodies.



PRION PROTEIN EXPRESSED IN E. COLI (COURTESY NIAID/NIH)

"Once they stopped the mortuary feasts, it all went away," says Knowles. "But *kuru* can incubate for very long periods, so cases still crop up occasionally."

"The same thing happened with mad cow—once we stopped cows from eating other cows, BSE has all but gone away," he says. "It's my opinion that BSE started with the spontaneous misfolding of normal cow prions. Then, sick animals were butchered and mixed into feed supplements for other cattle, widely transmitting the disease."

Knowles says that with mad cow, mink encephalopathy, and *kuru*, infectious prions do not leave the body, so disease is spread only if the carcass is opened and subsequently touched or eaten.

The scenario is different with sheep scrapie and chronic wasting disease, where infectious prions do leave the body in urine, feces, and saliva. In these cases, prions contaminate the environment, easily infecting other animals who eat tainted leaves or brush.

Thankfully, sheep scrapie has never been shown to cause illness in people. And, so far, it appears the same for chronic wasting disease. But no one really knows for sure.

David Schneider, WSU-ADRU project leader for spongiform encephalopathy research, is puzzling out the details in hopes of providing answers. His team develops ultrasensitive diagnostic tests for detecting prions in animal tissues and the environment. They also study genetic resistance to prion disease in sheep and goats.

Schneider follows in the footsteps of retired veterinary microbiologist Katherine

O'Rourke '87 PhD, who pioneered the USDA-WSU prion research program with professor of veterinary clinical sciences Steven Parish '73 DVM. In 1998, they developed an eyelid test for sheep scrapie that provided an easier way to diagnose the disease.

Similar diagnostic improvements, together with careful breeding programs and strict regulatory measures, have dramatically reduced the incidence of sheep scrapie in the United States.

Unfortunately, the principles don't transfer well to wild deer with CWD.

Ground contamination, extensive migration patterns, and a population explosion in white-tailed deer have disseminated the disease through deer, elk, and moose in 24 states and Canada. So far, no cases have been reported in Washington, Oregon, or Idaho.

Some have proposed slowing the epidemic with controlled burns in forests and grasslands. Though not hot enough to destroy prions themselves, fire could eliminate a large percentage of the prion-laden vegetation deer like to eat. Montana wildlife advocates also suggest using wolves as an ally in the fight against CWD.

As for killing prions directly, Schneider says radiation and boiling have little effect. Incineration, strong bleach, and some forms of autoclaving can work, but not in wildland forests.

It's enough to cause nightmares, but Schneider is encouraged by recent breakthroughs. "Advances are being made in genetic resistance and breeding programs, antiprion disinfectants, and the development of ultrasensitive testing methods," he says.

Indeed, Schneider hopes new assays will one day allow veterinarians to screen barnyard fences and feeders for scrapie in addition to testing sheep for infection. Other scientists are developing tests to monitor prion activity in plants and soil.

And in Woodinville, the Briotech USA company just developed a disinfectant solution that kills prions, yet is mild enough to use on tissues and medical equipment.

For now, the best advice is to avoid eating or handling sick animals and to report sightings promptly to state wildlife officials. ✱

Going postal

While digital communication has made a lot of things easier—like video calling someone on the other side of the world—it has made collecting public opinion and behavior data more challenging.

Government agencies rely on that data from censuses, public opinion, and behavior surveys to make extensive policy and financial decisions that impact quality of life, such as healthcare measures that curb smoking.

Don Dillman, a Washington State University Regents Professor in sociology and internationally renowned survey methodologist, has dedicated his career to improving the design of surveys to collect that information.

When he started his career in the 1970s, he had to worry about improving methods in only three ways—through in-person interviews, postal mail surveys, or telephone surveys. While each had their challenges, household addresses and phone numbers provided a reliable pool to select a representative sample. Phone surveys quickly became the industry standard—in part thanks to a still commonly referenced book written by Dillman—due to their savings in cost and time.

The advent of caller ID, cell phones, and the internet in the 1990s introduced many new ways to communicate, but also made people harder to reach and more likely to ignore or miss surveys.

"In the 1970s you could depend on people being home at a certain time," Dillman says. "Now people are on the go more, and even if you can reach them, they are more likely not to answer."

By the early 2000s, response rates to telephone surveys had fallen to single digits, rendering them less reliable. Survey methodologists needed a new option, and Dillman turned to a surprisingly old-school method: postal mail.

From 2007 to 2014 Dillman and WSU sociology doctoral students Jolene Smyth '07 PhD, Leah Christian '07 PhD, Michelle Edwards '13 PhD, Benjamin Messer '12 PhD, and Morgan Miller—all part of WSU's Social and Economic Sciences Research Center, one of the only university-based survey labs—developed the web-push methodology that is now used in censuses and other public policy surveys around the world.

The methodology drives people to take an online survey by sending a request through the mail, and has surpassed the response rate of phone surveys by a factor of five.

For their ideas, Dillman and his former graduate students received the Warren J. Mitofsky Innovators Award from the American Association for Public Opinion Research in May, an award last granted in 2015 to Nate Silver, creator of statistics news website FiveThirtyEight.

When phone survey responses declined, online surveys introduced a time- and cost-saving option. However, generating a representative sample from email addresses proved challenging. Individuals often have several emails, and the non-uniform format of addresses makes it difficult to generate a random sample.

Without phone or email options, Dillman returned to postal mail. The USPS still provided access to 98 percent of household addresses.

"Given cybersecurity concerns of today, mail also feels more secure to people," Dillman says. "It is likely to stay universal."

In 2007, funding from the National Science Foundation allowed Smyth, Christian, and Dillman's first design. It involved sending a postal request and \$2–4 incentive to take an online survey. The researchers followed up with a reminder, as well as a paper mail-in option. It received a 58 percent response rate, 44 percent online and 14 percent by mail.

"We were so shocked by the response rate over the web," Smyth says, "It was the first time a web-based survey of households received that high of a response."

The subsequent nine tests by Dillman and three other graduate students resulted in similar numbers. Over seven years they perfected the methodology and published a book in 2014. In the meantime, countries and organizations began adopting and evolving the method, and are already seeing promising results.

Australia, Canada, and Japan have used the method in their censuses, and the United States will also use it for the Decennial Census in 2020.

"Perhaps the biggest success so far is Canada's 2016 census," Dillman says. "Sixty-eight percent of households responded online, and most of the rest responded via mail. That is a huge cost- and time-saver."

Continually changing technologies and communication social trends will keep survey methodologists busy for years. Dillman's former students are already leading the survey evolution: Christian is vice president of data science at Nielson, Messer works for Research-in-Action, and the other three work at universities. ✱

WELLbeats

Getting a new perspective on stress

Humans generally think of themselves as highly evolved creatures, but when it comes to stress, our fear response is as primitive as the tiny beasts that fled predators 500 million years ago. Though lifesaving, this fight-or-flight system is also triggered by modern concerns such as political Facebook posts or being stuck in traffic. Over time, psychological stress can build into an internal time bomb.

While some suggest humans have outgrown their stress system, studies show there are ways to teach that old brain new tricks, helping to calm the angst that comes with contemporary living.

Ryan McLaughlin, assistant professor in the Department of Integrative Physiology and Neuroscience at Washington State University, studies the impact of pervasive, day-to-day stress and how it contributes to a rising prevalence of anxiety disorders.

Referring to Robert Sapolsky's entertaining book, *Why Zebras Don't Get Ulcers*, McLaughlin says, "Our stress system has been passed down nearly intact for eons—we have the same machinery to respond to imminent danger as a zebra does. Birds, reptiles, fish, the lowest level of vertebrates—all have a similar cascade of events to produce the fight or flight response. But today's stressors are different than those our stress system was originally designed to handle.



ILLUSTRATION ISTOCK

"Now, life moves fast. With phones in our pockets, our contacts, colleagues, jobs, and responsibilities are with us every moment," says McLaughlin. "With more connectedness comes less time to take a break from the trials and tribulations of everyday life."

Add family problems, financial woes, or an accident, and it can trigger a downward spiral that's tied to physical problems such as diabetes, high blood pressure, digestive disorders, suppressed immunity, and impaired brain function.

Behind the scenes, several brain centers interact to regulate these reactions to stress. Two of the key players are the amygdala and prefrontal cortex (PFC).

The amygdala is involved in the creation and memory of emotions, notably fear. The PFC coordinates complex behavior, impulse control, and emotional reactions. In a healthy system, the two balance each other like yin and yang.

McLaughlin says trouble comes when the wary amygdala is bombarded by present-day concerns and responds with alerts like, "You'll die if you don't get more money or

fix a relationship!" He says it's the PFC's job to calm the amygdala down—telling us, "You're not going to lose your job or your wife. Take a breath and make an appropriate decision."

But if stress continues, the brain begins to change. As we focus on negative concerns, we strengthen those neural connections, setting up an endless cycle of rumination. The amygdala responds by expanding and adding connections to other brain cells, all while sending out warnings that create even more anxiety.

At the same time, the PFC shrinks, losing connections and its ability to control the amygdala. As a result, it gets harder to control your emotions.

McLaughlin says you're essentially reverting to the childlike state when you couldn't regulate your emotional brain centers. You find yourself feeling irritable, angry, tearful, overwhelmed, and unable to cope.

Some scientists suspect the amygdala can even become "stuck" in a hyperfunctional state—such as PTSD where the primitive fear center tries to keep you alive at all

costs despite the side effects. Researchers in Europe have also linked hyperfunction to chronic illnesses like chemical sensitivity, chronic fatigue syndrome, and fibromyalgia.

Thankfully, most stress-induced brain changes are reversible once you intervene and break the negative cycle.

"It takes some time to recover from a bout of intense stress—about a month or so," says McLaughlin. "That's why we need vacations to be a few weeks. We need that time to really revitalize our brain, re-engage the PFC, and get a different perspective."

Mindfulness training is one way to engage the PFC and quiet the amygdala. In fact, McLaughlin says any sort of novelty, social interaction, or change of routine can help reset the brain and give you a fresh outlook. *

Short-circuit the stress

Imagine sitting on a park bench waiting for a friend. You're checking messages on your phone when a noise catches your attention. You look up and suddenly realize it's a beautiful autumn day. The sun is warm on your skin and a gentle breeze tempers the heat.

From a nearby tree, birds call while a few golden leaves flutter, break loose, and slowly drift to the ground. On the grass, a parade of tiny black ants drags a bread crumb. Traffic passes in the distance. Quiet voices chat and laugh.

The scene is a simple example of mindfulness, and your brain loves it, especially during times of stress.

Typically, thoughts jump around like a game of hopscotch—fretting about this, remembering that, planning ahead to something else. Pile on the stress and there goes your ability to focus.

"With mindfulness, we basically set aside our concerns of the day and cultivate an awareness of the present moment," says pharmacotherapy professor Tracy Skaer at Washington State University Spokane.



TRACY SKAER (PHOTO CORI KOGAN)

"In our fast-moving, constantly-changing world, we have to retrain people how to do it," she says.

Skaer is a trained mindfulness practitioner who works with a team of nursing and medical faculty to help patients dealing with stress, anxiety, depression, insomnia, chronic pain, and other conditions.

Although medication can be helpful, Skaer says it's not the end-all, especially with chronic illness. "Patient-centered care and taking part in treating your illness help you gain more ground in overcoming problems. You can't just go to the doctor and get a pill; you've got to get to the root cause."

When that root cause is an overactive amygdala and shrinking prefrontal cortex, mindfulness can help. Within just a few weeks, mindfulness training can rebalance the brain and build protective resilience against stress.

Skaer says the differences are notable. People react more calmly to the small stresses of everyday life, and recover more quickly from major ones. In many cases, patients report better sleep, lower blood pressure, and enhanced ability to cope with pain.

"So often people end up suffering at home instead of getting the help of an interdisciplinary healthcare team, which includes yourself," she says.

"Take charge of your illness or stress. Maybe you can get an app with nature sounds to help you fall asleep at night. Or take a tai chi or yoga class. When you compassionately tune into yourself and others, it reduces the need for medication as well as the risk of side effects." *

A FEW OF SKAER'S TIPS FOR REDUCING HARMFUL STRESS:

- 1. TAKE CARE OF YOURSELF** and maintain a healthy body through adequate rest and exercise. Walking is great and so are short power naps.
- 2. EAT A HEALTHY DIET** with nutrient-rich foods. Stay hydrated. Reduce excess carbohydrates.
- 3. CULTIVATE A STRESS-FREE MINDSET** by letting go of judgment and negative thought patterns. Become more mindful and optimistic.
- 4. GIVE YOUR BRAIN** a nature break. Watch the squirrels outside the window.
- 5. LAUGH OFTEN**—even fake laughter reduces stress.
- 6. SEEK OUT HELPFUL THERAPIES** like massage and acupuncture which can improve sleep and reduce stress, pain, and tension.
- 7. ENROLL IN ANGER OR STRESS MANAGEMENT** classes if needed.

Going the distance. Really.

It is about the miles when you are an ultramarathoner.

BY TODD MORDHORST



TWO DAYS BEFORE THE START OF WSU'S FALL SEMESTER,

Di Wu staggers down a rugged trail in the towering Sawatch Mountain Range in Colorado. He wheezes with every breath after loping, hiking, and toiling for nearly 50 miles—his training ground in Pullman had done little to prepare him for the suffocating, thin air.

Wu crosses 12,000-foot Hope Pass, a rigorous day's hike by itself for most. Faced with the prospect of continuing back over the pass, and on to the finish of the Leadville Trail 100-miler, Wu realizes his weary legs are not up for the confrontation. Exhausted and defeated, he drops out, determined to try again next

year for the silver Leadville finisher's belt buckle he's coveted for years.

The outcome at Leadville was not all that surprising. Wu's mind, and all too often his body, is busy preparing research proposals, and constructing his new course on Nanostructured Matter in Chemical Engineering. His wife Yuanyuan Cui is herself an assistant research professor at WSU in the Department of Integrative Physiology and Neuroscience, and their son Feifan is a bustling two-year-old, commanding attention at all hours of the day. It all left Wu ill-prepared to cover ungodly distances on foot, at two miles above sea level.

"My legs are tired, they felt heavy," Wu says. "I've had stomach issues in the past, but my stomach felt good all day. Leadville was really enjoyable, but what killed me was my legs."

Throughout 2017, he spent months training on lonesome Palouse roads and isolated Moscow Mountain trails. Unlike major road marathons, runners like Wu receive little fanfare at 100-mile footraces. The races themselves present brutal physical, mental, and emotional challenges.

Wu lined up for not one, but five 100-milers in 2017. He registered for the Grand Slam of Ultrarunning, a lineup that just a handful of runners in the world finish each year. The fairytale ending sees Wu crossing finish line after finish line, cruising

toward the glorious completion of his goal.

So far, Wu has yet to finish a race, though he remains upbeat.

In May at the Old Dominion 100 in Virginia, Wu made it about 80 miles before he grew dizzy and faint, and was unable to continue. At California's historic Western States 100 in June, he covered less than a standard marathon before illness cut his day short. And at the Vermont 100 in July, a wrong turn near mile 70 cost him more than two hours and spoiled what had been a brilliant day to that point.

Wu landed his position as an assistant professor in the Voiland College of Engineering and Architecture in the summer of 2016. Fresh off a postdoctoral fellowship at the University of California, he had high hopes for his research proposals but, like 100-mile races, best plans are sometimes dealt unforeseen setbacks.

"I did not finish (the Vermont 100) and I think the critical reason was, I was not patient," Wu says. "It's like in my research. After a couple of rejections of proposals last year, I did not submit anything this spring. I was reanalyzing my failed proposals and trying to write new ones. Currently, I'm working on eight to ten proposals. Patience is key, in running, life, and work."

Wu grew up in a small town in Jilin Province of China, where he discovered his slim legs were



more ideal for running than one of the most popular sports in his chilly region—speed skating. He clocked speedy times in high school in the mile and the 400 meters. In graduate school at the University of Akron he discovered the trails of Cuyahoga National Park, and began running longer and longer distances. His first U.S. race was the New York City Marathon.

He caught the ultrarunning bug in 2010 at the Stevens Creek 50k (31.2 miles) in California.

More than half a million Americans finished a marathon in 2013. That same year, just 5,500 finished a 100-miler. But ultrarunning is rising from obscurity with more participants, more sponsors, and more exposure.

Dozens of ultramarathons are hosted each weekend throughout the United States. In 2017, more than 4,200 people entered a lottery for just 369 starting bibs that would enable them to compete at the Western States 100. The sport is even bigger in Europe. Chamonix, France, hosts the Ultra Trail Mont Blanc and a number of associated races at the end of each summer, bringing more than 10,000 runners to the Alps.

"Running is my release from pressures of work," Wu says. "Running on the trails, I've had some nice ideas for research."

He teaches in WSU's School of Chemical Engineering and Bioengineering, and researches

the interaction between surfaces and material chemistry. Its applications include energy storage and energy efficiency. Wu's hobby also centers on efficiency as he churns out between 60 and 90 miles each week, depending on his training cycle.

"You want to have the body of a Civic, but the engine of a Mustang on race day," Wu says.

His quick smile hides any dismay he may harbor over his 2017 race results. He's already plotting race plans for years to come.

The goal isn't glory or fame, but rather to see his hard work, determination, and patience translate to magnificent days on the trails. ✨

INseason

"After you set the table with your best efforts, let your real pleasure come from looking around the table before breaking bread together and appreciating the similarities in your guests rather than the differences."

—Maya Angelou, 2011

At our table

BY LARRY CLARK



Breaking bread, banquets, or potlucks—however and wherever we enjoy the delightful experience of sharing a meal, we can tell our stories, cross cultural boundaries, and begin to learn each other's histories.

The holidays especially give us the opportunity to gather for food and talk, so important when it feels like we live in a time rife with incivility and torn by divisiveness.

American poet, author, and civil rights activist Maya Angelou, who passed away in 2014, had a deep fondness for cooking and sharing meals, even publishing a cookbook memoir. "There are very few times we can be more intimate as to share food together," Angelou told National Public Radio's Don Gonyea in 2010.

In Angelou's gracious spirit of hospitality, the Elson S. Floyd Cultural Center at Washington State University offers not just a place to learn about African-American, Latino/a, Asian-American, Native, Pacific Islander, and other cultures, but also a welcoming place to dine together.

"Food is a wonderful catalyst for building community and honoring differences, and there is no better place to facilitate these kind of connections than inside the Cultural Center," says Mary Jo Gonzales '95 MA, '01 PhD, WSU vice president of student affairs.

EVENTS LIKE THE CRIMSON TABLE, pictured here, use the commercial and demonstration kitchen in the Cultural Center to showcase foods from across cultural and ethnic groups. But it's about more than just delicious cuisine; choosing to sit together and dine can be the first step to necessary discussions on race, ethnicity, and culture.

"Meals provide a landscape from which to explore all manners of cultural and economic dilemmas," wrote sociologist Alice Julier in *Eating Together*. "Decisions about whom we eat with, in what manner, and what kinds of food are inextricably tied to social boundaries."

Studies have shown practical benefits to eating together, from problem-solving to work relationships. It's also proven to build trust and cooperation.

Most of all, it's a shared human experience, as chef and philanthropist Aarón Sánchez wrote, "Coming together and sharing a meal is the most communal and binding thing in almost every place in the world. Being able to make a dish and share that with the people you love is one of the most universal concepts because it's at the root of our survival." ❄️

Opposite, from top: Matcha Tea Cakes; Smoked Salmon Crostini with Herb Cream Cheese, and Cucumber Caper Relish (on cutting board); Huli Huli Style Chicken Satay

Insets, opposite from left: Spiced Lamb Meatballs with Red Pepper Harissa along with Saffron African Drop Donuts with Red Pepper Jam; beverages including Hibiscus Tea, Horchata, and Strawberry Ginger Infused Water

Top right: Student Hula dancers performing at the Crimson Table Event. **Right:** Chocolate Flan Flower Cups

Background image: Dining tabletop in the WSU Elson S. Floyd Cultural Center

Photos Robert Hubner



OPPOSITE, LEFT: UNIMPROVED ROAD IN GRANT COUNTY (PHOTO ARPAD JASKO)

The request came last spring.

Jim and Linda Bauer have opened their home to visiting symphony musicians, international artists, and others traveling to the Tri-Cities, and community leaders were turning to them again. This time, the Bauers were asked if they'd host a medical student for a weeklong stay at their Richland home.

"We were like, 'Of course,'" recalls Linda Bauer, a retired U.S. Department of Energy employee. Her husband, also a retiree from the nearby Hanford Nuclear Reservation, adds, "We enjoy having visitors and hosting get-togethers."

This, however, was different and the couple knew it.

The region has long identified physician recruitment as a top priority, and with Washington State University designating the Tri-Cities as one of four regional hubs for its new medical school, it would be a chance to make a lasting impression.

The Bauers were ready.

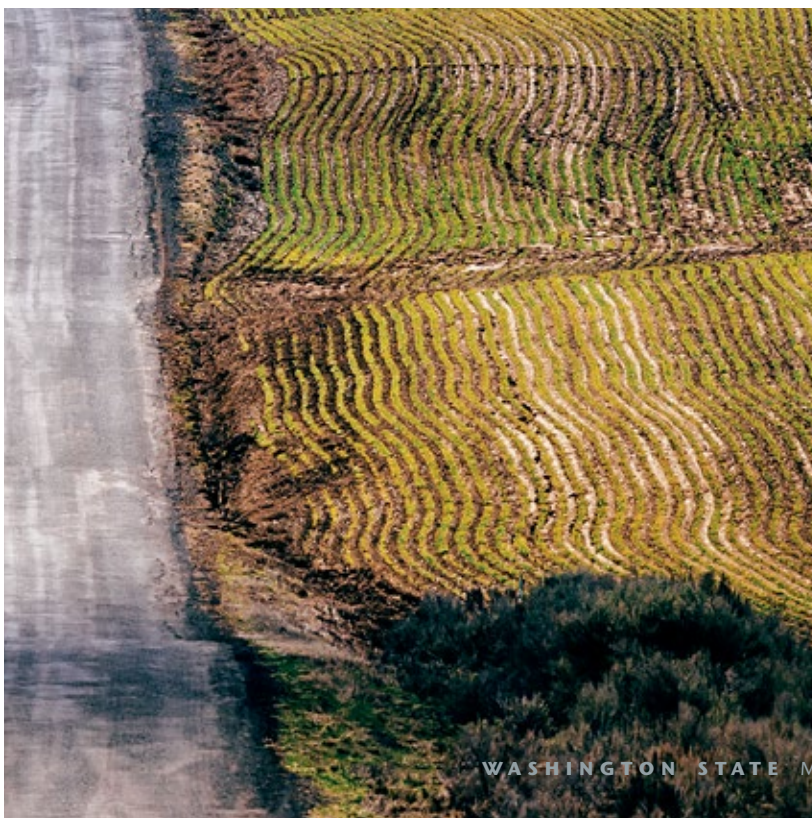
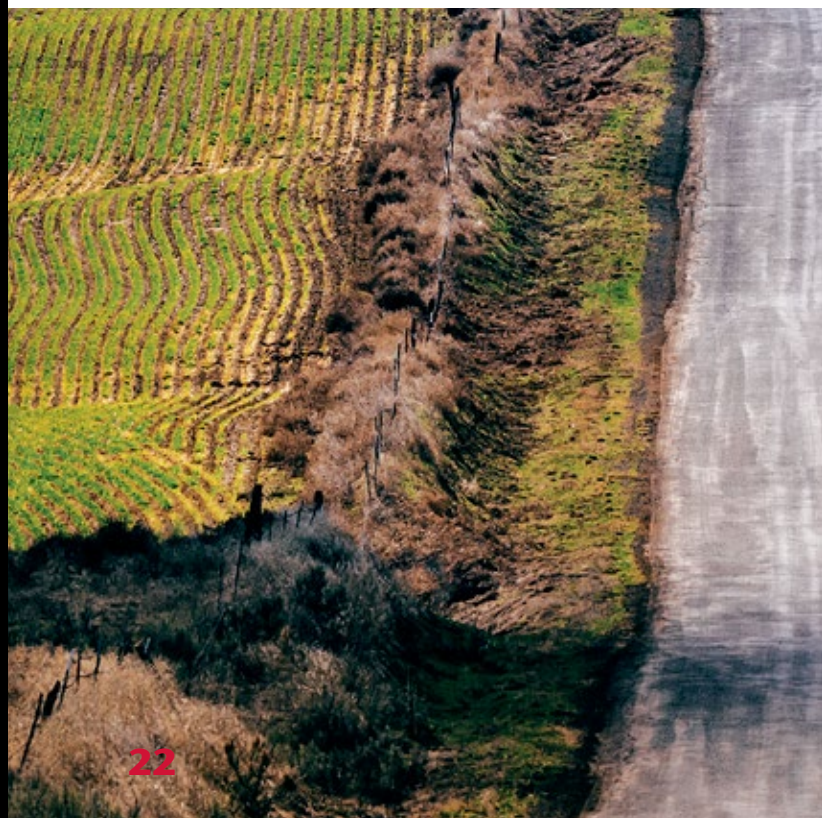
When student Kiah Jones arrived in September for a week of community immersion and instruction along with several of her classmates on the WSU Tri-Cities campus, a packed social calendar was waiting as well: visits with members of the local medical community, tours of the diverse Tri-Cities region, and even a Friday night concert inside a decommissioned nuclear reactor.

"We're transplants from the Midwest and we love it here," Linda Bauer says. "We know that if people take the time to learn about Eastern Washington, experience what it has to offer, they'll love living here, too."

Medicine to all corners

BY DAVID WASSON

Washington State University has embarked on one of its most ambitious expansions. The Elson S. Floyd College of Medicine is carving out its physician-training niche by emphasizing innovation, technology, and the importance of bringing high-quality care to some of the state's most underserved regions.



Similar introductions were being made throughout the state as the inaugural class of 60 students from the Spokane-based Elson S. Floyd College of Medicine packed suitcases, grabbed their textbooks, and spent the third week of their first semester learning about the communities that desperately hope they'll be back.

Washington State's grand experiment in community-based medical education is underway.

FROM THE BEGINNING, WSU promised a different kind of medical school. A program committed to carving its own niche in physician training by emphasizing innovation, technology, leadership, and the critical importance of bringing high-quality care to underserved communities.

It had collaborated for years with the University of Washington's medical school, but the two parted ways in 2014 over continuing differences in how best to address worsening physician shortages.

Clearing the way was former WSU President Elson S. Floyd's successful push in 2015 to convince the Washington legislature to authorize and support a second public medical school for the state. Floyd, who had been battling colon cancer throughout the lobbying effort, died a few months later and other University leaders picked up where he left off, meeting tight deadlines to win national accreditation in 2016 and begin accepting student applications for the planned fall 2017 launch.

The commitment to primary care and underserved communities is what appealed to Jones, the medical student who spent a week with the Bauers in the Tri-Cities.

"I'd originally thought I wanted to do medical research," she explains.

But during her junior year at Central Washington University, where she played intercollegiate volleyball when she wasn't studying cellular and molecular biology, Jones became immersed in an

intensive laboratory-based research project and discovered something important about herself: “I need to work directly with people.”

Her career goals shifted to clinical medicine, and having grown up in Port Angeles she understands what it’s like to live and work in small towns.

“My grandfather, actually, is who told me I should be looking at WSU,” Jones says.

Her undergraduate adviser and others, however, cautioned that the medical accreditation deadlines WSU faced were so tight that it was questionable whether the school would be ready to admit students for the 2017–18 academic year.

Nonetheless, Jones’ grandfather continued to provide regular updates on the school’s progress.

“He told me that everything I’ve been saying about why I want to go into medicine is what WSU is emphasizing,” she recalls.

When the Liaison Committee on Medical Education granted preliminary accreditation in October 2016, the traditional application period for U.S. medical schools already was underway. Jones’ grandfather called her immediately.

“I think the announcement had just been made,” she laughs. “I promised him I’d take a look, and when I got home I started reading everything I could. It was incredible; he was right.

“It was like someone had designed a medical school specifically for me.”

FOCUSING ON RURAL AND PRIMARY CARE was no accident.

The nation’s medical schools, physician residency programs, and others have struggled for years to boost the number of physicians practicing in rural and other underserved settings. Yet each new study shows fewer doctors setting up shop in America’s small towns.

A study commissioned by WSU in 2014 found the problem particularly acute in Washington, where the population continues to grow faster than the national average and too few in-state medical training opportunities were available for otherwise qualified students.

The problem is made worse by the disproportionate concentration of medical professionals in Seattle and King County, home to just 29 percent of the state’s total population but nearly half—49 percent—of its practicing physicians.

In the early 1900s, the legislature designated University of Washington as the sole public provider of physician training statewide. The UW medical school flourished and now is widely considered one of best in the world, featuring a faculty that includes three Nobel laureates.

But enrollment capacity had been largely limited even as the state’s population swelled. The 2014 study noted that increasing numbers of qualified students were having to leave Washington each year to enroll in out-of-state medical schools because there was no room for them here.

In Spokane, efforts to expand physician training as part of the collaboration between WSU and UW had mixed results, leading Floyd and others to begin pushing for greater control over medical education and curriculum. The two universities ended their partnership in late 2014 to pursue separate Spokane expansions.



PHOTO BRUCE ANDRE

Kiah Jones grew up in Port Angeles and was drawn to WSU’s new medical school by its focus on improving access to primary care services in rural and underserved communities. During a weeklong school visit to Tri-Cities, her host family Linda and Jim Bauer (below) sought to highlight the quality of life available in Eastern Washington.



PHOTO ROBERT HUBNER



A LONG-AWAITED CHECKUP AT A YAKIMA NEIGHBORHOOD CLINIC

PHOTO SHAWN GUST / YAKIMA HERALD-REPUBLIC

University leaders had been studying a new model that other states had pioneered over the past decade or so with what initial indications suggest could be promising results.

Community-based medical schools differ from the traditional model in that they rely on educational partnerships with existing hospitals and clinics rather than development of university-owned medical centers.

Instead of receiving their clinical training and experience in a central university hospital, for example, students spend their third and fourth years of medical school working alongside veteran physicians within communities where healthcare services are most needed.

The model was seen as a solid fit for WSU, a land-grant university with branch campuses and other facilities throughout the state that could help support the community-based approach.

In 2014, a group of WSU leaders toured Florida State University’s community-based medical school in Tallahassee and liked what they saw.

“The students were out in the communities, getting experience and developing relationships where their skills are most needed,” Brown explains.

The model had another advantage that Brown, a veteran of Olympia budget battles from her years in the legislature, recognized as well: “This was a way to operate a medical school without requiring a major capital investment in a university hospital.”

NEARLY 1,800 MILES AWAY, Dr. John Tomkowiak had heard about WSU’s interest in community-based medical education. Tomkowiak, dean of Chicago Medical School at the time, had built a reputation as an innovator and advocate for developing curriculum and training that keeps up with the rapid pace of change within the healthcare industry itself.

Before moving to Chicago, he held administrative and faculty roles at what was then a fledgling Florida State medical school and became a widely recognized proponent for community-based medical education.

Not surprisingly, Tomkowiak quickly emerged as a finalist in the nationwide search for a founding dean of WSU’s medical school.

“WSU has always had a significant health science focus so something like this wasn’t that big of a stretch,” says former WSU Spokane Chancellor Lisa Brown, a former state Senate majority leader who oversaw establishment of the new medical school in Spokane. “We train nurses and pharmacists and veterinarians and all kinds of other health professionals. We’re already doing amazing medical research here and on our other campuses. This is a logical next step.”

In fact, WSU earlier had moved its nursing and pharmacy schools to the Spokane campus along with other health science programs and much of the infrastructure already was in place to support a new medical school even before it received state approval. The effort also had the backing of the Spokane community, which had made increased medical education and research a top economic development priority.

The plan involved more than simply increasing educational capacity.

At right, clockwise from top left: ESFCOM Dean John Tomkowiak. Photo Cori Kogan. Former WSU Spokane Chancellor Lisa Brown. Courtesy WSU Health Sciences. ESFCOM Vice Dean Ken Roberts. Photo Cori Kogan



His hiring was approved by the Board of Regents in September 2015 and the task that awaited him was immense.

"I immediately saw it as this great opportunity," says Tomkowiak. "It was this chance to start from the ground up. We're able to ask ourselves, and our community partners, what does the doctor of the future look like, and then create a medical school that prepares them for that."

At WSU, student innovation and entrepreneurship is being fostered.

Students will participate in problem-solving exercises known as hackathons where they'll be presented with a current medical industry problem and given a fixed amount of time to brainstorm solutions. Ideas that might hold commercial potential will be nurtured along through a health technology incubator being developed on campus to help entrepreneurs.

"Literally, we are training the next generation of healthcare leaders and we want them to think big," Tomkowiak says. "We want our students to not only learn about how to take care of patients but to focus on entire systems."

Leadership is considered key.

WSU is among the first medical schools in the nation to require leadership training for graduation.

Doctors often are asked to take on leadership roles within hospitals, their own medical practices, and within their communities as well, Tomkowiak says, but typically have little or no preparation for that.

The curriculum also includes an emphasis on technology, including video consultations with patients in remote settings, and the use of composite data to identify health patterns and trends specific to a community that should be monitored or addressed.

"The more you practice, the better you get," he says. "Our students will know how to use data to develop information that helps keep people well."

EACH OF THE STUDENTS in the charter class hail from Washington.



PHOTO BRUCE ANDRE

Growing up near Everett, **Keely Coxon** was interested in healthcare from an early age, but was drawn to communications as an undergrad. A family illness rekindled her interest in medicine a couple of years ago. At WSU, she'll work with medical faculty and physician mentors at Providence Regional Medical Center Everett and other facilities.

In the rush to get the medical school ready for a fall 2017 launch, the University was so focused on serving regional needs it never developed an out-of-state tuition rate.

"Didn't even think about it," WSU President Kirk Schulz told students, their families, and others during a gathering in Spokane just before fall semester began. "We're going to continue that commitment."

Much like the school itself, the first class of students represents a departure.

More than half are female, all but two of the sixty grew up in medically underserved counties, 11 are first-generation college graduates, and a third are from low-income backgrounds, according to enrollment records. They range in age from 21 to 36 and bring a variety of undergraduate backgrounds.

Keely Coxon, for example, had her own public relations company before deciding to return to school in 2014 to finish needed prerequisites for medical school.

She grew up near Everett and had been interested in medicine when she enrolled at the University of Utah after graduating from high

Left, clockwise from top: Farion Williams, associate dean at Tri-Cities. Lawrence Schechter, associate dean at Everett. Kevin Murray, associate dean at Vancouver. Distributed clinical campuses. Courtesy Elson S. Floyd College of Medicine



WSU EVERETT MEDICAL FACULTY AND LEADERSHIP

PHOTO RANDY BOLER/JACK

school in 2005 but eventually was drawn to writing and graduated with a degree in communications.

"When I was starting out, I looked at startups and nonprofits, I think because I liked giving people a voice," says Coxon, a competitive runner and Alpine skier lured to Utah by the Wasatch Mountain Range. "But you end up taking on more projects on the Fortune 500 side."

Then in 2011 her mother was diagnosed with a rare heart condition. The experience of researching the diagnosis and being there with her mom through genetic testing and treatment rekindled Coxon's interest in medicine.

She later re-enrolled at Utah to complete the prerequisite coursework she'd need for medical school. Her microbiology professor, aware that she planned to take a year off between her postbaccalaureate studies and medical school, encouraged her to consider laboratory jobs because it would provide valuable exposure to the healthcare field and Coxon ended up at a pathology lab back in Everett. Her professor's advice was solid. "The great thing about working in pathology is you get to see a lot about every field," Coxon says.

Friends and family, meanwhile, had kept close watch on WSU's progress and urged her to apply.

"I think my mom just wanted me back in Washington," Coxon says with a laugh. "The day they got their accreditation, she called me.

"I'd been watching it too and there was something about the way they were doing their curriculum. I just had a good feeling about it."

IN AUGUST, Elson S. Floyd's wife, Carmento, traveled to Spokane to meet the inaugural class of medical students.

In the final months of her husband's life she'd celebrated with him the legislative victory that enabled WSU to begin creating its own medical school, and reflected again on the accomplishment, this time alone, when it received national accreditation.

Each of the students in the charter class had been individually interviewed by WSU faculty and administrators, but she wanted to make sure they understood that her husband's legacy is now in their hands.

"My husband... believed that if greatness can be accomplished it can be accomplished at Washington State University," she said, tearfully. "Your journey... fulfills his dream.

"We expect greatness from you and you must expect greatness from yourselves."

Nearby, student Sam Bloomsburg contemplated the final months of Elson S. Floyd's life, what it must have been like to continue pushing for something so ambitious while battling a terminal condition and realized that Carmento had been as much a part of that journey as anyone.

"I was surprised by how much it affected me," says Bloomsburg, who was raised in suburban Bellevue but got a hands-on introduction to rural healthcare this past summer shadowing a family physician in northern Idaho.

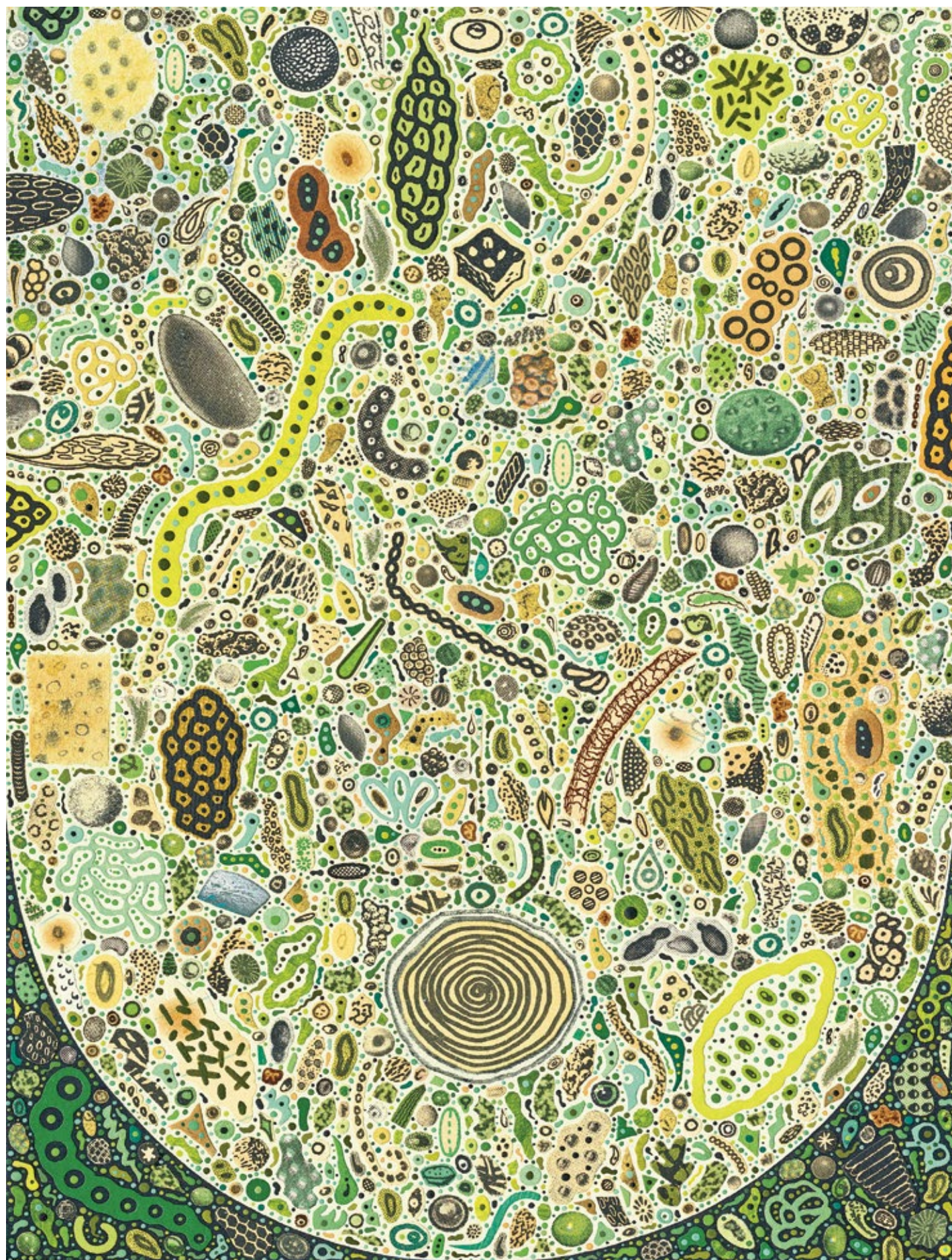
He approached Carmento Floyd during the Spokane event and hoped he could adequately convey his and his classmates' gratitude.

"I went up to her and all I could think to say was, 'Thank you for everything you and your husband did,'" Bloomsburg explains. "She was very gracious. I just thought it was important for her to know we recognize the opportunity we've been provided." ❄️



WSU HAS PARTNERED WITH PROVIDENCE HEALTH & SERVICES. DEPICTED HERE IS THEIR NEW ACUTE CARE TOWER AT THE PROVIDENCE REGIONAL MEDICAL CENTER IN EVERETT

PHOTO BENJAMIN BENSCHNEIDER



It happened again, most recently at a conference in Prague. After she gave her talk, a scientist came up to Shelley McGuire, a pioneer exploring the microbial communities found in human breast milk, and told her, *You don't know how to take a sample. Your samples must have been contaminated. Human milk is sterile.*

McGuire, a professor of human nutrition at Washington State University, knows differently: She's seen the microbes with her own eyes. But she understands the shock some feel when long-held assumptions are challenged. The realization that our health and well-being depend on vast communities of microbes hanging out in our most intimate areas has been something of an eye opener for a lot of researchers.

"It's like a whole new world," McGuire says.

Microbial communities—microbiomes—are everywhere. They are in our mouths, eyes, gastrointestinal tracts, and sex organs. Microbes cover our skin, swarm through air and water, and invest our soils with life-giving properties that feed the plants that feed us. Our gut microbes help us extract nutrients from our food, protect us from disease, and probably affect our moods and immune systems. Microbial communities in soil are plants' metabolic partners and, as well, are able to sequester toxic metals and other materials, keeping

don't know what healthy is, you're going to have a hard time understanding what *not* healthy is.

"One way to think about these bacteria is that they really represent part of your innate immune system," Forney says. Inoculation with that extended immune system begins, if not before, then certainly with the passage through the birth canal, where infants are blessed with their mothers' microbes.

A CHILD IS BORN

Some scientists, such as Forney's New York University colleague, Martin Blaser, have argued that the increase in the number of C-section deliveries has resulted in a vast uptick in autoimmune diseases, such as diabetes, as well as other chronic conditions, such as obesity and asthma. While cautiously agreeing with Blaser, the author of *Missing Microbes*, Forney takes a broader view of the development of the human immune system.

A mother's microbial gift

Old assumptions about human breast milk are giving way to new thinking about microbes in milk and their role in children's health and our immune systems.

them out of our food supply. Microbiota in air and water, meanwhile, perform critical environmental services that researchers are only now beginning to understand.

The names of bacteria found in the breast milk and other microbiomes scroll forth like the *personae dramatis* from some ancient Greek play: *Streptococcus*, *Staphylococcus*, *Pseudomonas*, *Serratia*, *Corynebacterium*. One figure that gets bandied about is that human cells are outnumbered ten to one by our microbial partners. While that figure is almost certainly too high—it's probably more like three to one—it hardly matters. We are not so much individuals as supraorganisms or, as microbial ecologist Larry Forney argues, we are each an ecosystem. "We've coevolved with these organisms," he says.

Forney, a professor at the University of Idaho who works closely with colleagues at WSU, says that our rapidly increasing awareness of the importance of microbial communities to our health is due in part to technological advances. Before the advent of fast, cheap genome sequencing, we simply didn't have a way to tell which microbes were doing what.

Another issue, in Forney's view, is that we've been studying microorganisms one at a time. When Forney consulted with Proctor and Gamble on toxic shock syndrome and the role tampons play in creating a pathogenic environment, he first asked, "What bacteria are normally found in the vagina?" Proctor and Gamble scientists, he says, "like many others, were focusing on a specific pathogen that causes disease—and they were studying the hell out of it. But if you

"We talk about the natural progression of exposure, both at birth and throughout the early years when the immune system is maturing," he explains. "There are a lot of things in the hygiene hypothesis—the use of antibacterial soaps and disinfectants, the use of antibiotics, C-sections—that are changing the way the process of community assembly takes place. If you think of it as an ecosystem that is very highly evolved and is repeated with billions of women, then anything you do to change things is like playing with fire."

While we don't know for sure when babies' microbiomes first start to develop, there is some evidence of a microbial community in amniotic fluid and possibly the placenta. But one place a baby can for sure get a good dose of microbes is at a lactating breast.

Together with her husband, University of Idaho lactation biologist Mark McGuire, and WSU anthropologist Courtney Meehan, Shelley McGuire has formed an international team to study what Meehan calls the anthropology of child rearing.

Working in the Congo Basin with hunter-gatherers, Meehan's work focuses on the early childhood environment, childcare, and nursing. Meehan and the McGuires' first collaboration took place there, where they sought to understand how the physical and social environment in an Aka village affected the milk microbiome.

"Like a lot of cultures," Meehan says, "the Aka capture childcare from many people in the community. Social networks are influencing the milk microbiome" as infants are passed around, cuddled, and played with.



The McGuires, Meehan, and their colleagues were among the first to use molecular techniques to show that there are bacteria in human milk.

"But here's the real paradigm shift," McGuire says. "When the baby nurses, whatever is in the baby's mouth actually backwashes into the mammary gland with every suckle." The suckling baby's tiny mouth creates a vacuum around the mother's nipple and when that pressure is released, the outward flow of milk reverses and baby spit gets



into the breast. "This has been shown with ultrasound," McGuire says, adding, "There's reason to think that maybe the mom and the baby are a sort of supraorganism and that there is cross-talk between their microbiomes."

Which sounds gross, and maybe even dangerous, except, as McGuire explains, "The big hypothesis is that the baby is playing in and exposed to the environment," picking up whatever microbes are out there, "so all

of those microbes go into the breast. The mammary gland has a very developed immune system, and the immune factors there can be customized to those bacteria [backwashing from the baby, the newly customized immune factors] then go back to the infant via milk." The infant's immune system is thus bolstered in ways that tailor it to the local environment.

It's that supraorganism idea again, says Meehan. There's you and your "multiple microbial communities," all working together, "so you are a supraorganism. But we go one step further and put the mom and the baby together. Their bacterial communities are completely related."

So related are the mother and child's microbiomes that the one can be used therapeutically to treat the other. For instance, Spanish researchers cultured some of the bacteria in milk, turned it into supplements that were given to breastfeeding women—and cured their mastitis.

Although no one is yet exactly sure how bacteria end up in breast tissue and milk, Shelley and Mark McGuire in a recent paper suggest that there is likely an entero-mammary pathway from the mother's gastrointesti-

nal tract to her breasts, as well as bacterial exposure through nursing. However it gets there, one thing is sure: lactic acid bacteria—LAB—abound. LAB are also very common in fermented foods, including yogurt, that confer health benefits on their hosts. Human milk is, in other words, probiotic.

PROBIOTICS

Late in the nineteenth century, Élie Metchnikoff noticed that Bulgarian peasants lived longer than average. Already a famous immunologist, and fascinated by microbiology, Metchnikoff figured that deleterious bacteria in the stomach caused aging—but that they could be controlled by lactic acid. The Russian scientist figured it must be the LAB-rich yogurt the Bulgarians were regularly eating that kept them healthy beyond their years. Metchnikoff himself religiously drank sour milk, and published his theory in *The Prolongation of Life: Optimistic Studies* in 1908—the same year he won a Nobel Prize for his work on immunity.

Ünlü Gülhan, an associate professor in the WSU/UI Bi-state School of Food Science, has studied lactic acid bacteria for years and, in the past few, has turned her attention to a popular fermented food from her native Turkey: *kefir*, "the champagne of the Caucasus," as the late, great biologist Lynn Margulis called it.

Kefir is one of many fermented milk products popular all over the world. Traditional Turkish kefir is started with kefir grains, an admixture of 30 or more species of bacteria and yeast bound up in a matrix of sugars called kefiran. Kefir grains look like cottage cheese, like something bubbling and boiling, which may be the source of the word kefir which, in ancient North Caucasian, means "foam." Before drinking, the grains are strained out of the fermented cow, sheep, or goat milk and, like mother of vinegar or sourdough starter, used again in the next fermentation.



Center: Working with several African communities, anthropologist Courtney Meehan sits with a Sidama woman in the Ethiopian highlands.
At bottom: A Sidama mother nurses her infant. Courtesy Courtney Meehan



But how do probiotics work? While still an area of intense study, at least one of the basic premises is simple. LAB "colonize the same space as pathogens and compete for the same nutrients," Gülhan says. The good lactic acid bacteria simply outcompete pathogenic species.

LAB do much more, say Gülhan and her colleagues. LAB produce natural antimicrobials which, among other things, kill competitors like *H. pylori*, which can cause ulcers and gastric cancer; are anticarcinogenic (LAB kill cancer cells *in vitro*, and slow cancer cell growth *in vivo*); reduce cholesterol by various mechanisms; and bolster the immune system by increasing concentrations of immunoglobulin E, which binds allergens, thus deactivating them.

Kefir's microbial content varies enormously across geographic space as well as by production method. The kefir we can buy in the United States is probably not nearly as diverse in microbes as the homemade kefir Gülhan grew up with—but that doesn't mean kefir, yogurt, and other probiotic foods are less effective. Gülhan does point out that to get the benefit of lactic acid bacteria in our GI tracts, we need to consume probiotic foods several times a week, at least.

As with the diversity of probiotic foods, the mammary microbiome also shows considerable variation in the composition of communities in individual women. This brings to mind Larry Forney's question: How do you know what unhealthy is if you haven't yet been able to determine what health looks like? The McGuires "urge the clinical and public health communities to be patient... in order to allow human milk and lactation researchers to first understand what constitutes 'normal' in terms of the milk microbiome (as well as factors that impact microbial community structure) prior to jumping the gun to investigate if and how this important source of microbes impacts maternal and infant health."

In short, says Mark McGuire, the milk microbiome is "very personalized."

Sequencing microbiomes, tick guts, and critical microbial ecoservices:
magazine.wsu.edu/extra/more-microbes

WHAT IS HEALTH?

What, then, is a healthy microbiome? Is there a "normal" environment in the breast, the gut, the vagina? Is it simply the average of a given population's condition? For WSU population geneticist Omar Cornejo, these are not just philosophical questions.

"The way I came to the world of microbes is that I was working on basic population genetics questions but I wanted my work to be applicable to something that could help society," the Venezuelan scientist says. He's worked on malaria as well as bacteria found in a watery environment: the human mouth.

Streptococcus mutans causes cavities in human teeth, but it hasn't always done so. Dental caries caused by *S. mutans* only appeared about 10,000 years ago, Cornejo says, when humans developed agriculture.

"The adaptation to the new environment, which was influenced by diet, was not by single nucleotide substitutions, which is what we are used to seeing, but by the acquisition of new genes," says Cornejo. "Of the new genes that were horizontally transferred [shared without mating] to *S. mutans*, about 70 percent were involved in carbohydrate metabolism, low pH resistance, oxidative stress"—all the issues *S. mutans* had to deal with after the change in human diet.

Cornejo and his colleagues figured this out with sophisticated statistical techniques and huge genomic and demographic data sets. So, for instance, the differences between two populations—of people or of microbes—can be determined by looking at allele frequencies. An allele is a variant form of a gene, a region of DNA that controls a specific trait. By analyzing the interplay of alleles, Cornejo can generate results that reveal the range of variation and relatedness between populations, as well as locate the point in time when certain traits changed.

What Cornejo wants to know is, "How much variation should we expect to see? What is healthy? What is normal?" He's collaborating with University of Idaho microbiologist Forney to try to answer those questions. "We tend to define 'healthy' by what we perceive as the norm," Cornejo says. But the norm can

be misleading. "We know we have a very high proportion of overweight individuals in the population." If we took the average weight of Americans as normal, and thus healthy, "we would be in trouble!"

Forney and Cornejo are investigating how microbial communities provide protection from disease. "We'd like to understand how different community compositions impact getting an STD, for example," Cornejo says. Some compositions are more protective than others, and the composition of the community is very sensitive to changes in the local environment.

"What we are seeing," Cornejo says, "is that whatever a single pathogen was doing, especially with bacteria, it is very relevant to who else is there, because what they are doing is going to change in the context" of the entire microbial community.

Cornejo says there are two primary contexts that affect the constitution of a microbial community. "One," he says, "is the context created by other bacteria." The other is the host—us, bacteria's human partners.

Humans are "very similar but there are important differences among populations and regions. We respond differently to drugs. We have differences in our ability to respond to parasites."

Most Europeans, for instance, don't have the antigen receptor that blocks one of the parasites that causes malaria, whereas many African populations, because of a variation in an allele called *duffy*, do have that immunity.

Once we start to get a grip on those two components of contextualized health, "we start putting all these pieces together. We can put together the genetic composition of the host, the microbiome composition," and all its genetic variation, "and the presence or absence of pathogens and start to ask, 'How does that all add up to what we call disease?'"

Cornejo and Forney are launching themselves into what one writer called the invisible universe of microbial "dark matter." What they find likely will, as Shelley McGuire says, "change everything."

It's an exciting time to be a biologist, a nutritionist, or a medical researcher, she says. "Now that we know nothing is sterile, we have to redo decades of work and relook at it with a microbiome lens on." ✱

Ethics and effectiveness in medicine

BY WILLIAM KABASENCHE

“Can you be an *effective* physician without also being an *ethical* physician?” That’s the question students in the inaugural class of the Elson S. Floyd College of Medicine at Washington State University faced for the first time on day two of classes. They’ll revisit it regularly as they make their way towards the MD degree and entry into a profession that has, many bioethicists and physicians believe, an ethic built right into it. To say that there is an ethic internal to medicine is to say that certain kinds of moral responsibilities are built right into what it means to be a part of the profession and to be doing what society expects of its physicians. We need not import ethics from elsewhere. It is native to the land of medicine.

“But what does it mean to be effective as a physician?” some students wonder as the discussion gets going. Indeed, many students explicitly answered the question, throughout the application process and in their personal professions during the August white coat ceremony: The fundamental aim of medicine is to help people. Put more formally, the goal is to promote the (health-related) well-being of one’s patients. So how does ethics help physicians to do that? The discussion on day two focused on conflicts of interest. Later ethics sessions will be devoted to discussing, among many other topics, informed consent and medical confidentiality. Each of these illustrates the connection between ethics and effectiveness.

Consider conflicts of interest. If a prominent medical group receives a very large donation from a major soft drink maker for the purpose of developing educational materials, ostensibly to help patients make good nutritional choices, we might wonder what’s in it for the soft drink maker. But we would also have to wonder if the money changing hands would affect the claims and language of the medical group writing the educational materials. If a physician owns a financial stake in an imaging center, we might wonder whether her judgment that a patient needs a medical scan is affected by the profit she makes each time someone comes through that center. Is that scan really necessary? Is it truly in the best interests of the patient?

At the heart of medicine is a relationship between physicians and their patients. Some describe this relationship as being a covenant, as opposed to a contract. Covenants are defined not by mutual self-interest but by shared goods. And the shared good of the physician-patient relationship is the patient’s well-being. That’s not to say that physicians shouldn’t be paid to do their work. But any financial consideration that affects their clinical judgment does put the covenant between physician and patient in jeopardy. We could quite reasonably wonder if the physician would make the same judgment in the absence of that financial incentive. So, a physician committed to making sure his or her clinical judgments represent a best effort to promote the patient’s well-being would want to avoid a conflict of interest that might compromise that judgment. (Medicine rarely happens by algorithm; doctors must make judgments—decisions under conditions of some uncertainty—all the time on behalf of patients.) An effective physician will thus avoid any conflicts of interest that might affect clinical judgment. And in doing so, he will be—at least in that respect—an ethical physician.

Another aspect of the physician-patient relationship that illustrates the “ethics and effectiveness” connection would be informed consent. Students at the ESFCOM will receive excellent training in many areas—basic biomedical science, clinical training, professionalism, leadership, and more—but what they

won’t receive is an expert knowledge of the “next” patient who comes through the door of their practice. Generally, the patient knows her life better than anyone else. So when the question arises, “Which among the medically appropriate interventions we might do for this patient will best allow us to promote her well-being?,” providers have to look to the patient for help in figuring that out. That usually happens in the context of a conversation between physician and patient in which the physician seeks to provide sufficient understanding of the options and to allow the patient to voluntarily decide which option is most consistent with her understanding of her well-being. Many patients will choose the option with the highest odds of success. But not all. Other considerations might inform a patient’s decision to opt for a treatment with, say, lower odds of success but fewer side effects. And of course some patients will opt for no further treatment, or at least none that attempts to cure or overcome a disease. In each of these cases, the physician seeking to use her training to best promote a given patient’s well-being will need to gain that patient’s informed consent in order to know which treatment will do that. It is, with a few exceptions, an ethical responsibility of physicians to gain the informed consent of their patients to provide treatment. And it turns out that gaining informed consent will also allow the physician to best promote each patient’s well-being. So, again, ethics and effectiveness are linked.

As a final example, consider the ethical responsibility physicians have to protect the medical confidentiality of their patients. Laws such as HIPAA (the Health Insurance Portability and Accountability Act of 1996) require the protection of personal health information. But long before HIPAA, ethical doctors understood the importance of not betraying the trust of their patients. Patients must sometime disclose very sensitive information to their physicians. They might discuss with their doctors things they don’t discuss with anyone else. And indeed just about every patient comes to the doctor with needs and vulnerabilities that create a power differential between them. The doctor has knowledge, credentials, and social recognition; the patient may not understand his condition or symptoms and feel like he is in a position of weakness. The doctor observes but the patient is the subject of observation. Under these circumstances patients are understandably eager to be able to trust that their physicians will not take advantage of the imbalance. They will want to know that their doctors will treat them, with all their vulnerabilities and embarrassing symptoms, with respect and consideration. Sharing “war stories” at the bar after work or posting pictures to social media about the gruesome cases she saw that day does not express such respect and consideration, particularly if the identities of patients can be figured out from the details.

Should physicians care if their patients trust them? Yes, if they want to be effective in caring for those patients. A patient who does not trust his doctor will be less likely to share the most embarrassing details, or may not come in to see the doctor at all. In both cases, the doctor cannot effectively treat the patient. Imagine the young teen who swears she is not sexually active and nearly dies from the complications of an ectopic pregnancy before doctors figure out that she is pregnant. Her hesitancy to trust the physician could come at the cost of her life. Thus, when doctors take their ethical responsibility to protect medical confidentiality very seriously, they present themselves to their patients as trustworthy. Trustworthiness is just one of many moral virtues that increases the chances that the physician will also be effective in clinical settings.

So can a physician be effective without also being ethical? In at least some respects such as those discussed above, it seems clear that the answer has to be no. Of course, sometimes students like to point to fictional doctors who seem to be good (at being doctors) precisely because they are bad (at ethics). *House, M.D.* comes up a lot in these conversations. Dr. House does skirt the institutional rules and laws sometimes. But we shouldn’t equate ethics with all rules and laws. An institution might be flawed; a law might be unethical. Most people can quickly think of historical examples of each. In some cases, the ethical physician is the one who challenges a policy that compromises his ability to provide the best care to his patients. And because contemporary physicians will practice medicine in the context of a host of institutional arrangements with many competing interests, they will likely have to protect their patients on some occasions from the bureaucracy that threatens to compromise patient well-being. The rest of us will look to our physicians for leadership, both as individuals and as members of a profession, that protects us from harm and promotes our well-being as patients. We will look for our doctors to be ethical, so they can also be effective. ✱

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COURTESY PERKINS+WILL

Medical research design that's 24/7

Jason Chan '99 had to travel roughly 10,000 miles to satisfy a childhood curiosity. "I grew up in Singapore and the rate of urbanization is incredible there," explains Chan. Interested in engineering and design, "architecture felt like a natural step."

Chan, who specializes in medical and research facility architecture, first pursued his passion in Pullman. "I definitely had to look at architectural history and design studies with critiques. (Being a Cougar) helped me develop design skills," Chan says.

Now a principal and regional leader for the research sector at Perkins+Will in Houston, Texas, his design prowess is on full display in concrete ways.

The Texas Medical Center, the largest medical complex in the country, is home to the Jan and Dan Duncan Neurological Research Institute at Texas Children's Hospital. Chan was part of the Perkins+Will team tasked with that project—one of the first research institutes in the nation dedicated solely to battling childhood neurological diseases. The 13-story building has since received several design awards and a LEED Gold Certification by the U.S. Green Building Council.

Going from the infant stages of a project to completion plays out over a handful of years. "The beginning of a project is a chance to be really creative," Chan says. "You sit with the stakeholders and you have design charrettes, work sessions, and meetings. You consolidate every need and wish. But we also have to balance that with a budget and a schedule."

Chan has also been part of a \$110 million renovation and expansion at the Louisiana State University College of Engineering, and the Neuroscience Engineering Collaboration Building at Wright State University.

However, construction's end is actually a continuation of Chan's work. Post-occupancy discussions give him unofficial feedback from the people using a facility. As the tools and technology available to researchers change, Chan and his peers have to think about long-term viability. "In terms of research space, there could be a new discovery the next day," Chan says. "Spaces have to be adaptable and flexible so the client is not locked down."

Because of mobile tools and changing work sites, there is an advantage in maintaining a versatile building. The previous focus on four walls and big boardrooms has changed as video conferences have become more common. "Technology also affects the way a building

is designed and operates," Chan says. "Research buildings often operate 24/7 instead of 9 to 5. We need to have an energy efficient system that does not compromise the safety of the scientists."

In Chan's estimation, medical research facilities make up the most challenging section of the architecture field. Balancing the flow of people and research subjects with the research process, while maintaining a safe environment, is key.

"When a project is done, it is something visible that benefits society," Chan says. "It has to create better places for people, improve the quality of life, and enhance the environment."

Chan and his wife, Grace, reside in Houston with their two boys. ✱

Afterword: Many employees at Perkins+Will in downtown Houston were affected by flooding in the aftermath of Hurricane Harvey in late August. Jason Chan reported in September that those affected by flooding or evacuation are all safe.

From top: The Jan and Dan Duncan Neurological Research Institute at Texas Children's Hospital. Wright State University's Neuroscience Engineering Collaboration Building in Dayton, Ohio. *Courtesy AIA Houston*



Knowing malice beyond the pale

Pete Simi's mother wanted him to understand racism, so when he was 9, they watched a PBS documentary on the Ku Klux Klan. Here's how he remembers one Klansman who was interviewed. "He spoke with such passion, anger, such strong emotion. And it just struck me, as a young child, trying to understand what was driving this person, how this person could get so enmeshed in hate."

That question stuck with Simi '96 throughout his undergraduate studies at Washington State University and later as a graduate student at University of Nevada, Las Vegas.

Simi, the author of *American Swastika: Inside the White Power Movement's Hidden Spaces of Hate*, now is widely considered one of the nation's leading experts on white supremacists. A sociology professor at Chapman University in Orange, California, he has spent more than 20 years studying extremist groups.

One vivid memory is from a white supremacist backyard party in Anaheim, California, that he was attending as part of his research. A man who appeared to be Native American passed by and unintentionally antagonized Shorty, who had been released from prison a week earlier and was on the



COURTESY PETE SIMI

verge of attack. Simi was able to persuade the man to move on. "I was about to witness a hate crime and not only would he be facing Shorty," Simi said of the dark-skinned man, "but maybe 50 people who would join in a 'boot party.'"

White supremacists have long been part of American culture. "These groups have a degree of persistence that most people are not aware of, but their persistence is very central to American history," Simi asserts. And yet, with Barack Obama and Donald Trump, they are making a resurgence, he says. A black man as president galvanized extreme racists. Then they were emboldened to come into the open by Trump, who led the birther movement against Obama and then made statements such as Mexicans are rapists, Simi says.

"For white supremacists, they're licking their chops, saying, 'Finally, our time has come. We know that the time is right. We've got to take advantage of this time,'" Simi says. White supremacists believe Trump is "making it OK to be overt about white identity, about white culture. And that's a real opening. He doesn't need to be a Klan member or overtly saying that he thinks white supremacists are great. But if he's willing to signal things by saying things like Southern culture being under attack, then that's enough."

Simi's research has found that people who become white supremacists typically experienced trauma in childhood—such as physical abuse or neglect, or parents who were

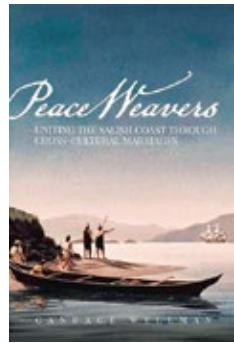
substance abusers and casual racists. By the time they meet white supremacists, Simi has observed, "their life is in a downward spiral, they're experiencing a lot of emotional anger, frustration, sadness, depression that hasn't been really dealt with. And the extremist group kind of represents a coping mechanism, of sorts. It gives them a direction, a way to channel violence, it rewards them for engaging in violence, and they get camaraderie and kinship in being a member of a group."

When white nationalists marched on August 12, 2017, in Charlottesville, Virginia, a car plowed into a group of counter protesters, killing one woman, and at least 34 people were injured in the clashes. Simi says that episode shows that while people should not ignore white supremacists, they might be better off holding separate diversity rallies rather than counter protesting—given that it can lead to more attention for the white supremacists and violence.

"That's quite the opposite of what we want to do, that back-and-forth violence," he says. "To these hate groups, violence is central to how they see the world. Responding to them in that way is giving them exactly what they want." ✱

Visit magazine.wsu.edu/extra/pete-simi for links to his lecture at USC on far-right extremism and his *New York Times* article (coauthored with Robert Futrell) on the white power music scene.

NEWmedia



Peace Weavers: Uniting the Salish Coast through Cross-Cultural Marriages

CANDACE WELLMAN '68
WSU PRESS: 2017

Clara Tennant Selhameten was born the daughter of Lummi tribal leader in what became Whatcom County, and eventually married John Tennant, the son of a famous Methodist minister around 1859. Tennant established the first permanent farm in the region, on Lummi land. In later years, she and John traveled as missionaries and built many churches. It was clear that the couple were true partners in both spiritual and business matters.

Selhameten's tale, along with those of three other Native women who married white settlers and military officers, give historian and sociologist Candace Wellman specific examples of cross-cultural marriages in early Whatcom County. Unlike the oft-told stories of white pioneer mothers and mail order brides, these narratives of intermarriage have been hidden from history.

Despite the lack of historical record, marriages between indigenous women and white men were extensive; Wellman discovered that about 90 percent of all marriages in the early years of Whatcom County were cross-cultural.

Caroline Davis Kavanaugh, for example, was a Samish-Swinomish woman who married Lt. Robert Hugh Davis, nephew of future Confederate president Jefferson Davis, in 1855. Davis became a deputy sheriff in Whatcom County after leaving the Army, and had a son with Caroline. He returned to Mississippi to fight in the Civil War, and

died shortly after serving as a prisoner of war. Caroline then married Irish immigrant James Kavanaugh, and continued to serve as a go-between for the Native tribes and growing white towns for many years.

Wellman also tells the story of Mary Fitzhugh Lear Phillips, a S'Klallam woman who married a territorial justice, then a founder of Wrangell, Alaska, and finally, a Welsh cooper. The fourth woman whose life story is detailed in the book is Nellie Carr Lane from the Sto:lo. She was married for decades to the son of a well-known Massachusetts seafaring family, and joined him in his entrepreneurial activities. He also fought in the court system for years for Nellie's rights.

The book sheds new light on the crucial role of these and other Coast Salish women who married settlers and military officers in the mid-1800s, and the legacies they left in the far northwest corner of Puget Sound. Even though their contributions weren't noted in "official" records, they built communities and bridged cultures. Their multiracial children, too, contributed to the region.

As Wellman writes, "They and others possessed the ability to adapt to their environment as well as bring their own values into marriage and new friendships with women of the invading culture... They maintained ties and integrated husbands and children into their own family complexes."

Wellman, a Bellingham resident and local history consultant, dug through primary sources, genealogy, and family memories over many years to piece together this compelling addition to Northwest history, and to tell the stories of these strong women who became cultural ambassadors and intermediaries between the Native people and the newly-settled white communities.

—Larry Clark

House of 8 Orchids

JAMES THAYER '71
THOMAS & MERCER: 2016

Master storyteller James Thayer turns in another winner with *House of 8 Orchids*. In Chungking in the early twentieth century, Chinese gangsters snatch the two sons of a

diplomat—John, five, and his brother William, two—from the care of their *amah*.

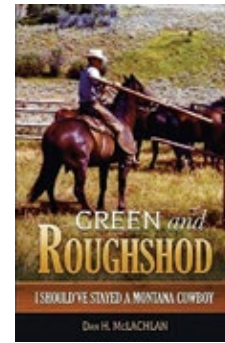
Fast forward to the 1930s. War with Japan is heating up. The boys, now men, have been raised in the eponymous House to serve its master, the eunuch Chang. John, bigger than his artistic brother, is a lightning-fast expert with his throwing knives. William's talents are employed forging documents and scrolls, which are sold to fund the eunuch's nefarious schemes.

John is intensely loyal to Chang until one day he has to decide between the eunuch and William. But simply leaving the employment of the House is not an option, so John must use his street smarts and fighting ability to try to rescue his brother and himself from the unforgiving eunuch.

Vividly rendered scenes follow hot on the heels of one another as Thayer runs his characters up and back the Yangtze River gorge, searching for William. Dark backstories emerge and we realize just how much trouble John is in and how slim his chances of success really are. As the adventure cascades towards its climax we meet a feisty lady doctor from Idaho, and our heroes are rescued by a huge and terrifying dog called Big Moon.

Thayer's lean prose makes for page-turning thrills, while knife-wielding John's noir wit leavens the action with salty humor. For readers who haven't yet discovered Thayer, this is a great place to start and his backlog of some dozen or so novels leaves plenty for those hungry for more. Thayer's novels collectively cover a lot of often-neglected history and geography, so no two are the same but all are crafted with loving attention to detail and a dangerous sense of fun.

—Brian Charles Clark



Green and Roughshod: I Should've Stayed a Montana Cowboy

DAN H. MCLACHLAN '66, '69 MA
AVENTINE PRESS: 2016

The dream of a little boy to become a cowboy came true for Dan McLachlan. He read a 1927 text, *All in the Day's Riding*, as an eighth-grader in Palo Alto, California, and became enamored with the vision of a wide blue sky viewed from horseback. After earning enough to buy two horses and tack, he eventually ended up in Montana for a three-month summer stint as a cowboy before going to Washington State University.

In 1960, McLachlan's dad and a family friend dropped him off near the Canadian border at Browning, with his horses Tex and Lady, a .22 single-shot rifle, and a pack of gear. He was ready for a cowboy adventure.

As he rode through Montana towns and countryside, he met a bronze sculptor, Blackfoot Indians, a banjo-playing rancher, and many other characters. Some were bemused by the Californian looking for a cowboy life, others saw a kindred spirit. McLachlan traveled over 1,700 miles that summer, and consistently found hospitality and kindness as he repaired roofs, mended fences, and tended livestock—including pigs.

McLachlan even ran into the WSU Geology Survey Camp and some Cougars in the mountains.

McLachlan sought an idealized cowboy world in his travels through the Montana of 1960. Did he find it? The Old West may have been mostly gone by that point, but he did discover some of the spirit of cowboying in

trail riders, rodeos, and ranches. His road led to Bud Beshear, an old-school cowboy and horseman who knew the work was extremely difficult, and not some romanticized fantasy from books and movies. He lived like a hermit in the mountains, and McLachlan had to ride far to reach him.

It was through Beshear that McLachlan learned how to rope horses, drive cattle, and do the work of a cowboy. They developed a friendship and camaraderie out on the open range. McLachlan did find a sense of the Old West and, as he writes at the end of the book, continues to revere the wide country he found in Montana the summer before he went to college.

—Larry Clark

BRIEFLY NOTED

Untold Stories: Forty Years of Field Research on Root Diseases of Wheat

By R. JAMES COOK
AMERICAN PHYTOPATHOLOGICAL SOCIETY PRESS: 2017

Throughout the compelling stories and personal experiences shared by Jim Cook, a retired research plant pathologist with the U.S. Department of Agriculture's Agricultural Research Service and emeritus professor of plant pathology at Washington State University, readers can find practical crop management techniques and other beneficial information that can be used in the field and the lab. Cook also chronicles many of his insightful experiences—and imparts his philosophy, wisdom, and practical guidance.

Living on the Edge: Adventures of a Hunter

By SHANNON L. KOLLMEYER '66
2017

Kollmeyer guides readers through a spectrum of hunts of over 50 species in four countries, 20 locations, different cultures, and every type of terrain and weather imaginable, with an eye to how hunting plays a role in conservation. A self-described "mild-mannered real estate and banking guy" from Chelan, he has stalked animals from caribou to Cape buffalo. Kollmeyer notes that hunters help fund government agencies that manage North America's rich wildlife

resources, which in turn leads to the ability to experience the danger and excitement of hunting.

Why the Undocumented Belong to America: The Experience of Rosa Robles Loreto and Eleven Million Others

By DENISE HOLLEY '00
2017

Journalist Denise Holley tells the story of Rosa Robles Loreto, who worked hard cleaning houses until a minor traffic incident led to her deportation. Holley's book explains how the United States has criminalized immigration, and how undocumented farmworkers employed in the orchards of Washington and the vineyards of California underpin our economy despite what Holley describes as arbitrary immigration policies.

We Are Aztlán! Chicanx Histories in the Northern Borderlands

Edited by JERRY GARCÍA '99 PHD
WSU PRESS: 2017

Ten essays reach beyond the lives of Chicanos and Chicanas in the well-studied southwestern United States to concentrate on cultural, historical, and gendered experiences of Chicano communities in Washington, Oregon, and Michigan during the twentieth and early twenty-first centuries. The research, both academic and nonacademic, covers art, history, immigration, gender, labor, literature, sociology, education, and religion among Chicanx in the north. García, formerly with Eastern Washington University, contributes an article on his own childhood experiences in the predominantly white communities of Quincy and Seattle during the '70s and '80s.

Carry Forth the Stories: An Ethnographer's Journey into Native Oral Tradition

By RODNEY FREY
WSU PRESS: 2017

As an ethnographer and anthropologist for over 40 years, Frey forged close relationships with Crow, Couer d'Alene, Nez Perce, and Warm Springs Native communities, interacting with elders and participating in tribal activities. He shares his personal stories, as well as those told by tribal members, to provide insight into the power and value of story, storytelling, and empathy.

CLASSnotes

Former Cougar football and NFL standout **STEVE GLEASON '00**, whose battle with ALS has become an international symbol of perseverance and determination, has been named the Regents' Distinguished Alumnus for 2017.

"Steve Gleason epitomizes the essence of 'Cougar Spirit,'" said Washington State University President Kirk Schulz at the August 10 ceremony. "His passion to persevere and succeed despite life's challenges has inspired thousands, not only in the United States, but around the world."

Gleason helped take WSU to the Rose Bowl in 1997 and in 2006 had a punt-blocking dive for the New Orleans Saints that rallied the hurricane-ravaged city's down-but-not-out spirit. Five years later, he was diagnosed with ALS at the age of 34. The terminal neuromuscular disease has since left him immobile and reliant on eye-controlled technology to communicate.

Gleason, however, continues to fight back.

He and his nonprofit foundation, Team Gleason, have raised millions for ALS research, persuaded the U.S. Congress to restore funding for speech-generating devices, and elevated global awareness of the debilitating disease through advocacy and educational efforts.

During the award presentation at Martin Stadium in Pullman, Gleason addressed the crowd through audio technology he controls with a series of eye movements. He credits former Coach Mike Price and others at WSU with reinforcing a commitment to helping others, which has guided his life. That commitment, he added, has



Steve Gleason received WSU's highest alumni honor in August, presented by his friend and teammate Grady Emmerson '99 and WSU President Kirk Schulz.

PHOTO RYAN DURKAN

kept him focused through numerous life challenges.

"Naturally, part of the reason for receiving this award is because of how I've handled ALS (and) part of how I've been able to handle ALS is because of my experience here at WSU," he said, thanking the Board of Regents for the honor. "Coach Price told the football team something that would stick with me forever: 'I'm interested in what you can do for people that cannot help you in return.' I think that is what being a Cougar is all about. That's our spirit and legacy as WSU alums."

His longtime friend and former WSU teammate Grady Emmerson '99 described Gleason as the kind of guy who has always

been focused on accomplishment, a trait known well to any of his teammates, but one that his battle with ALS has demonstrated to the world.

"We dream about it; Steve does it," Emmerson said. "I do truly believe that this man would be receiving this award whether or not he was diagnosed with ALS. He would have done something else to find his path to be on this stage."

Tributes to Gleason's courage and character have been growing. In 2012, the New Orleans Saints erected a statue alongside the New Orleans Superdome commemorating Gleason's diving punt block. A highly acclaimed documentary chronicling his ALS battle debuted at last year's Sundance Film Festival. And, *Washington State Magazine* featured the growth of his foundation and its advocacy efforts in "No White Flags" in the Spring 2016 issue. ✨

BY DAVID WASSON

50 DON TRUNKEY ('59 Zool.), a professor emeritus of surgery at the Oregon Health Science University, received the WSU Alumni Association's Alumni Achievement Award in recognition of his influential career and contributions to medical education, surgical methods, and trauma care. During his career, he has served in a multitude of leadership positions regarding surgery and trauma. A few of these include chief resident for the University of California hospitals, chief of surgery for the University of San Francisco, and professor and chairman of surgery at Oregon Health and Science University. His public service has included president of the American Association for the Surgery of Trauma, president of the American Surgical Association, and

president of the Society of University Surgeons. ✨ Washington Interscholastic Activities Association Hall of Fame inducted **DUKE WASHINGTON** ('59 Int. Des.) to its 2017 class. Duke was the first African-American athlete selected to an all-state team, in 1951 with Pasco. He was elected to WSU's hall of fame in 2008. Duke died on February 16, 2017, at age 84.

60 Yakima businessman **RICK PINNELL** ('68 Comm.) received this year's Ted Robertson Community Service Award from the Yakima Chamber of Commerce. In addition to several business ventures, Rick served as chair on several local boards, including the Yakima Rotary Club, YMCA of Yakima, the Yakima Rotary Trust, Heritage University,

and Yakima YMCA Trust. He has also served on boards for the Yakima Valley Bank, Red Cross, Providence Hospital, and various business associations.

80 DOUGLAS BURNETT ('81 HBM), the resident manager of The Coeur d'Alene Resort, was reappointed to the private-sector advisory Idaho Travel Council by Gov. Butch Otter. He started serving on the council in 2014 and his new term will expire in 2020. ✨ **AMY FREEMAN** ('82 Const. Mgmt.), assistant dean of engineering outreach and inclusion at Penn State University, has been elected president of the Women in Engineering ProActive Network. The nonprofit educational organization founded in 1990 aims to be a catalyst for

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CLASSnotes

What started as a summer teaching job for **ANDREW STEPHENSON** evolved into plans to build a kindergarten for underprivileged children in Saint-Louis, Senegal.

Stephenson, a senior studying civil engineering at Washington State University, says he fell in love with the area and its people after he taught English there in 2011 through a British volunteering organization called Projects Abroad.

"I've never seen people so excited to learn," Stephenson says.

The kindergarten project, Foundations for Senegal, began when Stephenson reached out to Fina Senghor, a native of Senegal and a Projects Abroad deputy director, in 2016 to see how he could help Saint-Louis.

Senghor founded the Association for the Protection of Early Childhood (ASPE) and originally opened a kindergarten in 2011 that offered free education for children of poverty-stricken families, but a lack of funding forced the facility to close after only two years.

Because of high birth rates in Senegal, many families cannot afford to take care of all their children, often leaving them to fend for themselves, Senghor says. This can lead to accidents and abuse due to lack of supervision.



FROM YOUTUBE (COURTESY ANDREW STEPHENSON)

"There's lots of bad things happening to kids, and that's why we opened that kindergarten," Senghor says.

Since the original kindergarten was closed, Senghor hoped she could find a way to reopen it. She recommended Stephenson build a kindergarten on a 300-square-meter property purchased by ASPE.

Stephenson embraced the project, developing a sustainable design with the help of four other engineering seniors. He flew to Saint-Louis during WSU's spring break in March to test soil samples from the property so he could better design the building's foundation.

"I got to interact with the people who are going to use the school, and it felt so much more real," Stephenson says.

Stephenson has already turned down job offers because of his responsibilities to the project.

"Most jobs want a three- to four-year commitment," he says. "If I took them, I could make the money I need to finish the project, but I wouldn't be able to go and do it."

Stephenson says he hopes to begin building the kindergarten in the spring of 2018 if they get funding. ✱

BY ALYSEN BOSTON '17

change to enhance the success of women in the engineering professions. Prior to joining Penn State in 2000 as director of the Multicultural Engineering Program, Freeman served as director of human and cultural diversity at Lock Haven University. Amy received two National Society of Black Engineers Golden Torch awards in 2010, for lifetime achievement in academia and as minority engineering program director of the year. ✱ **THERESA LIBBY** ('83 Elem. Ed.) retired as the K-8 principal for the Wahkiakum School District after 15 years there. She also worked 17 years in the Kalama School District. ✱ The Airport Consultants Council (ACC) selected **KAREN MILES** ('84 Civ. Eng.), civil engineering project manager in the Federal Aviation Administration Seattle Airport District Office, for the 2017 ACC Agency Best Practices Award in recognition of her outstanding leadership role in the Pullman-Moscow Regional Airport runway realignment design and construction project. Karen joined the FAA in 1998 and has enjoyed working with airports across the state of Washington.

✱ **ERIC ELDER** ('85 Ag. Econ.), professor of business and economics at Northwestern College in Orange City, Iowa, is retiring after 32 years. An accountant, Elder says he felt a sense of calling to become an economics professor at a Christian college. ✱ **DICK SPINK** ('85 Ed.), a Mount Vernon teacher and boatbuilder, appeared in the History Channel's documentary, "Amelia Earhart: The Lost Evidence" in July. On the show, Spink explained airplane parts he and companions found in the Marshall Islands that could be from Earhart's 1937 crash. He's been assisted in the search by **JOHN BOLIS GONZALES** ('93 Poli. Sci.), chief of staff for the Northern Marianas Islands lieutenant governor. ✱ CBRE has appointed **JULIE PURNELL** ('86 HBM) as managing director of CBRE Hotels. She brings more than 25 years experience in the hotel industry. Based in San Francisco, Purnell will bolster the firm's advisory practice in the northwest and mountain regions. ✱ **JOHN STEACH** ('86 Chem. Eng., '05 MBA, '11 EdD) is now the superintendent for Evergreen Public Schools in Vancouver. Evergreen is the sixth

largest district in Washington and serves over 26,000 students. ✱ Boeing appointed **JENETTE RAMOS** ('88 Phys. Sci.), a 29-year Boeing veteran with executive leadership roles in fabrication, supplier management, and environmental health and safety, as senior vice president for supply chain and operations. She has held numerous roles at Boeing, most recently as leader of fabrication overseeing more than 17,000 employees on manufacturing commercial airplanes. ✱ Yakima Valley College appointed **MARCIA SOMER** ('88 MA Hum. Dev.) as dean of their Grandview campus. In her over 25 years in higher education, she was associate dean of Lake Washington Institute of Technology in Kirkland, a dean of English and social sciences at Diablo Valley College in Pleasant Hill, California, and worked at several other community and technical colleges.

✱ **KELAN KOENIG** ('90 Phil.), medical director of Overlake Medical Center's Psychiatric Services since 2001, is the new chief of staff elect for the Eastside Health Alliance and Network in Bellevue, a joint venture and

clinically integrated network of Overlake Medical Center and EvergreenHealth.

✱ **MARK JOHNSON** ('91 Ag. Eng.) has been named project manager for Bechtel's Sabine Pass Liquid National Gas project in Louisiana. Johnson has worked at Bechtel since 1998 and held positions of increasing responsibility including project engineer at the Yucca Mountain project in Nevada and others. He was elected a principal vice president of Bechtel National Inc. in 2015. ✱ **JOY FISHER** ('92 MBA) was promoted to the position of executive director of the University of Idaho Foundation in May. She has worked at UI for 35 years, most recently serving as the director of finance for the foundation. ✱ Architects **JIM FRIESZ** ('93 Arch.) and Kristen Becker, and artist Saul Becker announced the formation of Seattle-based Mutuus Studio. The firm is focused on an interdisciplinary design approach, merging architecture and interior design, as well as artist collaboration projects and material exploration. Among the firm's current projects are a residence in Southern California, a large-scale art installation at the Snug Harbor Music Hall in Staten Island, New York, and cabin retreats in Big Sky, Montana and Cle Elum, Washington. Friesz spent 23 years with architecture firm Olson Kundig.

PCS Structural Solutions in Tacoma and Seattle promoted **LUKE HEATH** ('00, '01 MS Civ. Eng.) to principal. He has been with the company for 15 years and worked on the WSU Elson S. Floyd Cultural Center, Centralia High School, and Madison Elementary School in Mount Vernon. PCS also promoted **KYLE MURDOCK** ('06 Civ. Eng.) from project manager to associate. He first joined the company in 2006 and returned in 2014. ✱ Riverview Bancorp in Vancouver, Washington, announced that **KEVIN J. LYCKLAMA** ('00 Fin.) has been promoted to executive vice president and chief operating officer, responsible for the daily operations and management of the bank. He has been executive vice president and chief financial officer since February 2008. Previously, he served as vice president and controller of the bank. ✱ Priest River, Idaho, Police Chief **ANDREW MCLAIN**

('01 Crim. Jus.) received the POST Executive Certificate, the highest certificate awarded to peace officers in Idaho, in June. He has served as chief there since 2014. ✱ The International Nurses Association welcomed **SHELLY L. LAFRANCE** ('01, '05 MN Nursing) to their organization with her upcoming publication in the *Worldwide Leaders in Healthcare*. LaFrance is a family nurse practitioner currently serving patients within the Moonstone Medical Group in Vancouver, Washington. She specializes in functional medicine, bio-identical hormone replacement therapy, and hyperbaric oxygen therapy, and also provides a range of aesthetic medicine services. ✱ **LICIA LEGRANT** ('01 Arch.), AIA, NCARB, has joined BernardoWills Architects in Spokane. LeGrant is currently working on the Catalyst Project in Spokane's southern University District, Kattera Inc.'s CLT manufacturing facility in Spokane Valley, and Refrigeration Supplies Distributor's branch store in Vancouver. LeGrant has 16 years of

architectural experience. ✱ Ridgefield High School in southwest Washington has a new principal: **CHRISTEN PALMER** ('01 For. Lang. and Lit., Ed., '08 MEd). Palmer has taught in the Vancouver area since 2001, and was previously associate principal at Heritage High School. ✱ **JAYMEE SIRE** ('02 Comm.) is headed for Food Network, where she will serve as floor reporter on *Iron Chef Showdown*. Sire writes the food-related blog "e is for eat." She previously worked as an anchor for *SportsCenter* on ESPN. ✱ **JAMES FORD** ('03 Elec. Eng.) has joined Meier Architecture + Engineering in Kennewick. He brings more than 13 years of experience as an electrical engineer to the firm. ✱ **RUTH MOLLET** ('03 Nursing) has joined the gastroenterology department at St. Peter's Medical Group North in Helena, Montana. The board-certified family nurse practitioner previously was a same day nurse at St. Peter's Hospital. ✱ The WSU College of Pharmacy selected **NICK BRUCK** ('04 DPH), pharmacist and district pharmacy



On October 20, the WSU College of Pharmacy presented its first **Lifetime Achievement Award** to R. Keith Campbell (center), who served many roles at the college in his 45 year career at WSU. Campbell was selected for this honor because of his unwavering commitment to WSU student pharmacists, his lifetime of service to the college, and his extraordinary contributions to the pharmacy profession.

To read more about R. Keith Campbell, make a gift in his honor, or learn more about the WSU College of Pharmacy, please visit www.pharmacy.wsu.edu.

CLASSnotes

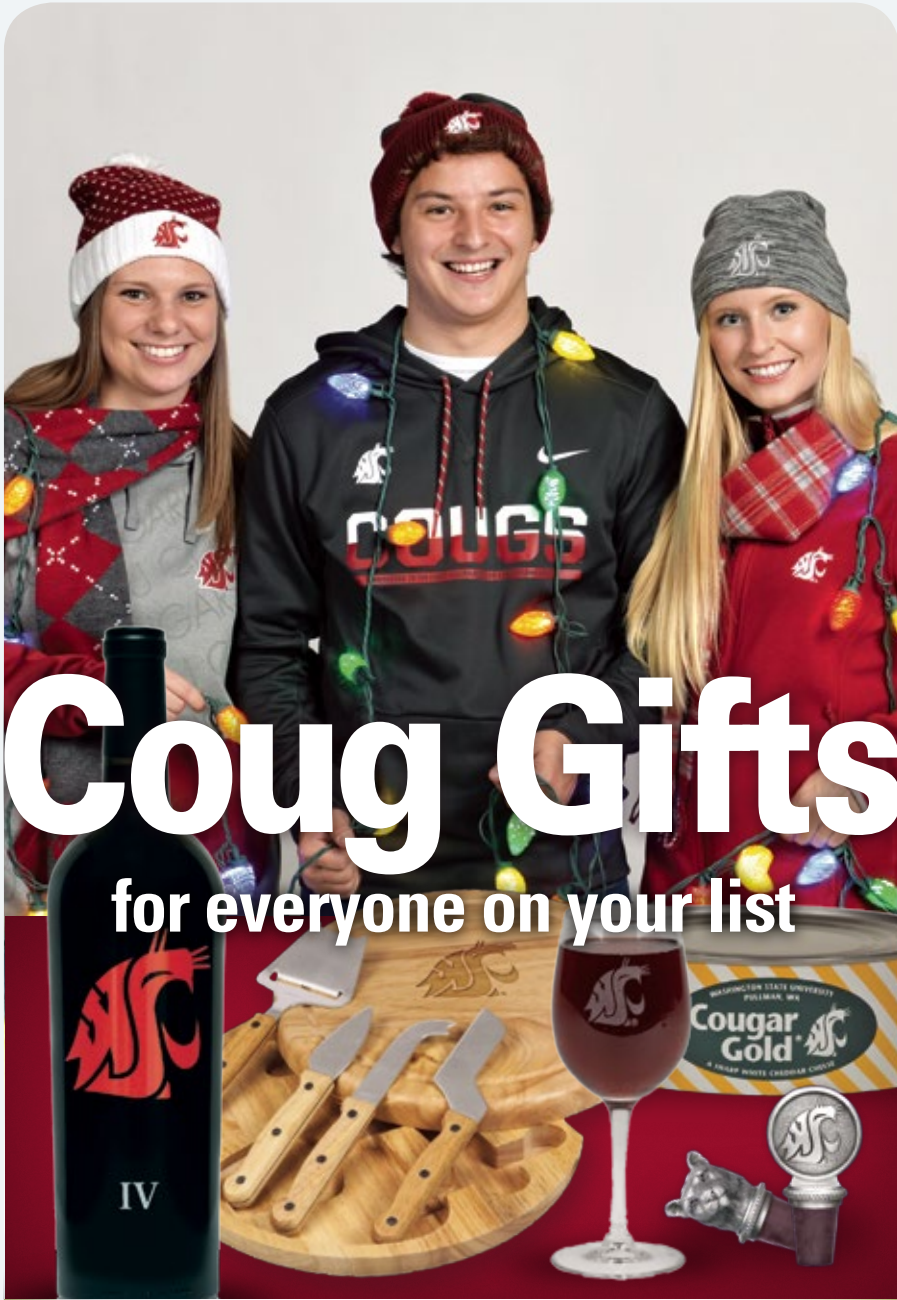
manager for Walgreens, as its 2016 Outstanding Alumnus of the Year. He is the youngest alum to receive this honor since the college began the award in 1991. In the past year, Spokane experienced an unanticipated mumps outbreak that affected more than 250 residents in the region. Bruck donated his time and skills to help students organize clinical teams that would provide MMR vaccinations at schools, community centers, and other locations. Earlier this spring, Bruck was honored with the Inland Northwest Service-Learning Partnership Impact Award for his contributions to the response surrounding the mumps outbreak. ✨ **HAROLD HECK** ('04 MIS) has joined the University of Idaho College of Law as the director of academic success in Boise. He moved from Charlotte, North Carolina's Charlotte School of Law where he served as an academic success lecturer. In private law practice before teaching, Harold focused on personal injury, bankruptcy, Social Security, and veteran

benefits. ✨ Oakland immigration attorney **OTIS LANDERHOLM** ('04 Phil., Spanish) has been recognized by The State Bar of California as a certified specialist in immigration law. Landerholm has been named a Super Lawyers' Northern California Rising Star from 2012 to 2017, an honor bestowed on only two and a half percent of attorneys in California. ✨ **BENJAMIN RIGGS** ('04 Phil.) was named executive chef at Salish Lodge & Spa in Snoqualmie. He has 18 years of culinary experience and has been with Salish since 2015. ✨ Winemaker **SHANE COLLINS** ('05 Comm.) left Tsillan Cellars after ten years to join Rocky Pond Winery. The Lake Chelan native will take on a number of viticultural and winemaking duties for the young Rocky Pond operation. ✨ Chief Umtuch Middle School teacher **BETH DOUGHTY** ('05 MIT) won the honor of history teacher of the year for Washington state. The Gilder Lehrman Institute of American History, a national organization devoted to K-12 American history

education, chose the Battle Ground teacher, who received \$1,000 and eligibility to be the national history teacher of the year. ✨ **PAUL LUNKES** ('05 MBA) became a national technical leader with the Siegfried Group, a leadership advisory company for financial executives. Lunkes joined Siegfried in 2015 and has served as director of its Houston office. In his free time, Lunkes likes sport fishing, motorcycling, and traveling. ✨ **BRANDY STERN** ('05 Busi.) was promoted to manager of the Spokane Teachers Credit Union U-District branch after three years with STCU. She previously was assistant manager at the STCU Cheney branch. ✨ Trout Unlimited has hired local ecologist **KERI YORK** ('05 MS Env. Sci.) as project manager for the Big Wood River area in Idaho. She has worked in several conservation initiatives in central Idaho. ✨ **ANDREA LOGAN** ('06 Arch.) has joined Steele Associates Architects in Bend, Oregon. She has over 15 years of experience working on mixed-use, multifamily residential, single-family residential, and commercial projects. ✨ **TREVER SUMMERS** ('06 History) is the new principal of Haller Middle School in Arlington. He previously worked in Moses Lake and Wenatchee. ✨ **KILEY SMITH** ('07 Gen. St.) joined state and local advocacy firm Stateside Associates as a senior political consultant. In her new role, Kiley will plan and support state advocacy efforts on behalf of Stateside's clients. She most recently worked as executive director of the Republican Legislative Campaign Committee. Kiley has also held professional positions with the Republican National Committee, the U.S. Chamber of Commerce, the Republican Governors Association, and on Dino Rossi's 2008 campaign for governor. ✨ Cougar Crew brought on former standout Cougar rower **PETER BREVICK** (x'08) as head coach. Cougar Crew, now approaching its fiftieth anniversary, includes both the men's and women's varsity sport rowing clubs. Brevick replaces Arthur Ericsson, who had been the Cougar Crew coach since fall 2004. ✨ Highlands Veterinary Hospital welcomed **ANNA ODASH** ('08 Nurs., '12 Ani. Sci., '17 DVM) to its Butte, Montana, practice.

Anna was a registered nurse for five years before going to veterinary school. Her interests include surgery and rehabilitation at work, and likes flyfishing, cooking, and hiking with her black lab in her spare time. ✨ Aerospace Industries Association hired former Boeing Commercial Airplanes executive **DAVID SILVER** ('08 ETM) as its vice president of civil aviation. Silver brings almost two decades of experience from Boeing, as director of engineering and regulatory affairs, and deputy fleet chief for the 787 program. He served 22 years in the Washington Army National Guard. ✨ The University of Hawai'i men's basketball program brought on **MARLON STEWART** ('08 Sport Mgmt.) as an assistant coach. Stewart has been working in collegiate basketball for more than a decade, including the last three seasons at the University of Montana. During his stints at Montana, Virginia, Cal, and WSU, the teams reached the postseason 10 straight times, including six NCAA tournaments, three conference championships, and two Sweet 16 appearances. ✨ **GARET STUDER** ('08 Sport Mgmt., '12 MED) joined Everett Community College as athletic director. He has spent the past two years working as the director of operations for the Northwest Athletic Conference. ✨ **ARON BAYNES** ('09 Kinesio.) was signed to the Boston Celtics of the NBA. The former WSU star center won an NBA title with the San Antonio Spurs in 2014.

10 William S. Hart Union High School District in Santa Clarita, California, hired **RALPH PESCHEK** ('12 Hum.) as chief financial officer. He has worked with and for school districts since 2001, and before that was general manager for Sodexo School Services in Maryland for almost 11 years. ✨ **LARYSSA SCHMIDT** ('12 Soc. Sci.), a teacher at Charles Wright Academy in Tacoma, received a James Madison Fellowship, which supports further study of American and U.S. Constitutional history for teachers in secondary schools. Schmidt, a Gig Harbor resident and one of 53 recipients in the United States, will get funding to pursue a master's degree. ✨ The



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Thurston County Economic Development Council hired **KARISSA BENJAMIN** ('15 Sport Mgmt.) as its new marketing and events manager. Karissa previously worked as an athletics department assistant at Tacoma Community College, and as events coordinator for the Lacey South Sound Chamber of Commerce. ✨ Euroleague basketball team Anadolu Efes Istanbul signed former Cougar standout forward **BROCK MOTUM** ('15 Psych.) in June. Brock has spent the past two seasons with Lithuanian champion team Zalgiris Kaunas. ✨ University of Kentucky entomology student **EMILY NADEAU** ('15 Biol.) had a type of parasitoid wasp named for her, after winning Kentucky professor Michael Sharkey's insect trivia contest. The wasp, *Scabagathis emilynadeauae*, is officially registered by the International Commission on Zoological Nomenclature. Emily received her master's at the University of Kentucky in August and has begun pursuing her doctorate. She is also joining a research team to Antarctica to study extreme environments. ✨ Eco Building Products, Inc., a subsidiary of Wood Protection Technologies in San Diego, hired **JINXUE JIANG** ('16 PhD Mat. Sci.) as director of chemistry and technology. He will lead the company's research and new product development, and has extensive experience in wood physics and chemistry as well as polymer science. ✨ **CHARLEE LINTON** ('16 Psych.), a record-setting Cougar distance runner in 2015-16, has joined the Washington State University track and field and cross country coaching staff as an assistant coach for the women's distance runners. ✨ **ROBERT "WILL" MELLISH** ('17 Elec. Eng.) has been commissioned as a second lieutenant in the U.S. Air Force, after serving as a member of Air Force ROTC Detachment 905 at WSU. He was assigned to the Persistent Infrared Squadron at Wright-Patterson Air Force Base in June. ✨ Korsmo Construction added **JOE SHOEMAKER** ('17 Civ. Eng.) as a project engineer to their Tacoma-based contracting company. He will manage submittals, communicate with subcontractors, and assist project managers. Joe is currently working on a project for Telecare Mental Health Services.

KATHLEEN IRWIN (x'36 Lib. Arts), 102, May 25, 2017, Spokane. **BETTY S. MOTTET** ('38 Busi.), 100, May 14, 2017, Santa Rosa, California. **JEAN C. AUSTIN** ('39 Gen. St., Kappa Kappa Gamma), 100, July 2, 2017, Seattle. **WILLIAM RAY MCGEE** ('39 Vet. Sci., '40 DVM), 100, August 4, 2017, Naples, Florida.

FRANCES C. UHLEN ('40 Music), 98, May 30, 2017, Spokane. **MARY-LOU DAY** ('42 Home Econ., Delta Delta Delta), 96, June 17, 2017, Fort Collins, Colorado. **RALPH BERG** ('43 Zool.), 96, June 2, 2017, Spokane. **JOHN J. MAJNARICH** ('45 Phys. Sci.), 95, June 19, 2017, Preston. **DONALD DALE MORRISON** ('47 Agro.), 95, June 7, 2017, Winter Park, Florida. **GENEVIEVE L. DEVLEMING** ('48 For. Lang. and Lit.), 91, August 22, 2017, Pullman. **ROBERT S. EVETTS** ('48 Gen. St.), 91, July 13, 2017, Seattle. **VIRGINIA RUTH NEWELL** ('48 Home Econ.), 91, June 15, 2017, Spokane. **ELIZABETH J. BUNTING** ('49 MS Psych.), 93, August 3, 2017, Glen Mills, Pennsylvania. **JAMES H. ROBERTSON** ('49 Elem. Ed., '50 MA Ed., Lambda Chi Alpha), 92, June 26, 2017, University Place. **WESLEY M. SLAUGHTER** ('49 Forest & Range Mgmt.), 93, March 15, 2017, Walla Walla. **SHIRLEY RUTH SPEARE** ('49 Gen. St.), 89, June 9, 2017, Billings, Montana.

BETTY L. CLARK-NILAN ('50 Ed.), 89, July 9, 2017, Pullman. **DALE GORDON CRAWFORD** ('50 Math.), 91, June 19, 2017, Eugene, Oregon. **HAROLD B. LINDBERG** ('50 English), 92, July 6, 2017, Richland. **BARBARA J. PRINCE** ('50 Nursing), 89, May 25, 2017, Olympia. **CHARLEYNE C. ROBERTS** ('50 Home Econ., Ed.), 92, September 8, 2016, Wenatchee. **JOHN JOSEPH COAD** ('51 Hotel and Rest. Admin.), 88, July 21, 2017, Houston, Texas. **RICHARD GEORGE GOSS** ('51 Bacterio.), 91, July 17, 2017, Alderwood. **HAROLD T. HENRIKSON** ('51 Busi.), 89, January 12, 2016, Coon Rapids, Minnesota. **JOHN WINSTON NASHEM** (x'51 Lib. Arts, Beta Theta Pi), 85, August 8, 2017, Seattle. **HAROLD M. STILSON** ('51 English),

91, May 15, 2017, Olympia. **ROBERT E. WESTBROOK** ('51 Police Sci.), 88, August 9, 2017, Seattle. **RICHARD M. OLTMAN** ('52 Gen. St., Theta Chi), 89, July 28, 2017, Olympia. **DONALD COX** ('54 Civ. Eng.), 86, August 4, 2017, Vancouver. **DONALD D. ERNST** ('54 Civ. Eng.), 85, July 25, 2017, Olympia. **CHARLES E. TRAINER** ('54 Wildlife Bio.), 86, July 21, 2017, Corvallis, Oregon. **JANET KAY ANDREWS** (x'55 Lib. Arts), 82, May 8, 2017, Portland, Oregon. **JAMES BRUCE RANKIN** ('55 DVM), 87, January 28, 2017, Salem, Oregon. **DONALD "BRUCE" BUTLER** ('56 Busi.), 81, November 16, 2015, Beaverton, Oregon. **DOUGLAS ROSS CURRIN** ('56 Math., Pre-med.), 83, June 1, 2017, Seattle. **WILLIAM W. DOBLER** ('57 Acc.), 82, June 8, 2017, Tulalip. **BRYAN DOUGLAS HARRIS** ('57 Ani. Sci.), 85, May 18, 2017, Spokane. **DONALD DAVIS SMITH** ('57 Mech. Eng.), 82, July 17, 2017, Auburn, California. **JAMES S. BEITINGER** ('58 Busi.), 83, August 31, 2016, Maricopa, Arizona. **DONALD L. CRIMMINS** ('58 DVM), 89, March 1, 2017, Portland, Oregon. **RICHARD LEE GORDON** ('58, '66 PhD Physics), 81, August 16, 2017, Richland. **ROBERT JOHN PEARSON** ('58 Psych.), 85, June 16, 2017, Vancouver.

WILLIAM HERBERT GILLIS ('60 Math.), 78, July 25, 2017, Seattle. **HAROLD LLOYD PAZER** ('60 Busi.), 80, July 16, 2017, Albany, New York. **GARY DUSKIN** ('61 DVM), 80, August 2, 2017, Stanwood. **MARIANNE IDE** ('62 Speech & Hearing Sci.), 76, June 10, 2017, Bremerton. **MERLYN DEAN KRAFT** ('62 Mktg.), 77, June 7, 2017, Wickenburg, Arizona. **CAROLYN A. TOMICH** ('62 Elem. Ed.), 77, June 27, 2017, Burien. **DENNIS M. MCLAUGHLIN** ('63 Poli. Sci., Beta Theta Pi), 76, June 20, 2017, Spokane. **DIANE MARIE PEDERSEN** ('64 Socio.), 76, August 8, 2017, Tacoma. **RICHARD AREND DAWSON** ('65 Mktg., Delta Chi), 73, May 16, 2017, Kona, Hawai'i. **MICHAEL R. SZYMCZAK** ('65 Wildlife Biol.), 74, October 30, 2016, Casper, Wyoming. **CLETUS B. ANDERSON** ('67 MAT), 87, July 29, 2017, Lebanon,

Washington State baseball and basketball standout **GENE CONLEY X'50**, the only professional athlete to win both a World Series and NBA championship, died July 4, 2017. He was 86.

Conley was a pitcher with the Milwaukee Braves when the team won the World Series in 1957 and he helped the Boston Celtics to three NBA titles from 1959 to 1961. He played against sports legends such as Hank Aaron, Mickey Mantle, Jackie Robinson, and Wilt Chamberlain during an 18-year dual-sport career that also included four All-Star appearances.

At Washington State, where he anchored both the baseball and basketball teams for two seasons before going pro, he led the Cougars to Pacific Coast Conference baseball and basketball championships in 1950, including the school's first appearance in the College World Series title matchup.

Raised in Richland, Conley was among the most highly recruited high school athletes of 1948-49. Sports historian Richard B. Fry notes that three programs, including Washington State, were hit with recruiting violation fines in connection with their attempts to land him.



PHOTO BOSTON GLOBE

Longtime basketball Coach Jack Friel faced heavy criticism at the time but unapologetically called Conley worth every dime, Fry wrote in his 1989 book *The Crimson & the Gray: 100 Years with the WSU Cougars*. Besides, the coach argued, the fine levied against WSC was the smallest of the three, with University of Washington being hit with \$5,500 and the University of Idaho with \$4,010 compared to Washington State's \$3,720.

Conley signed his first pro contracts in 1950. During his Major League career he played with the Boston (and later Milwaukee) Braves, the Philadelphia Phillies, and the Boston Red Sox. In the NBA, he played with the Boston Celtics and the New York Knicks.

After retiring from professional sports, Conley founded a paper company in Foxboro, Massachusetts, which he operated for 36 years. He is survived by his wife, Kathryn, their three children, seven grandchildren, and a great-granddaughter. ✨

BY DAVID WASSON

Ohio. **RONALD ROY KING** ('67 Comm.), 72, June 2, 2017, Yakima. **RICHARD F. ROACH** ('67 Hotel and Rest. Admin.), 75, March 21, 2017, Redmond. **MIR KURSHEED ALI** ('68 PhD Math.), 90, May 12, 2015, Fresno, California. **NORMAN "NORM" ALBERT OLSEN** ('68 Comm.), 76, June 18, 2017, Longview. **DAVID B. GABRIELSEN** ('69 Forestry), 70, August 9, 2017, Beavercreek, Oregon. **PAUL F. HOLSTINE** ('69 Econ.), 69, June 30, 2017, Seattle. **TERRY LEE LINDEN** ('69, '71 MS Ag.), 70, May 6, 2017, Goldendale. **ALAN LEWIS ROECKS** ('69 Math., '70 Psych.), 70, July 6, 2017, Spokane.

CHERYL J. MARSHALL ('72 Int. Des.), 66, September 16, 2016, Tacoma. **THOMAS BLAKE WILLIAMS** ('72 MA Poli. Sci.), 69, June 28, 2017, Potomac, Maryland. **JACQUELINE J. DONOVAN**

('73 Elem. Ed.), 66, July 3, 2017, Samish Island. **GEORGE ARTHUR KNUDSEN** ('74 MA History), 69, June 10, 2017, Mountainside, New Jersey. **THOMAS D. NAGLE** ('74 Poli. Sci.), 64, October 22, 2016, Yakima. **JANINE ADELE PRINDLE** ('74 Ed.), 64, July 3, 2017, Spokane. **CONSTANCE R. ANDERSON** ('75 Ed.), 63, May 16, 2017, Steilacoom. **RICHARD E. ANDERSON** ('77 Hort.), 65, December 15, 2016, Parkdale, Oregon. **MICHAEL D. STRICKLAND** ('77 Pharm.), 62, March 1, 2017, Portland, Oregon. **STEVEN RAY TOMLINSON** ('78 Pharm.), 62, June 30, 2017, Camas. **SHELDON JAY MILLER** ('79 History), 61, June 9, 2017, Bellingham.

LORNE DOUGLAS MACGREGOR ('84 MS Env. Eng., '88 PhD Civ. Eng.), 60, July 22, 2017, Vermilion, Alberta.

DAVID EDWARD MADLE ('84 Chem. Eng., '91 MS Elec. Eng.), 54, July 23, 2017, Stanwood. **JAMES E. WRIGHT** ('84 Hum.), 56, May 30, 2017, Spokane. **KELLY JOSEPH SANFORD** ('86 Mat. Sci.), 54, May 25, 2017, Boise, Idaho. **DENISE LENORE DENGEL** ('88 Crim. Jus.), 52, July 15, 2017, Tacoma. **CRAIG A. CARO** ('89 Arch.), 52, August 5, 2017, Priest Lake, Idaho. **GREGORY PAUL BOIVIN** ('89 DVM), 55, August 11, 2017, Springboro, Ohio. **MARY ELLEN MARTA PASTOR** ('89 MA English), 58, September 8, 2016, Moscow, Idaho.

GARY A. DOWNING ('90 Mktg.), 49, August 21, 2017, Tacoma. **GREG ALLEN BREWER** ('91 Busi.), 53, February 12, 2017, West Valley City, Utah. **JENNIFER ANN LAMANCE** ('91 Elem. Ed.), 48, June 8, 2017, Tyler, Texas. **SUSAN L.**



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MUNK ('91 Comm.), 48, March 14, 2017, Portland, Oregon. **JEANNE N. RATLIFF** ('94 MA Comm.), 72, February 3, 2017, Spokane. **ADAM WAYNE ZEIGLER** ('97 Chem. Eng.), 44, August 6, 2017, Kennewick. **DAVID MARC NEAR** ('99 Biochem.), 43, July 11, 2017, Alaska. **SAMANTHA ANNE RAMSAY** ('99 Nutrition), 41, July 30, 2017, Switzerland.

EDWARD D. HARNESS ('00 DVM), 44, July 27, 2017, Jerome, Idaho. **ANNE E. RAFTIS WHITE** ('00 DVM), 52, May 2, 2017, Orange, California. **CURTIS NELSON TONG** ('07 Elem. Ed.), 51, November 26, 2013, Vancouver.

SHARON LYNN LINDEN ('10 Busi.), 59, April 27, 2014, Seattle. **KEITH BORJA BRUB** ('15 Acc.), 43, May 7, 2017, Barrigada, Guam.

FACULTY AND STAFF

JONNY ALLEN, 57, Information Security Services, 1980-2016, April 17, 2017, Pullman.

JOHN S. "JACK" BENSCOTER, 89, Physical Plant, 1968-1987, July 1, 2017, Pullman.

HARLEY DODSON, 90, Physical Plant, 1971-1992, July 4, 2017, Palouse.

JOHN A. LARSEN, 93, Physical Plant, 1954-1986, July 3, 2017, Troy, Idaho.

KARIN MAERTENS, 75, Biological Chemistry, 1969-1983, May 19, 2017, Clarkston.

EVERETT "JAKE" MURRAY, 95, WSU Prosser, 1958-1983, September 4, 2017, Prosser.

FRANK PIRNIQUE, 79, Economic Sciences, 1967-2003, June 29, 2017, Pullman.

MARCIA WANNAMAKER, 65, Clark County Extension, 2014-2017, August 8, 2017, Brush Prairie.



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Alumni Association News

The #1 license plate

Driving around the state of Washington, Cougar license plates are impossible to miss. In fact, they are the number one specialty license plate on the road, dwarfing all others. What many do not know is that these crimson plates mean a lot more than just Cougar Pride; with \$28 of each plate supporting WSU student scholarships, this program raised over \$600,000 last year.

Since the WSU Alumni Association assumed responsibility for managing the license plate program and launching its cool crimson plate design, the program has exploded. Today, the Cougar plate is proudly displayed on nearly 23,000 vehicles (and counting!). The growth of this program means that an ever-growing number of WSU students receive scholarship support, helping them to complete their education.

In order to obtain a Cougar license plate, you must be a Washington state vehicle owner. Cougs can choose to accept the standard alpha numeric crimson plate or opt to add some creative flair to their crimson plate with a custom message. RV and motorcycle license plates are also available under the same program.

For all of you who proudly sport Cougar plates on your vehicles, thank you! If you don't have a plate, please sign up. Send the WSUAA photos of you and your plate and become famous on the association's Facebook page at facebook.com/WSUAA.

You can learn more about the WSUAA's license plate program at alumni.wsu.edu/license.



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HOW ARE TWINS MADE?

—Brody, 8, Kauai, Hawaii

ILLUSTRATION ROB MCCLURKAN

Dear Brody,

By the time you finish reading this sentence, about twenty babies will have been born into our world. Sometimes they're twins.

When I got your question, I figured what better place to go than the Washington State Twin Registry based in Washington State University's Elson S. Floyd College of Medicine. Ally Avery, a researcher who studies twins, was happy to help with the answer.

You may remember that cells are the building blocks of life, Avery says. We are made up of billions of cells. Each one carries DNA, the miniaturized master plan that, among other things, influences how tall we are or what color our hair will be.

"People also have cells for making babies," Avery says. "Males carry sperm cells. Females carry egg cells."

When these two kinds of cells come together, the sperm cell fertilizes the egg, which begins growing and dividing.

"Nine months later, a baby is born," says Avery.

As you've noted, sometimes two babies are born. Twins start their journey like most babies do. Then something pretty rare happens.

Sometimes a single egg cell will divide into two. When I asked Avery why it happens, she said the research hasn't yet shown us exactly why. It's still one of the mysteries of science.

We do know that when an egg cell divides into two, identical twins are born. They have very similar DNA and may look alike, but they aren't exactly the same. They may have very different personalities. They even have different fingerprints.

Humans aren't the only ones that can be identical. One animal that scientists study to learn about multiple births is the nine-banded armadillo. They are very curious about this critter because it very often gives birth to not just two, but four identical babies.

Of course, not all twins are identical. Some are fraternal. Fraternal twins happen when two totally different eggs are fertilized.

The number of fraternal twins born differs around the world, while the number of identical twins is the same. Again, we aren't entirely sure why. Registries of twins can help us learn more about twins around the world, though. We know that Benin, a country in central Africa, is home to the most twins on the planet.

Meanwhile, in the Washington State Twin Registry, there are more than 18,000 twins who have agreed to be studied. That's more than 9,000 pairs of adult twins.

One thing Avery and WSU researchers study is discordance. That means one twin has a health condition and the other does not. They can look at twins living in different environments, how they travel, and how it affects their health. One study has helped them find evidence supporting the idea that living in a place with access to outside activities is really good for health.

Together twins are helping researchers answer big questions that can help improve health for all of us—whether you came into the world solo or with a buddy.

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(and their twin kids)



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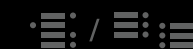
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