

Spring18
vol17no2

Washington State

MAGAZINE



22
Communities for
the golden age

28
Fires burned,
cauldrons bubble

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Ana Cabrera

Anchor, weekend primetime edition,
CNN Newsroom, 2017

Mark Twain Award,
Best Morning Show Broadcast, 2013

Emmy Award,
Best Morning Newscast,
In-the-Field Reporting, 2012

Murrow College of Communication
graduate, 2004

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Read more of Ana Cabrera's story:
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FIRSTwords

Forged by fire. The intricate mastery of Japanese swordmaking relies on a smith's deep understanding of fire, metal, and techniques to control both. Each unique sword shimmers with thousands of layers from the folding of the metal, a work of art in steel. That steel, though, traditionally comes from an iron-rich sand full of impurities, pounded and blended by the smith. A smith then uses a secret mix of water, clay, ash, and other ingredients over the blade as they once again plunge the sword into fire to create a keen edge. Only when the blade glows a certain color is it quenched in water.

Humans have learned to use fire over the centuries to great effect, not only on our weapons but with our defenses. A 1,500-year-old hillfort in Sweden, for example, has rocks fused together with an ancient glass, now being studied by Washington State University materials scientist John McCloy. As he reverse-engineers the techniques and ingredients, we might even use the glass as a defense in a new battle against the radioactive waste at the Hanford Site.

There are other fires that forge the human spirit. We all face adversity in our lives, and it tempers our spirit and resolve. For Tom Haig '09 as a young man, it was a bicycling accident that paralyzed his legs. He turned that moment into a chance to advocate for others with disabilities, and even set up a radio station in Nepal.

Leaving home is a traumatic event for many of us, particularly as we get older. Over 60,000 Americans turn 65 every day, and that wave will often look to new kinds of communities as they make the transition to their next phase. Students in WSU's hospitality program are taking up the call for more managers in senior living communities, and finding rewarding work that assists older people in finding a new home.

Difficulties come in many forms. It may be trouble sleeping, or it could be traipsing through a jungle to track jaguars and ocelots. Sometimes it's a societal problem, like the scourge of fake news that threatens our democracy. In troubled times like these, we need to hone our critical thinking blades to slice through misinformation, and come out the other side stronger and wiser.

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TALKback

Yacht club

Is there still an active Cougar yacht club? My friends own the *Elmore*, which was featured in your magazine in the early 2000s. It's for sale now, in great shape, and still owned by the Cougar fans. It would be a great boost for the yacht club and could possibly keep it in the Cougar family. She's still painted Coug colors and was built in 1890!

SARAH SELTZER
Seattle

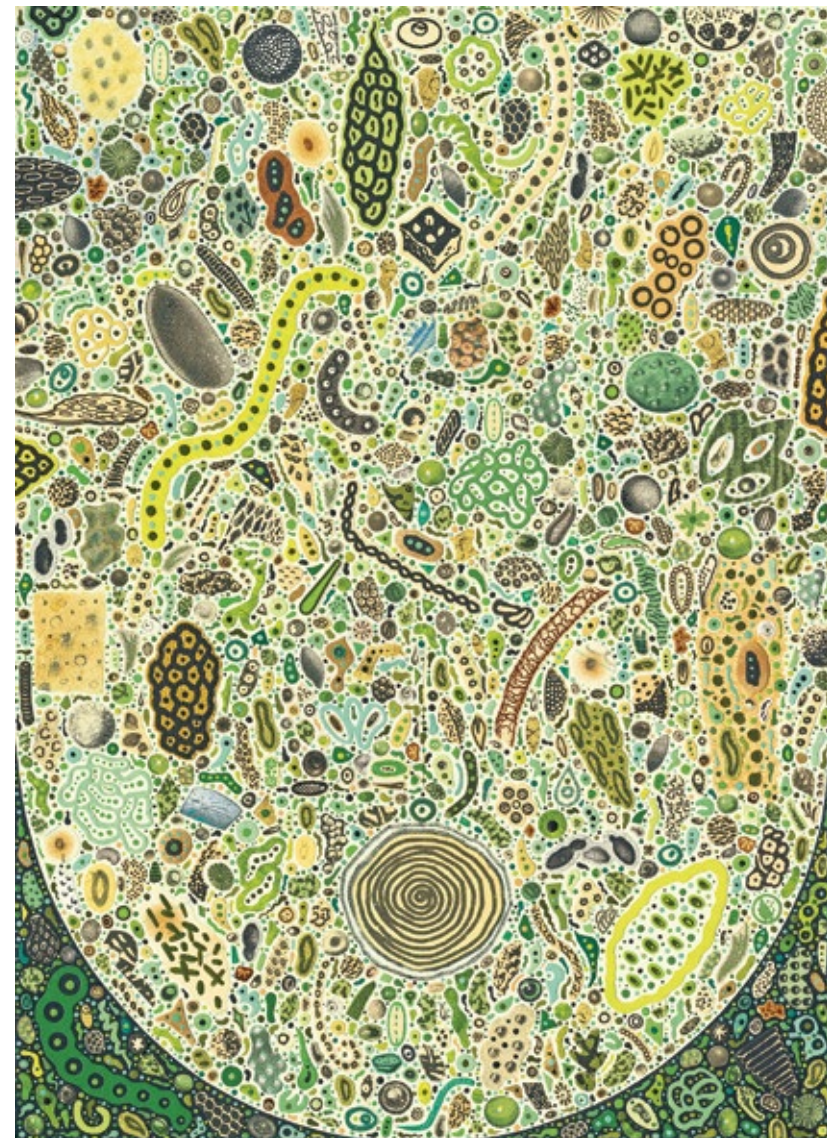
Rocket man

I was in the Signal Corps of the U.S. Army's satellite tracking station at Ft. Stewart, Georgia, from April 1958–March 1959. I was working telemetry the night Cape Canaveral tried to send a rocket from Earth directly to the full moon above the east coast. The rocket went up 79,000 miles, turned around by gravity, and came back down. Since then all space travel goes up in orbit first and heads out into space. There were three satellites being tracked in spring of 1958, many more to follow. Our job was to watch their orbit path, to not drop down with a bomb attached, or burn up in space. It was an exciting time to be a part of NASA and the beginning of space travel.

RALPH H. QUAAS '57 HORT.
Everett

Buried treasure

SHANE DUNBAR '56, a former agriculture and biology teacher from Everett, asked for some background on the illustration in "A mother's microbial gift," Winter 2017 issue. Specifically, he was interested in the relationships between the bacterial representations in the intricate editorial artwork by Colin Johnson. I asked our art director if there was, indeed, subtle information the work conveyed:



"Since research of microbiomes is in its infancy, we simply gave our illustrator the names of the bacterial genera that are some of the 'important players' in the story—*Streptococcus*, *Staphylococcus*, *Pseudomonas*, *Serratia*, and *Corynebacteria*. Scientists at WSU and elsewhere are busy investigating the complex microbial and host interactions. All concur that there is still plenty to do and many more exciting discoveries to be made. Therefore, we left the positioning and interplay of the bacteria in the illustration up to the artist. We really only aimed for the illustration to convey the intricacy of the subject matter rather than any specific biological relationships.

"We do many times 'bury treasure' in our artwork—sometimes instructional, sometimes just for fun—so Shane was right to ask if there was any present in this particular illustration."

— J. Paxson, AD

We are always most interested in our reader's questions and comments that probe deeper into all the stories we tell. Remember to sign up for the monthly Washington State Magazine email newsletter to get previews of stories, videos, and more bonus features: magazine.wsu.edu/email.

— Editor



SAY HELLO TO YOUR FUTURE DOCTORS.

In August 2017, the first WSU medical students put on their white coats and began their studies.

They're working and learning in the same environments they'll see when they enter medical practice. And they're building a healthier future for Washington state by serving where they're needed most.

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Jordan Schnitzer Museum of Art/WSU

Clad in unique crimson mirrored glass tiles, the new Jordan Schnitzer Museum of Art/WSU will open April 6, 2018, across from the CUB. The 10,000-square-foot building has six exhibition spaces, which will debut with works by Jim Dine, Marie Watt, and Jeffry Mitchell, along with multimedia presentations. Designed by architect Jim Olson of Olson-Kundig, the new museum offers a beautiful home for the growing permanent collection and space for both traveling and WSU exhibitions. *Photo Robert Hubner*

⊕ Read more: magazine.wsu.edu/extra/new-art-museum

BELOW, FROM TOP:

JIM DINE, *LAKESIDE*, 1998,

HAND-INKED PRINT; MARIE

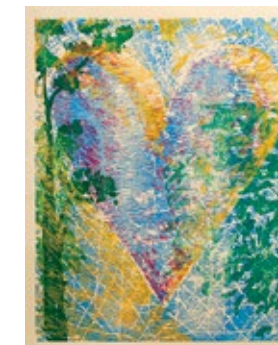
WATT, *ARTIST IN STUDIO*,

2012, FIBER ART; JEFFRY

MITCHELL, *SALT FIRED JAR*

HOLA, 2015, CERAMIC

(COURTESY JSMOA-WSU)



UPfront

It's in the genes

BY BRIAN CHARLES CLARK

When Omar Cornejo got his genomic analysis back from 23andMe, he and his wife, fellow population geneticist Joanna Kelley, were both a bit surprised and vindicated. Venezuelan, Cornejo expected to see the alleles, or variations of a gene, from Native American, western European, and North African populations. But he was unaware that his family's deep history also included ancestors from sub-Saharan Africa.

That just goes to show the importance of broadly sampling the genome, says Kelley. "The lesson is that if you just look at the mitochondria, you'd assume this person is from Africa. But if you look at just the Y chromosome, you'd assume that this is a Native American."

Cornejo and Kelley study the emergence and spread, over space and time, of adaptations and mutations. Among many other things, population geneticists help pinpoint genes involved in disease, opening avenues of investigation that may result in treatments. Population genetics is also a key part in conservation, as understanding genetic diversity can help ward off extinction.

The couple has adjoining labs and offices at Washington State University, just as they did at Stanford, where they met as post-doctoral students in 2010.

Cornejo was working with Carlos Bustamante, one of the world's great population geneticists. Next door was vivacious but no-nonsense Joanna Kelley, also working for Bustamante.

Kelley says, "Omar has this very Latin charm. So me, being a naïve Californian, I thought he was flirting with me. I said, 'OK, what's going on, are you interested?' And he said, 'No, I'm not interested at all.' I said, 'Oh, OK, I misinterpreted that.' And that was it."



PHOTO: ROBERT HUBNER

At least for a month or two. But as the days rolled by, Kelley says, "I *really* thought he was interested."

"I had no idea I was interested! But when she asked, *Are you interested*, I started looking through a different glass," he says.

A week after they started dating, Bustamante asked Cornejo to move to Miami to work on a cocoa genome project. Cornejo said, "I'm sorry, but I can't."

When Cornejo explained why, Bustamante nodded sagely and calmly replied, "Just don't break my lab."

Not only did the couple not break Bustamante's lab, thanks to their research they managed to both score jobs at WSU.

In order to maintain academic independence, they don't usually collaborate on projects together. But their adjoining labs and offices are home to a gaggle of grad students whom they train together. And there's certainly plenty to do, as the population geneticists work to uncover the lineage and spread of important adaptive traits in fish and microbes.

Kelley works on mollies, tropical fish popular with home aquarium keepers because they're hardy and colorful. But the mollies Kelley studies are beyond hardy: They live in springs rich in deadly hydrogen sulfide.

The springs are in southern Mexico, where volcanic activity emits the toxic gas. "The levels of hydrogen sulfide in these springs are incredibly high," Kelley says, "and incredibly toxic for other fish—including freshwater mollies."

Understanding how an animal genetically deals with a toxic environment may have therapeutic applications.

"Hydrogen sulfide has always been known as a toxicant and only much more

recently appreciated as a potential therapeutic. We produce it in our cells endogenously. It's now viewed as a signaling molecule in the cardiovascular system," she says.

Indeed, recent research by WSU scientists shows that hydrogen sulfide levels change in association with certain diseases.

"To me, these fish are a fantastic way we can learn about the processing of hydrogen sulfide without doing experiments on humans. This is hopefully going to give us some really great insight into these pathways, because these fish have been dealing with it for thousands of years."

Next door, Cornejo takes what amounts to an ecosystem approach to health. "We're looking at pathogens and the host and asking what is relevant in the interaction between them and how does that interaction develop disease?"

Population genetics is a kind of time machine, as it allows scientists to peer into the distant past to see when, and potentially why or under what conditions, a trait emerged.

As important as it is to understand the demographic history of a single organism, microorganisms never work solo. They live in ecosystems called microbiomes.

There are two contexts to health and pathogenicity, Cornejo says. "One, the context created by other bacteria. The other is the human host. We have a lot of variation, different responses to drugs depending on our genetics."

The couple decided to get married two weeks after Kelley's interview at WSU. When they told Cornejo's mother in Caracas, she said, "I am getting on an airplane."

At San Francisco City Hall, they crammed their party of 11 into the judge's chambers "Omar laughed a lot," says Kelley.

"The judge started reading in Old English!" he says.

Kelley laughs, "'With this ring I thee wed.' And Omar says, 'Shakespeare now?' And everyone starts laughing."

Even with two young children and busy research programs, they are sunny and mutually supportive.

"The idea of supporting each other is really important," Cornejo says. "It's not like we're sacrificing anything for our careers."

"We definitely don't feel that way," Kelley confirms. "This is our life and it's awesome." *

To catch a cat

BY LARRY CLARK

Trekking through one of the largest unexplored rainforests in the world, La Mosquitia in Honduras, Travis King set up traps last spring to catch jaguars—or whatever other animal came into range of the cameras.

King, an environmental science graduate student at Washington State University, was one of twelve biologists conducting the first biological survey of the area known as La Ciudad Blanca or the Lost City of the Monkey God, astounding ruins first identified in 2012.

It was already familiar work for King, who has used remote-sensing camera traps and other methods to identify the behavior and distribution of elusive big cats from Costa Rica, Honduras, and Belize all the way to central Washington.

Although his travels have taken him far from his hometown of Dickinson, North Dakota, King knew what he wanted to do from an early age. As he explored around Theodore Roosevelt National Park, says King, "I knew I had this interest in vertebrate animals, anything from frogs to cats."

King sought a university that connected to his interests and WSU fit the bill, where he

first helped with cougar and caribou research in the Selkirk Mountains.

His diligence took him to Belize, where King joined Virginia Tech predator researcher Marcella Kelly and set camera traps to look at wild Central American felines—jaguars, pumas, ocelots, margay, and jaguarundi—and their prey. It was quite a training for King.

"I lost 25 pounds from hiking seven to ten miles every day through some of the toughest jungle I've seen," he says. "But the work I did in Belize really set me up well for the work I do now."

When he returned to WSU, King met Dan Thornton, assistant professor in environmental sciences and head of WSU's Spatial Ecology and Conservation Lab. Thornton had done jaguar research in Guatemala, so he was a natural mentor for King.

Thanks to Thornton's connection to big cat research and conservation organization Panthera, King headed to Costa Rica for the summer to study ocelots and their latrines.

"Multiple ocelots go to the same location to urinate and defecate," says King, "and there was not much research on why." Using camera traps, King identified several communication behaviors around ocelot latrines, and was published in the *Journal of Mammology*.



Travis King (left front) travels through a Costa Rican swamp at Tortuguero National Park in 2014, with a team from Panthera and local guides. A jaguar caught on camera in the Honduran night. Courtesy Travis King

help students like Travis King compete for national scholarships: [DistinguishedScholarships.wsu.edu/support](https://distinguishedscholarships.wsu.edu/support)

wildlife photos from the deepest jungles of Central America and forests of Washington: magazine.wsu.edu/galleries

No barriers to a better world

Eman Ibrahim started volunteering in [Iraq's first cancer support center](#) in the northern Iraqi city of Erbil when she was 18, providing psychological support and reading to patients. It was satisfying work for the energetic young woman, if heart-wrenching at times.

Yet, when the 21-year-old Kurdish medical student from Hawler Medical University became head of the Erbil Hub center last year, she wanted to do even more to help—and that meant learning new ideas. Last July, she got her opportunity with the Iraqi Young Leaders Exchange Program.

The highly competitive scholarship program brings 100 Iraqi college students to the United States for 17 days, to foster the next generation of Iraqi leaders through cultural and social exchange.

Washington State University was one of four U.S. universities selected in 2017 to host the program, which is sponsored by the U.S. Embassy in Baghdad and administered by World Learning. The focus at Washington State was public health, and all 25 participants at WSU were medical students. WSU will host another 25 Iraqi students this coming July.

WSU coordinator Cheryl Hansen says the Iraqi students didn't waste a minute during the packed visit. They saw the global animal health program, veterinary hospital, and equine therapy program, among many other departments, says Hansen, director of partnerships and outreach at WSU International Programs.

As future doctors, the visitors particularly enjoyed WSU Spokane's health sciences campus, sharing a lunch with faculty physicians and touring the anatomy and nursing simulation labs.

Off campus, the students learned about civic life in Pullman with tours of police and fire stations, city government, and the Pullman

Regional Hospital. They also had seminars on leadership, civic education, and diversity awareness.

"We were so impressed by the participants, a group of passionate medical students who want to make the world a better place," says Asif Chaudhry '88 PhD, vice president of International Programs.

One participant, Ahmed Darweesh from the western province of Anbar, exemplifies that altruistic nature. Darweesh says his father inspired him to always improve his community, and now he wants to pass that on.

"We need to improve the community through the youth," says the 21-year-old Darweesh. "I want to encourage them to have the power to do something."

The Iraqi students didn't just visit WSU departments and Pullman offices. Each weekend, they lived with local residents. It had a profound effect on both host families and the Iraqis.

"The host families were tired of reading about Iraq in the newspaper and watching on TV, and wanted to talk with Iraqis face to face and find out what was really going on," says Hansen.

For Ibrahim, the homestay was a highlight. "My family is so protective. I'm the youngest, and they were worried about the host family," she says. But Ibrahim soon felt

comfortable, particularly after she told her host family about her concerns that people would judge her for wearing the hijab head scarf.

"The mother was so generous and kind," says Ibrahim. "The second day she came to me with a scarf and said, 'Can you teach me how to tie this?' She said if she sees someone who is hijabi, she'll wear the scarf."

Hansen says host families showed the Iraqi students around the region, from visiting the Moscow farmers market to taking a seaplane over Lake Coeur d'Alene.

"This group left an indelible mark on the hearts of Palouse area residents who hosted them in their homes over the two weekends," says Chaudhry.

They also learned to be part of the Cougar family, says Hansen. "One thing I taught them when we first met was 'Go Cougs!' They never let me down, and they said it at the end of almost every session."

Hansen says she hopes the students will return to Iraq with fond memories and useful knowledge. "They were already leaders before they came, and hopefully they became better leaders here," she says.

Ibrahim certainly returned to Iraq with some plans. She's already heading up an expansion of the support center to assist Syrian refugees and orphans in Erbil. ✱



PHOTO SHELLEY HANKS

Gaining on muscle loss

Cancer, says Dan Rodgers, is a hellish parade of horribleness.

Cancerous cells multiply aggressively, interfering with the normal function of healthy organs. Tumors secrete hormones and other chemicals that exploit the body's own defenses to the cancer's advantage. Your body knows something is wrong, so stress hormones are released in an effort to inhibit growth processes and channel nutrients to the brain.

Deprived of resources, muscles begin to atrophy. Washington State University muscle biologist Rodgers, together with colleagues at the Baker Heart and Diabetes Institute in Australia, investigated treatments for tumor-induced muscle wasting called cancer cachexia. The research was so promising that Rodgers founded AAVogen, a company dedicated to bringing the therapy to market.

For Rodgers, it's personal. "My dad died of pancreatic cancer. He didn't die from the tumor metastasizing. He died because of extreme muscle loss."

Cachexia can be fatal but, more often, it reduces a patient's mobility and quality of life—as does muscle wasting in muscular dystrophy. That's the condition for which Rodgers and his team think they may have found a treatment.

Myostatin, a protein that blocks the growth of muscle and helps optimize muscle mass, normally limits muscle growth, which is metabolically expensive to produce. Their treatment blocks the action of myostatin with a gene called SMAD7. Blocking myostatin in animals can result in double-muscling, like the Belgian Blue.

Myostatin inhibitors have been tested in clinical trials to treat muscular dystrophy and cachexia but they worked outside the cell. "So if you injected one of these inhibitors in the circulation, they'd block myostatin from working on every tissue, not just muscles. They'd also block other hormones that are structurally very similar to myostatin," Rodgers says. Administering a myostatin inhibitor outside the cell can result in nasty side effects that

weaken blood vessels and cause internal bleeding throughout the respiratory system.

AAVogen's solution is to deliver the inhibitory gene directly to muscle cells using an attenuated virus that co-evolved with humans and does not cause disease. "This works via injection but the virus only sticks to cardiac and skeletal muscles," Rodgers says. "The virus is recognized by a receptor, and the virus—and its therapeutic package of DNA—are engulfed by the cell. Once in the cell, the therapeutic package goes into bioreactor mode."

In other words, it starts reproducing and doing its therapeutic work.

Rodgers says, "You don't need to infect 100 percent of the cells in a muscle. If a few



COURTESY DAN RODGERS

cells recover, the whole muscle is going to be better."

The first goal is to get FDA approval for the targeted gene therapy to treat muscular dystrophy. To that end, late in 2017 AAVogen received a \$2 million infusion to run FDA Phase II toxicology and safety studies that are the prerequisite to human clinical trials.

"Our therapy increases the efficiency of the heart, so we could potentially treat

heart failure, as well," Rodgers says. Which means, he points out, that athletes will want it to build up heart muscle. "Gene therapy is on the anti-doping radar."

AAVogen is also developing an assay to determine if a person has been exposed to the delivery virus or has SMAD7 in muscle cells.

Rodgers says he gets dozens of emails a week from people whose family members have muscular dystrophy and who have seen his papers in scientific journals. "I spend several hours a week trying to answer questions," he says.

His urgency is palpable, not only because he lost his father to a potentially reversible condition but also because of another family member with muscular dystrophy. Flicking a

tear from the corner of his eye, he straightens up in his chair, determined, relentless, back to work. ✱

Truth or consequences

Fake news nearly started a war between Qatar and its neighbors in 2017. In Pakistan, a highly placed official bought into a fake news story warning that Israel was going to destroy Pakistan, and tweeted a warning at Israel that his country, too, was a nuclear power. And in Washington, D.C., an armed vigilante burst into a pizzeria and fired three shots, thinking he was bringing down a sex-slave ring.

While news has never been neutral, something has changed: Information has become weaponized. What's changed, says Washington State University communications professor Doug Hindman, is that the marketplace of ideas has broken down under the pressure of algorithm-driven myrmidons Facebook, Twitter, Google, and other ad-dependent social media and search platforms.

The marketplace of ideas, Hindman says, was the place where "truth and falsehood grappled," with truth usually winning. "That's why we have the First Amendment. We want all ideas to compete." Now, though, "we've got a marketplace that's flooded with bad, viral information."



PHOTO: JAKE MONROE/THE DAILY EVERGREEN

While far from the only symptom of a politically divided culture, the rise of fake news threatens to deepen the rift and, potentially, pull democracy into the crevasse with it. How we get out is unknown, but a new initiative from WSU offers a ray of hope.

Rebecca Donaway, a communications doctoral student, spends much of her time researching social media. She has some insight into how the social media platform's algorithmic decision-making process is driving this avalanche of fake news.

"What creators of content want to do is create sharable media," Donaway explains. When we repost something on Facebook, that "share" is algorithmically weighted more than likes or comments. The reason is simple: When we share, we expand the reach of ads that clutch the post's coattails.

Sharable, however, does not mean thoughtful. Thought, in fact, is the enemy of the "sharing" economy. What's shareable is that which appeals to the reptilian brain that knows only emotion.

The primary emotion that can be quickly—and thoughtlessly—shared, Donaway continues, is outrage. "The things I want to share are these things that I have solid ideas about. 'This person's rude; can you believe that jerk?'"

"This is high-emotion, low-information stuff," Hindman adds.

Donaway nods. "As opposed to some white paper that is breaking down the tax bracket implications for the middle third—something that is really dense and hard for me to create a quippy little post about."

As criticism of social media algorithms ramps up, Donaway says, "Facebook is just starting to ask, 'Is this information credible?' I was a teaching assistant for Doug last semester and in the first week we asked students, 'Where do you get your news?' And they told us, Facebook. We said, 'Well, that's not a source—what page on Facebook are going to?' Well, whatever is in my feed ...

"Credibility is a hard thing to teach. Maybe people should take a three-day detox," Donaway suggests. "How would you get information if you weren't on Facebook? Maybe it's worth finding out. Exercise that information-seeking muscle!"

It's not just the marketplace of ideas that has broken down, Hindman says, but our faith in institutions. Trust in university research is deeply divided between conservatives and liberals, as is trust in almost every sort of non-artisan expertise or shared institution of governance.

Michael Caulfield, director of networked and blended learning at WSU Vancouver, has thought a lot about how to beat back the tide of fake news. He, too, shares Hindman's concern that we're plagued by what every authoritarian leader knows. "When people are faced with a flood of misinformation, when they feel that they can't trust anything, they start to gravitate to what is convenient to believe. And when you remove truth from the equation, all that is left is power," he says.



REBECCA DONAWAY/WSU PHOTO SERVICES

"Look at propaganda, which many people think is purely about getting people to believe certain things, but more often than not it's about getting people to distrust one another."

Caulfield is working to change the way students are introduced to information literacy. He wants to empower them to put their gut feelings on hold and discern—with a little fact checking—truth from deception.

"So much of information literacy in the past has been a gotcha: 'Hey, we're gonna show you this thing and you'll debunk it!' We think we're teaching them techniques, but the lesson they're learning is that everything is junk. And once you think everything is junk you become a very easy person to manipulate. There's no one more easily manipulable than a cynic," Caulfield says.



COURTESY MICHAEL CAULFIELD

"If people feel that there is no way to separate truth from fiction it breeds a sort of cynicism that creates the worst type of government imaginable."

Instead of cynics, Caulfield is trying to empower students to be "enlightened skeptics." He calls this approach "the better angels model." There's no denying that "there are many parts of us that react in horrible and predictable ways to these click-bait and outrageous stories. But we do have empathy; and we do have the ability to step back and look at things in a way that is disconnected from our own interests."

Caulfield and his colleagues in other universities are also empowering students by having them write web content. They avoid hot-button issues in favor of less emotional ones—but that still give students a chance to exercise their information-seeking muscles.

"You can sit around all day and complain about the quality of information" on the web, Caulfield says, but we have a civic responsibility to, so to speak, green the information commons. Students researched and, with expert mentors, peer reviewed pieces on "niche" topics where the web is larded with junk information, such as "are bald men sexier?" and "does music increase IQ?"

The results have been gratifying. Several student-produced pieces have shouldered their way to the first page of Google results.

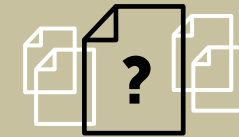
"If you can imagine this spreading to many institutions, you're no longer talking about impacting the search results of questions like 'are bald men sexier,'" says Caulfield. "You're talking about higher education reclaiming its place of impacting the information environment." *

online sites that check the veracity of claims: magazine.wsu.edu/extra/fact-checkers

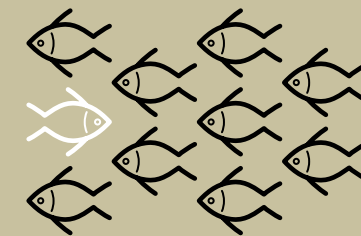
How to become information literate? It takes four moves and a habit...

Caulfield's approach to information literacy is simple. He argues that we should teach students to be fact checkers instead of rhetoricians. In rhetoric, readers spend a great deal of time reading closely, analyzing syntax and word choice for tone. Fact checking, though, is quick, involving only "four moves and a habit," Caulfield says. A recent Stanford University study supports the idea that a fact-checking strategy is superior to close reading.

Look for previous work. When fact-checking a particular claim, the quickest, simplest thing to do is to see if someone has already done the work for you. Has the claim already been fact-checked? Check Snopes, Wikipedia, or another reputable site.



Go upstream to the source. Almost all web content is reposted from another site. Find the original and evaluate it.



Read laterally. Don't dig deep into a single site, read across many sites to see what others have to say about the source you're reading.



Circle back. If you get lost, hit a roadblock, or otherwise start chasing your tail, stop and start over.



And the habit? If you feel strong emotion when you read a social media post, stop. As WSU graduate student and Facebook researcher Rebecca Calloway says, content creators are trying to appeal to our baser emotions, so if that's what you're feeling, don't give them the win.

What dreams may come

If Shakespeare lived today, the playwright would surely be [prescribed a sleep study](#). With his many references to sleep walking, apnea, insomnia, and nightmares, you can almost see the baggy-eyed bard sitting in his nightcap writing by candlelight.

"O sleep, gentle sleep! Nature's soft nurse, how have I frightened thee, that thou no more wilt weigh my eyelids down?" he bemoans in *Henry IV, Part 2*.

It's a familiar lament to all those who have lain awake yearning for sleep's healing balm. But there the comparison ends.

While Shakespeare's restless, seventeenth-century nights were lit with a single amber flame, today's insomniacs are usually staring at bright blue LED screens in a world increasingly devoid of darkness.

From streetlights to nightlights, light pollution is taking a toll on peaceful slumber in modern societies all over the world, says Ilia Karatsoreos, associate professor in the Department of Integrative Physiology and Neuroscience at Washington State University.

Karatsoreos studies the circadian timing system—an exquisite network of internal clocks that keeps our physiology running smoothly throughout the 24-hour light/dark cycle.

The system is governed by a light-sensitive master clock located in the suprachiasmatic nucleus (SCN) in the hypothalamus. This tiny timekeeper receives input through the eyes which is relayed to various brain centers and peripheral clocks

in the heart, lungs, liver, and other organs. Together, they control everything from behavior, hormone levels, and metabolism to body temperature and sleep.

"We have special cells in the retina that are very sensitive to blue-rich light, which is essentially a signal for dawn and time to wake up," says Karatsoreos. Unlike the rods and cones that provide vision, these photoreceptors regulate the sleep cycle through a direct line to the SCN.

Light also travels indirectly to the pineal gland which secretes the sleep-promoting hormone melatonin. As light diminishes and becomes more yellow late in the day, melatonin levels rise to prepare us for bed. That release can be delayed, however, by even brief exposure to artificial light.

While Shakespeare's nights consisted of first and second sleeps separated by peaceful moonlit "watches," Karatsoreos says using blue light-emitting e-readers or

cellphones in the wee hours sends a jarring wake-up signal that can disrupt sleep patterns for the rest of the night.

As a member of the Sleep and Performance Research Center at WSU Spokane, Karatsoreos is investigating how that disruption impacts our physical and mental health. He explores questions like, "What happens to the liver if you change the light/dark cycle and how does that affect metabolism?"

To find out, he studies mice who live in a shortened 20-hour day. Through EEG readings, Karatsoreos discovered that although they sleep the same amount of time as control mice, the quality of their sleep is poor.

"Their deep, slow wave sleep was reduced, which we think is the most restorative stage of sleep," he says. "It was also more fragmented—and they sleep in shorter bouts than normal."

In a recent project, Karatsoreos found that mice with disrupted sleep cycles also gained weight despite eating the same amount of food. Additionally, they showed impaired cognitive flexibility and problems with working memory. The mice had trouble changing tactics, for example, or remembering short-term information—similar to memorizing a phone number long enough to make the call.

His research even suggests that repeated sleep disruption might accelerate aging—an idea hard to dispute when you trudge to the bathroom and look in the mirror after a rough night tossing and turning.

"*Oh, sleep that knits up the raveled sleeve of care...*," writes Shakespeare in *Macbeth*. Indeed, the sleep-deprived poet understood the value of quality rest.

And, though sleep as a whole remains a mystery—Karatsoreos says no one knows exactly why we do it—it's clear that 7–9 hours of serene slumber can set the stage for a healthy and productive life, the kind that dreams are made on. ✨

IMPROVE SLEEP HYGIENE: Turn off extraneous lights. Use blackout curtains. Keep your bedroom cool and quiet.

NIGHT-LIGHTS, if needed, should be dim, low to the ground, and of a golden hue.

INSTALL NIGHT SHIFT OR FLUX on your digital devices. The app slowly shifts screen color from blue during the day to a more calming orange tint at night. Better yet, just turn them off.

ADOPT A RELAXING BEDTIME ROUTINE: Avoid work, reading thrillers, or watching action movies in bed.



A WALK AT NIGHT is relaxing but avoid heavy exercise 3–4 hours before sleep.

REDUCE SOCIAL JET LAG: Try to stick to a sleep schedule even on weekends.

REDUCE CAFFEINE INTAKE and avoid heavy meals several hours before sleep.

DITCH THE ALARM CLOCK: Try a dawn/dusk simulator such as the Philips Somneo.

TO HELP EASE SEASONAL AFFECTIVE DEPRESSION: Try the Verilux HappyLight or Philips GO Lite BLU in the morning to brighten your mood and improve sleep.

Do microbes dream of circadian sleep?

Anticipation is sweet. In anticipation of the blooming light, plants unfurl their leaves. For many marine creatures, rising to the sea surface as the moon rises is the anticipatory signal that food is available. In our gut, too, microbes anticipate dinnertime because microorganisms have internal clocks that sound the dinner bell.

"And here's where it gets interesting," says Hans Van Dongen, a professor of psychology at Washington State University Spokane and internationally known sleep expert.

"The biological clock those organisms have and the brain-based clock that humans have are not necessarily in sync. You notice this when you travel to another time zone. The first trouble people get when they travel to another time zone, other than being sleepy, is that they get GI upset."

But isn't that due to the water? That's the usual suspect. Van Dongen shakes his head.

"Most places have upgraded the quality of their water, and yet we still have these same problems," he says. "The symbiotic relationship between our microbiomes and ourselves is everywhere but it is particularly strong in the GI system. So just because you travel to another time zone doesn't mean that the microbiome got the message. So now their clocks and their activities, the proteins that they produce, are out of sync with you."

Just as our biological clock is governed by certain genes—with telltale names like clock, time, and per (for "period")—so too bacteria and other microorganisms have homologous genes. But instead of being light-triggered, as is the clock in the suprachiasmatic nucleus of the mammalian brain, microbial communities are triggered by the availability of nutrients in the gastrointestinal tract.

Van Dongen cautions that attributing the negative effects of travel to the microbial clock is not proven. But there is strong evidence that out-of-sync clocks are giving us fits.

"Shift workers," Van Dongen says, "consistently complain of their GI systems getting out of whack."

In one longitudinal study of nearly 75,000 nurses, those who worked night shifts on a rotating basis were 11 percent more like to die early compared to those who never worked the night shift. While disruption of the sleep cycle typically takes the blame, another study with mice that were artificially jetlagged confirmed the disruption to their microbiomes. In a followup with humans, researchers confirmed that, indeed, the composition of the gut biome changed after a time zone-jumping trip. Immediately after the trip, the subjects had a higher proportion of *Firmicutes*, a group of bacteria that, in overabundance, is linked to obesity.

Again, Van Dongen cautions that "we don't know this as a fact. It's just an emerging idea." ✨

Running up the competition

BY LARRY CLARK



COURTESY E. GARRY HILL

IF YOU WANT THE FACTS about track and field records, ask a statistics junkie like E. Garry Hill '69. But he might throw you with another fact, this one culled from long experience as editor of *Track & Field News*, announcer at the Olympics and World championships, and expert on the sport: Track and field as a spectator sport is struggling mightily.

Rows and rows of empty seats faced runners and field athletes competing at the Rio Olympics. And where can you watch big track events on TV? Hill calls it like he sees it, and he's seen a lot since he competed for Washington State University in the '60s.

"It's unfortunately gone from being a major sport when I was in college, to a mid-major sport when I started with the magazine, to now being pretty much a niche entity," he says in his gravelly tone.

Hill points out that lack of presentation, inability to keep up with the marketing of professional team sports like football, and other factors drive down interest in track and field.

He does have a few ideas to reform the sport, which, as a good editor, he's not afraid to share. Hill has already seen how the sport can thrill watchers and create fans, like when he came to WSU.

Recruited as one of a pipeline of athletes from Canada, Hill came down from Trail, British Columbia, as a triple-jumper for legendary WSU Coach Jack Mooberry in 1965. Unfortunately, Hill was hit with a terrible case of mono just before matriculating. The illness, followed by a string of injuries, didn't dull his interest in the sport, though.

"My hobby became track and field statistics, much to the detriment of my school work," says

Hill. "I spent all my time reading old issues of *Track & Field News*, compiling lists, and making predictions."

Hill remembers Mooberry as a bit of throwback in the changing culture: no sideburns or long hair, and no women in the stands during practice. "At times he was pretty crusty, but he was as honest and open as the day is long. Moo just had a down-home, easy, couldn't-help-but-love-the-guy persona."

He also earned his two Gray W letters alongside Cougar legends like runner Gerry Lindgren '70. Lindgren beat seasoned Soviet runners on national television in 1964 before going to WSU, then set many NCAA records and was one of two runners to beat Steve Prefontaine at the collegiate level.

"They tell tales of the mileage Lindgren put in. People now tend to not believe it. But I saw: You could go over to Bohler morning, noon, or night and he'd be either leaving on a run or coming back from one," says Hill.

At the end of his WSU days, Hill saw a help-wanted ad for a statistician in one of his favorite magazines, *Track & Field News*. "This was heaven to me," he says. "They couldn't have invented a better job."

Despite his degree in public health and bacteriology, Hill applied and "much to the chagrin of my advisor, who I gather had me targeted to go and work at a sewage plant in Wenatchee, they hired me."

Soon after he took the magazine job, the owners asked Hill to start writing. He moved up to managing editor and then editorial duties.

"I studiously avoided taking a class that required writing a term paper, which for some-

one who ended up in a journalism career was a pretty backwards way to go around it," he says.

Hill and the business manager bought the Los Altos, California, magazine from founders Bert and Cordner Nelson in 1987.

Earlier, Hill had met Bob Steiner, sports information director at Cal-Berkeley and renowned track and field announcer. The idea intrigued Hill. "I started mimicking Bob in my head. It's great to have someone explain everything that was going on and not only calling the races, but also throwing in historical data and national relevance for what the marks meant on that day," he says.

Steiner gave him an announcer gig in 1977 for a big meet at the Cow Palace, and Hill started announcing throughout northern California. A decade later, he started announcing at international meets, leading to the 1996 Atlanta Olympics. That was the first of five Olympics for him as an announcer, along with about 10 World Championships in 20 countries, filled with many memorable events that he also cataloged in *Track & Field News*.

A favorite Olympics moment for Hill was in 2004, when a few days prior to the Athens Games they staged the shot put competitions in the ancient stadium in Olympia a couple of hundred miles away. "The sun came up through part of the ruins and it was one of those spine-tingling moments," recalls Hill.

"That day was also one of the highlights of my announcing career," he continues. "We were sitting on an open platform on the hillside overlooking the open field where they were throwing. A German spectator came over during a break in the action and told me how much he appreciated my work, saying, 'I can understand

you better in English than I can understand the announcers in German back home.'"

Despite, or perhaps because of, his many experiences with the sport, Hill has witnessed a slowdown in interest for track and field.

"When I first moved to northern California, there were major meets galore," he says. "I'd go to a major track meet every weekend."

But since the 1960s, track and field just hasn't kept up with team sports with a professional marketing effort. Media, too, have moved away from covering track and field.

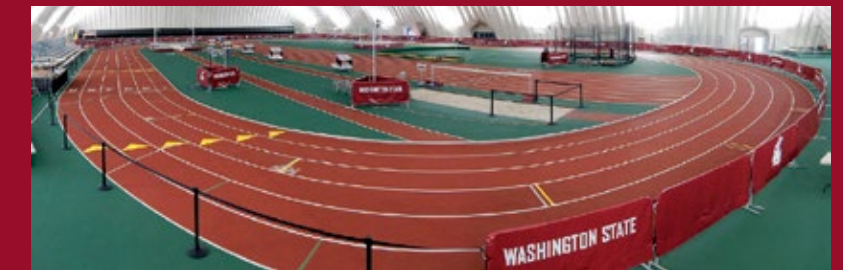
"The people who want to save the sport are not realistic. They don't recognize track's place in the hierarchy of the sports world. They keep trying to make it into something it's not," he says.

To fix it, Hill suggests streamlining track meets by reducing the number of disciplines, which likely means field events, and the amount of down time. "Waiting for them to measure a discus that landed a couple of hundred feet away is hardly twenty-first century entertainment," he says, despite being more of a field fan than a track fan.

To do that, Hill says it might be best to bring in people who don't know the sport, but with a keen eye for analyzing what works and what doesn't.

All is not lost. Even casual fans of track and field have more access to events and competitors through social media. "If you want to follow any big American track and field name on Twitter, they're there," says Hill. He also notes that most collegiate events can be seen on streaming video for free, which could drive up the fan base.

It might not reach the past levels of popularity, but to Hill, it's still been a great run. "It's been so incredibly rewarding. How many people get to turn their avocation into their vocation?" ✨



COURTESY WSU ATHLETICS

WSU Track & Field favorites

BY E. GARRY HILL '69

I DIDN'T REALIZE until I compiled this favorite-moments list just how much the dictum of "no cheering in the pressbox" has come to dominate how I watch/enjoy the sport. Unfortunately, I've done a good job—too good, in fact—of learning how to be dispassionate. It makes me a better journalist and broadcaster, but it saps some of the vitality of being a fan. So as you'll see, my list is very much front-loaded.

Chronologically, these self-centered moments stick with me (noting that I've restricted individuals to a single appearance apiece, or it would run the risk of being all Gerry Lindgren and Henry Rono):

MAY 1963—Don Bertoia '63, who ran for the same track club back home as I did, wins the Pan-Am Games 800 gold medal.

MARCH 1965—Bob Yard '66, who went to my high school, wins the pole vault at the first-ever NCAA Indoor Championships.

APRIL 1965—The first-ever Mooberry Relays, named after longtime Coug coach Jack Mooberry, are held at Rogers High in Spokane. I win the long jump with a mark I never surpassed.

JUNE 1968—The Cougs shock the formchart and finish second at the NCAA Championships. I wasn't good enough to go to the Nationals, but that was the year I lettered.

NOVEMBER 1969—Gerry Lindgren and Oregon legend Steve Prefontaine clash at Stanford's golf course in the greatest cross country race I've ever seen, Gerry narrowly winning the Pac-8 title. Added bonus: I'm there to see it, as I'm in town for my *Track & Field News* job interview.

MAY 1970—The setting is UCLA's Drake Stadium for the Pac-8. Two firsts: Rick Riley '71, my best buddy in Pullman, wins the mile with the first sub-4:00 in school history and I cry after a race for the first time.

MAY 1975—It's Pac-8 time in LA's historic Coliseum and Coug John Delamere '74 turns the long jumping world upside down, literally, by unveiling his somersault style.

NOVEMBER 1976—It's cross country time at Stanford again and I get to see Henry Rono '81 run for the first time. I make the flat-out prediction that he's going to be a world record setter. I conveniently ignore how many times I've said something similar and been dead wrong and never fail to bring up my prescience when he goes on his tear two years later.

MAY 1984—I get the honor of announcing the Pac-10 Championships in Pullman.

JUNE 1988—Throwing in Eugene, Laura Lavine '88 becomes the first woman ever to win the NCAA discus title twice.

AUGUST 2004—I'm standing a dozen rows from the track in the middle of the homestretch in Athens as Bernard Lagat '01 and world record holder Hicham El Guerrouj stage the greatest final 100 meters ever seen in an Olympic 1500. Bernard loses narrowly, but it's another tear-inducing moment.

SEPTEMBER 2017—Our '68 team is inducted into the WSU Athletics Hall Of Fame.

Any favorite track and field events of your own? Send them to us at wsm@wsu.edu

Beets

BY LARRY CLARK

Not everyone will love a beet, but it has long been a **vegetable of love**.

The deep red of a beet and its earthy sweetness speak to some people, who adore the vegetable in all kinds of dishes. Beets have a lot of healthy qualities, too, and even potential chemical uses in solar panels.

That's not to say beets don't have detractors. That same earthiness, produced by the substance geosmin, puts off some palates.

The beet—*Beta vulgaris*, also known as garden beet, blood turnip, beetroot, or red beet—was cultivated in ancient Greece and Rome, but there are stories of beets in the Hanging Gardens of Babylon as well.

It's related to Swiss chard and, in fact, people mostly ate the leaves and stalks of beets at first, with the thin bulb used for herbal medicine. It wasn't until the 1500s that varieties with a thicker bulb entered the diet of most Europeans. As a good winter vegetable, the beet became a staple through eastern Europe.

We now connect the blood-red color with beets, but that shade was selectively bred into the vegetable in the eighteenth century. We don't often see white beets at the store or farmers market, but they are the most common variety grown for sugar production.

Today 20 to 30 percent of the world's sugar comes from sugar beets, including some commercial growers in Washington. Almost half of the sugar consumed in the United States comes from sugar beets.

The ancient Greeks and Romans prized beets for their supposed aphrodisiac qualities. Long associated with lust and love, beets appear on frescoes in houses of prostitution of Pompeii and Rome. Even in Greek mythology, Aphrodite ate beets to increase her appeal.

While claims of amorous abilities are questionable, there's no doubt that beets carry plenty of health benefits. For example, betalains, the antioxidant-laced pigments that give beets their redness, are being studied as a way to fight cancer.

A number of studies support the use of beet juice to lower high blood pressure, due to its high nitrate content. Nitrate gets transformed by an enzyme to nitric oxide, which relaxes blood vessels. Beet juice can lead to drops in both systolic and diastolic pressure at rates higher than some medicine.

Beets could help improve brain and liver functions. They're an excellent source of fiber, vitamin C, magnesium, folate, potassium, and manganese.

The betalains could provide more than just a health benefit for us; they might improve our solar electrical panels.

Jeanne McHale, a Washington State University chemistry professor, and her team of students study how betanin, a betalain dye called beetroot red, can react to photons in solar panels. Betanin as an additive could make dye-sensitized solar cells potentially more economical and environmentally friendly alternatives to silicon-based solar photovoltaics.

The strong betalain-red coloring in most beets is also used as a dye in foods and other substances. In the nineteenth century, women used that juice as a cheek and lip stain.

Beets grow well almost anywhere in the state, but they grow best in cool conditions and bright sun, according to WSU Extension. Make successive plantings every three to four weeks from spring to midsummer, and then in the fall about 10 weeks before heavy frost, if you plan for winter storage.

They're biennial and normally grow an enlarged root in the first season.

Some recommended varieties for western Washington are Red Ace, Early Wonder Tall Top, Detroit Dark Red, Lutz Greenleaf/Winterkeeper, Cyindra, Golden, and the mellow Chioggia.

Beets, like many root vegetables, transform sublimely when roasted. The natural sweet flavor emerges and it becomes a little

less earthy, which can please palates that don't want that strong loaminess. If you boil them, leave four or five inches of stem on the beets so you don't have the red color "leaking."

In soups or stews, beets have long played a leading role. It's said there are as many types of borscht in Eastern Europe as there are villages. Beets pair nicely with sour cream or strong cheese in soups and other dishes.

Another way to appreciate the hardy flavor is a beet salad, combined with pungent greens, nuts, mustard, vinegar, and cheese.

And don't forget the beet tops; they're an excellent source of vitamin A and can be cooked or served fresh as greens.

Beets preserve well through pickling. Pickled beets are a Midwestern classic, but they can also be made with cinnamon and sugar to give them an intense flavor. Just be sure to follow WSU Extension recommendations for pickling to avoid contamination—unspoiled vegetables to start, the right amount of vinegar, and proper preparation—and you can enjoy the red root all year. ✨

Lentils with Roasted Beets and Carrots

Ingredients

- 2 1/2 cups French lentils (also called Puy lentils)
- About 1 dozen (1 large bunch) medium-small carrots, with their tops on
- About 1 dozen (2 large bunches) medium-small beets
- 2 tbsp. olive oil
- 1/2 cup chopped fresh herbs (whatever you have on hand: basil, chives, or parsley)
- 1/2 cup chopped carrot tops
- Grated zest of one organic lemon
- 1/2 cup feta cheese

Directions

- 1 ♥ Remove the leafy tops from the carrots and beets. Reserve the carrot tops. (Beet greens can also be kept as they are extremely nutritious and delicious). Wash and scrub the carrots and beets, removing any soil, leaving their skins on. Place the whole carrots and beets in a large French oven or enamelled iron pot and mix in the 2 tbsp. olive oil, fully coating the vegetables in oil.
- 2 ♥ In a 375° F oven, roast the vegetables for about 30 to 45 minutes, until tender when pierced with a fork. If you wish, once the beets are cool enough to handle, you can remove the skins from the beets by gently rubbing them off with your fingers.
- 3 ♥ Meanwhile, rinse the lentils and check them for small pebbles, then place them in a medium saucepan. Cover them with water and bring to a boil.
- 4 ♥ Simmer on medium heat, uncovered, for about 30 to 40 minutes, until tender but not falling apart or turning mushy. (Add water if necessary through the cooking). Drain the lentils and place them in a large shallow serving bowl.
- 5 ♥ In a blender or food processor, puree the garlic, lemon juice, and salt to make the aioli. Add the olive oil and puree until thick and opaque and no chunks of garlic remain. Pour this mixture over the lentils. Add the chopped carrot tops, chopped herbs, and grated lemon zest and toss it all together. Season with a bit of salt and pepper if you wish.
- 6 ♥ Place the roasted carrots and beets on top, then crumble the feta all around. Serve warm or cold.

Yield: 6-8 servings

Recipe courtesy of Kitchen Vignettes/PBS

For Eggless Aioli:

- 1/2 cup olive oil
- 2 cloves garlic
- Fresh-squeezed juice of one large lemon (1/4 cup)
- 1/2 tsp. salt

Communities for the golden age

BY LARRY CLARK

It's never easy to find a new home.

Just ask Barbara Nelson, a former account manager from Seattle. When her husband passed away, she moved from the century-old house where they had lived for 48 years. She has piercing eyes and a strong voice, but it trembles slightly as she explains: "It was so traumatic. After the estate sale, I took five things out of that house and walked away. I felt like I lost my neighborhood."

Barbara made the decision, consulting with her family, to move to a senior living community. She visited a number of locations in the Seattle area and two and half years ago decided on Mountlake Terrace Plaza.

On a quiet street in the suburb north of Seattle, across from a lush park and library, the building could pass for any upscale complex. It's become a new home, with benefits, for Barbara, her friends Mary and Pam, and about 75 other seniors. The three women are joined by Rosita Sandell '11, the community's executive director, after some tasty jelly-filled German doughnuts made from scratch in the building's kitchen.

Big band jazz plays from the speakers as the group describes the busy life at Mountlake Terrace Plaza: art classes, volunteering, yoga, Wii bowling, music, movies, barbecues, trips to Leavenworth for Oktoberfest, river rafting, and eagle watching, coordinated by their energetic activities director.

For Barbara, the active life and the friendly reception drew her into the community—oh and, she adds with smile, that she doesn't have to cook and do dishes.

Welcome to the rapidly evolving future of senior life, a blend of skilled nursing, technology, architecture, and business management all wrapped together with resort-style hospitality.

Sandell, who has been with the MBK Senior Living property for a couple of years, says the community, like a growing number of senior living facilities, provides a lot of what the residents need in a home, while allowing them independence. "You can't always tell someone who's 91 years old and made all their own decisions that this is the way it's going to be." Dressed in a red blazer with black slacks and shirt, Sandell, a graduate of Washington State University's hospitality management program with a gracious demeanor, could be a top restaurant or hotel manager. She in fact has that background, helping

start up concessions and catering at the launch of both Safeco Field and Seahawks stadium exhibition center, then later working at the Washington State Convention Center. Sandell grew tired of training her own managers, so she decided to get further education, first at Highline Community College and then WSU.

She was on track to go into the hotel industry, but a particular class her last year opened her eyes to senior living. "The 'a-ha' moment came when we visited residents and staff at a Seattle facility, and I saw the untapped potential."

That place and others are a far cry from the past drab image of a "nursing home" with listless seniors just sitting around. The Mountlake Terrace community and thousands more across the state and country help seniors create new homes and enjoy their golden years. But the communities are swelling with the tide of Baby Boomers entering their active later years, and the need is dire for people like Sandell.

THE SILVER WAVE

With around 60,000 people a day in the United States turning 65, and senior living communities filling up and popping up all over, the industry is starting to feel the crunch. An estimated 90 million seniors will live in the country by 2050, and while some will continue living in their homes and "age in place," many more will seek out apartment-style facilities or more residential active adult communities.

It was the pressing need that brought senior living executive Jerry Meyer to WSU and to Nancy Swanger, director of the School of Hospitality Management in the Carson College of Business, with a request in 2010. Meyer was then president of Aegis Living, a rapidly-expanding senior living company based in Redmond.

"When I first met with Jerry Meyer, he said to me, 'We want people with a hospitality background and not just a skilled nursing background,'" says Swanger.

At first she was a skeptic. "My 88-year-old parents still live in their own home. In my mind all I could think about was nursing homes. What was the connection to hospitality?" she says.

Meyer explained that similar skills are needed when operating senior living communities as running hotels and resorts. Since over a million more managers will be needed in the senior living industry in the next decade, he thought WSU was in a prime position to train them.

ILLUSTRATION KYLE T. WEBSTER



OPENING OF POEM RABBI BEN EZRA BY ROBERT BROWNING



Nancy Swanger. Courtesy Carson College of Business

Swanger, who's also associate dean at the Carson College and the W. Terry Umbreit distinguished professor in the 85-year-old hospitality program, agreed after visiting a Seattle Áegis Living facility. "I was blown away. It was like walking into the lobby of a really nice hotel."

Although she recognized that many of the operations—food and beverage, concierge, housekeeping, recreation—were similar to hotels and resorts, her own restaurant background wasn't sufficient to develop a senior living-specific class. So Meyer helped create the course for fall 2011, joined by presidents and executives from other Seattle-area senior living companies: Bill Pettit from Merrill Gardens, Granger Cobb from Emeritus, and Jason Childers from Leisure Care.

"Those leaders helped develop curriculum, found speakers, flew them over the mountains on their own dime. The very second class period, all four company presidents were sitting in Pullman, Washington, to teach a class," says Swanger. "We had competitors around the table multiple times, and you would think it was Thanksgiving dinner. It wasn't about being competitive. And they weren't there to market their own companies."

That first class of 12, which included Sandell, started a one-of-a-kind program, with field trips to Puget Sound senior facilities and classroom training on finances, marketing, and other aspects of assisted living, independent living, and memory care.

"It's not that we're the only people doing something in this area; however, we're unique in that most programs are in gerontology, graduate programs, and real estate," says Swanger. "In a hospitality school in a college of business, we're definitely it."

The class size has now grown to 45 students across WSU campuses statewide. It's led by Scott Eckstein, clinical assistant professor of hospitality and senior living executive-in-residence at WSU Everett. Eckstein joined WSU in March 2016, taking over for Merrill Gardens president Bill Pettit.



Scott Eckstein in the "Sports Den" at Áegis on Madison, Seattle. Photo Matt Hagen

A veteran executive with extensive experience in the senior living industry, Eckstein didn't start in the field. He began in real estate in his native New York City. When the market turned sour in the late 1980s, his research showed growth potential in building for an aging population. The company he worked for was leery of the prospect, since they didn't have expertise with senior properties. But Eckstein's professional insight in 1991 had an unexpected personal connection as well.



Rosita Sandell (center), executive director at Mountlake Terrace Plaza, visits with residents. Photo Matt Hagen

"At that time, my paternal grandfather was in a nursing home and my grandmother lived alone in her Bronx apartment. She would visit him seven days a week, nine to ten hours a day, and that was her life," he says.

Eckstein's voice lowers. "She ended up having an aortic aneurysm, alone on her kitchen floor where she laid for nine hours. I was very close to my grandma and that had a major impact on me. I thought if she was around people, somebody would have said, 'Why isn't Mary at breakfast?' It is very possible she could have survived."

He decided to take a new career path, and began working in senior living development and then senior living operations. His work expanded in the United States, as well as Spain, Mexico, and Asia. He has worked for ARV (now Atria), Sunrise, and Áegis Living, followed by a stint with Emeritus (now Brookdale).

Now, as he teaches the ins and outs of this hybrid business of hospitality, healthcare, real estate, and finance, Eckstein shows students that modern senior living is not what they expect.

"Senior living is not seen as sexy," he says, "A lot of the students want to go into hotel business. They want to run the Hilton in Waikiki." When they visit some senior living communities, though, it opens their eyes to the resort-like atmosphere of many of them.

Eckstein notes that many millennial students don't want just a job, either. They want to make a social impact while making a good living.

"Imagine making a difference in the lives of grandpa and grandma and their families. We talk about doing well by doing good," he says.

THE OLD AND NEW COMMUNITIES

The idea of "retiring," especially to warmer climes, certainly isn't a novel idea. Thomas Edison had one of his houses in New Jersey dismantled in the 1890s and moved to Jacksonville, Florida, where he would winter and finally live permanently. He was soon joined by Henry Ford and his wife, and other wealthy families.

Eventually middle class seniors in the 1920s started heading south with their "tin Lizzies" pulling mobile homes to Florida for the winter. Hotels in Sarasota, St. Petersburg, Miami, and other cities also began catering to aging semi-permanent clients, the "Snowbirds."

The grand social experiment in age-restricted communities really took off around 1960 with Del Webb's Sun City in Arizona. The entrepreneur founded a large community featuring mostly smaller homes, which then expanded to similar communities in Florida and



Touchmark manager Ken Alexander in the resident library. Staff Photo

California. Webb's Sun City properties drew the middle class, with their pensions and their dreams of an "active retirement" and country club lifestyles. They were often built around golf courses and maintained a strict 55+ policy for residents.

One of Webb's competitors, Ross Cortese, opened Leisure World communities in Laguna Hills, Seal Beach, and other California locations. Cortese changed the language from "retirement" to "active adult," with a concentration on recreational activities. The small, one-story

smart tech in senior living: magazine.wsu.edu/extra/smart-tech-seniors

homes were also more geared toward assisting seniors' changing health needs, such as bars by the tubs in bathrooms.

Fifty years later many senior living communities look quite a bit different. Down I-405 from Mountlake Terrace, just blocks from downtown shops, Áegis Living Bellevue also sits on a peaceful street across from a verdant park. Past the flowers and manicured landscaping, the busy lobby hosts an exercise class. A baby grand piano awaits a player under tall ceilings with chandeliers. It has the feel of a fine hotel, and one can see why WSU students like Sandell were impressed when they visited.

The manager, Patrick Mazzuca, greets residents by name as he leads a tour of the building, accompanied by his two vivacious goldendoodle dogs. Beyond a range of amenities, from a movie theater to gyms, beauty salon, a library, and more, Mazzuca says the most important thing is residents' happiness as they move in.

"Nobody says, 'I can't wait to move into senior living.' It's our job as staff to be compassionate and understanding, and to also help the families, who may feel some guilt," he says.

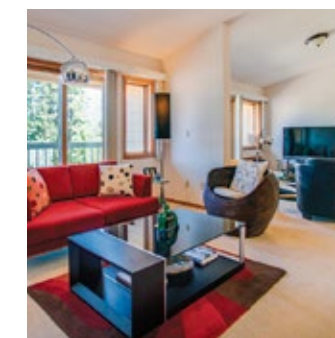
One common feature with many senior living communities, like Áegis Living, is the continuum of care. The residents are able to move from independent apartments to assisted living, memory care if they develop Alzheimer's or other forms of dementia, or other higher care needs.

In the memory care area, residents plant yellow flowers on a rolling cart. They're surrounded by nostalgic reminders: an alcove with vintage Coca-Cola signs, a back garden with a '50s-era car and a Sinclair gas pump, photos of their families. Mazzuca says it's all designed to ease residents, and help them feel safe.

Across the state, a similar experience awaits over 350 seniors at the Touchmark on Spokane's South Hill. Ken Alexander '94 manages the skilled nursing and assisted living area there, using his 14 years of industry experience. Beginning at an expansive lobby, he leads the way past apartments and through the dining area to recreation and art rooms. Large boards show the numerous daily activities. Nursing and memory care are in separate wings.

"We do a lot of transitions. As people age in place in the independent cottages and then might need extra help, they can move to nursing or memory care," says Alexander.

Apartment facilities like Touchmark and Áegis Living aren't the only model. Panorama, a 140-acre community in Lacey with 850 residences, comes from the same pedigree as Sun City. It was built 54 years ago as a "retirement" community, with 11 neighborhoods



Cottage family living room at Touchmark in Spokane. Courtesy Touchmark

that hold single-family homes, duplexes, and apartments. It also has an assisted living and care facility on the premises.

Howard Burton, Panorama's director of marketing, drives slowly through the winding streets, past the new pollinator garden (installed with help from WSU Extension), and to a recreation complex tucked amid the homes.



The theater at Panorama hosts plays, radio shows, and other performances by senior residents in the community. *Courtesy Panorama*

"It's changed. It has become more about lifestyle enrichment," says Burton, who's worked at Panorama for 24 years. He walks past exercise rooms and a swimming pool. "We have 108 hobby and interest groups, including a writer's group that's been around for 27 years."

At Panorama's 206-seat theater, where residents perform plays and hold film festivals, Burton introduces Katherine Billings, the effusive arts director. "We have an intelligent, engaged group that writes, directs, and acts in plays," she says.

"Some people may have felt invisible as they grew older," she continues. "No longer. They move to a community like this and they can learn and do things they've always wanted to do."

Burton notes that Panorama, too, has a long waiting list and a need for new staff. "The challenge is labor, in nursing and a lot of other areas. It's truly satisfying, though, and people really care what you do," he says.

Age-restricted and senior communities have not escaped criticism. Some claim they further fragment society by not engaging seniors but hiding them away, which can reinforce stigma around aging.

Another problem is financing. People are living longer, and wealth inequities can put many senior living communities out of reach. Eckstein points out that labor is still 50–60 percent of the cost in senior living, no matter what people pay. Help may come from new



Above: A resident enjoys a swim in the Aquatic and Fitness Center at Panorama in Lacey. **Below:** Panorama's 250-seat restaurant and bistro. *Courtesy Panorama*



business models, he says, or technology may help create efficiencies, like robots tending the growing population of seniors in Japan.

"We still need to figure out the middle market," he says, referring to financing for people with less money saved for their later years. "Maybe someone in one of my WSU classes will work that out."

Tens of millions of seniors, though, have already made new homes in age-restricted communities, and companies continue to evolve to serve their needs. For example, they've opened up affinity communities, such as ones for Chinese language speakers, religious affiliations, military veterans, and lesbian and gay seniors.

DOING WELL WHILE DOING GOOD

As the tens of thousands of senior communities expand and adapt, WSU's program also continues to grow. A new interdisciplinary senior living degree is in the works, with not only hospitality business operations, but also nursing, technology, and psychology, to reflect how many communities like Áegis Living, Touchmark, and Panorama serve a broad range of seniors' needs.

more on senior living research and education at WSU: business.wsu.edu/departments/hospitality/senior-living-management

After starting the business class, Swanger began conversations with other faculty around WSU who had interest in the field of aging and senior living: Maureen Schmitter-Edgcombe in psychology, Laura Hill and Cory Bolkan in human development, Diane Cook in electrical engineering, and Catherine Van Son and Shelly Fritz at WSU Vancouver's nursing department, to name a few. Swanger invited them over for lunch and the conversation led to the idea of a holistic degree and a research institute.

The Granger Cobb Institute for Senior Living will focus on three dimensions: workforce development, collaborative management and sponsored research, and undergraduate education. It would be named for one of the founding fathers of the WSU senior living program and a pioneer of the industry who died of cancer in 2015 at age 55. Some of that research includes smart home technology, like that being tested by Fritz at Touchmark in Spokane.

WSU has also started a noncredit online certificate program that will allow people to train in senior living management over the course of a year. "The industry doesn't have the supply of people to even meet the demand they have currently to run their communities," says Swanger, and this certificate can help get people up to speed.

That means not just training, but generating interest. "We need to let students know this is a career opportunity. It's a lot like a hotel, except the people check in and stay longer, and they might be, on average, older," says Swanger. "If you want to be the manager of a hotel property, it can take 15 to 20 years or more to work into that position. Rosita was running her own building in a year."

The program still brings in industry insiders for classes, such as Patrick Dooley, chief operating officer of Vancouver-based Milestone Retirement Communities, the eighth largest privately managed assisted living company in the country.

Through classroom and online learning, and experiential field trips, the school continues to show students that senior housing is not what it used to be. As one example, for their final project, Eckstein asked hospitality students to write a group research paper discussing what future products and terminology Baby Boomers envision will be part of the senior living environment.

Even that lexicon is changing.

"In all likelihood, we won't be using the term 'senior' as an industry," Eckstein says. "Boomers do not like the terms 'senior,'



Residents polish a classic car in the garden of Áegis of Bellevue. *Courtesy Áegis Living*

'senior housing,' or even 'senior care.' We are alerting students early on to this upcoming change in the conversation to help them develop a different mindset toward 'retirement' communities, though even the term 'retirement' will also be changing as we move forward. The definition of retirement is to cease to work, withdraw, or stop. That is not how the Baby Boomers will be doing it!"



Sandell with a Mountlake Terrace Plaza resident. *Photo Matt Hagen*

A PLACE TO CALL HOME

Whether it's called "retirement" or "active adult," back at Mountlake Terrace Plaza, Barbara, Mary, and Pat appreciate their life. They don't like the term "nursing home" or even assisted living, but they do like the camaraderie.

That still doesn't make it easy to call it home.

"At times, I feel I could have stayed at my house. Then I take a deep breath and say, 'No, I couldn't.' It was a very old house and needed a lot of attention. It was not a place to live alone," says Barbara.

The family environment, say the three residents, is what makes it a true community.

"Everyone watches out for each other," agrees Sandell, and that makes it feel safer and more comforting.

Sandell greets other residents with a smile and a friendly word as she navigates the remodeling work in the building. She turns pensive as she thinks about how she has benefitted, as well.

"Personally it's even helped me with my grandparents," she says. "It's also helped me rethink how I talk to people. How do I want to be treated when I get older? Do I want to be taken seriously, or will I just be looked at as a person with gray hair who nobody listens to?"

Sandell says the emotional rewards certainly add satisfaction to the work. "There's a lot of empathy involved. People bring their heart to it." ✨

fires burned

cauldrons bubble

In the embers of an ancient winter day, a Swedish scout scrambles up the hill of snow-covered boulders, hurrying over the slippery ground between them along a narrow path. His panting breath trails after him until he stumbles through the castle gate gasping, "Vandals on the riverbank! Bandits to the east!"

The heavy palisade slams shut behind him as men rush to position along a glinting rock wall. From 150 feet above the valley floor, they watch as silhouettes begin scaling the boulders below. With a signal, arrows and stones rain down upon them, yet the marauders advance, dragging their weapons or clenching them in their teeth. One brawny group attacks the wall with a battering ram but the rampart holds firm. In the end, wounded and spent, the intruders slink back to their ship in the darkness.

As the sun rises in 2018, that Iron Age hillfort is still standing. The Broborg (pronounced Brew-boy) castle, built around 450 C.E., remains surprisingly intact, one of the best preserved of the thousand or so defensive forts scattered throughout Europe.

Located north of present-day Stockholm, Broborg provided protection as well as a means for collecting toll along what was once a major waterway. It was not always appreciated.

The hillfort endured countless attempted sieges but survived 1,500 years thanks to the glassy substance that still holds it together.

With a technology modern researchers have yet to duplicate, pre-historic Scandinavian people melted special types of rocks to form an extremely durable glassy "glue" that fused the stone wall into an impenetrable matrix. The process is called vitrification.

Today, that ancient ingenuity is being unearthed in hopes of protecting twenty-first century Americans from a different kind of threat—the radioactive waste oozing from leaky storage tanks at Hanford, the nation's most contaminated nuclear site.

From 1943 until it was shut down in 1987, Hanford produced large amounts of plutonium that fueled atomic weapons during WWII and was later stockpiled during the Cold War.

Since the federal cleanup effort began in 1989, the government has spent billions of dollars mopping up residual radioactive and chemical wastes, 56 million gallons of which remain stored in rusty underground tanks. Experts say a better solution is to vitrify that waste into glass logs that would last for centuries using a replica of the rugged Broborg glass. It would also save taxpayers millions each year.

The ancient glass project, as it's informally known, is composed of an international team of scientists from universities, national laboratories, the U.S. Department of Energy (DOE), the Smithsonian Museum Conservation Institute, and more.

Leading the effort to reverse engineer the exact methods and ingredients used to make Broborg glass is John McCloy, associate professor of mechanical and materials engineering at Washington State

University. He also founded the WSU vitrification research program in 2013 and has a joint appointment with the Pacific Northwest National Laboratory (PNNL) in Richland.

McCloy is not your typical engineer, however. He also holds a master's degree in cultural anthropology and professes a life-long love of ancient technologies. As he talks about the unique adventure of studying Broborg, you can see a hint of the gold prospector's twinkle in his eyes.

"I got to climb up an iron-age fort in Sweden as it snowed," he says. "This is the first project I've worked on where I'll collaborate with biologists—and people interested in Earth's magnetic field, and others who specialize in ancient Scandinavian ironmaking. That diversity is what makes it so interesting."

At the molecular level, glass evokes a certain sense of alchemy. The translucent material is neither completely solid nor liquid but something in between. And, despite the way it sparkles in the light, glass is not composed of crystals but is instead an amorphous substance that can interact with a wide variety of atoms.

That flexibility allows scientists like McCloy to dabble with the ingredients when making glass. They can adjust the recipe to produce a glass specifically designed to trap nuclear waste particles.

It's good news for Hanford, where the waste storage tanks bubble with a thick yellow-brown sludge containing a witch's brew of radionuclides such as uranium, plutonium, cesium, and technetium. The muck is also packed with leftover production chemicals and corrosion products including aluminum, zinc, lead, and copper. Though isotopes like cobalt-60 have short half-lives and decay quickly, others, like plutonium-239, remain hot for ages.

The idea of using vitrification to contain this waste first arose during the 1970s with the advent of environmentalism and growing concern over the dangers of radiation. Scientists agreed the toxic material should be stored in an impervious, solid form that would remain stable for thousands of years while the radioactivity safely dissipated.

The task of choosing that form fell to a U.S. scientific committee which evaluated a vast array of materials as possible candidates. According to their reports, the overwhelming choice was borosilicate glass—a substance that is sturdy, stable, and easy to produce.

Since then, glass has been successfully used for vitrification in the United Kingdom, Germany, France, Korea, India, China, Russia, Japan, and Switzerland. It is also in use at the West Valley Nuclear Facility in New York and the Savannah River Site in South Carolina.

But Hanford presents the biggest challenge yet. Projected to cover 65 acres, Bechtel National, Inc., under contract with the DOE, is designing and constructing the world's largest radioactive

PHOTOILLUSTRATION FROM PHOTO OF EXHIBIT BROBORG HILLFORT RAMPART (COURTESY JOHN MCCLOY)

waste treatment plant, called the Hanford Waste Treatment and Immobilization Plant, or Vit Plant for short.

According to the DOE website, vitrification has never before been attempted on such a large scale or with material as complex as that stored at Hanford: “It will be a feat of engineering and construction at an unprecedented level—the largest undertaking of its kind.”

But first, researchers must develop a glass tough enough to survive at least 10,000 years of weathering. It’s not an easy task. Typical laboratory modeling can only predict deterioration in terms of decades. Natural glasses, like million-year-old obsidian, add nuance but still leave unanswered questions.

In something of a middle ground, McCloy and his colleagues are pioneers in the investigation of the glassy material used in vitrified hillforts like Broborg. Their efforts to decipher this “puzzle preserved in stone” could lead to the development of nuclear waste glasses able to withstand the test of time.

Unfortunately, Broborg’s rocks don’t part with their secrets easily. McCloy and his colleagues must painstakingly unravel the 1,500-year-old mystery bit by microscopic bit. Their initial scouting expedition began at the foot of the rock-strewn ruin after a long flight to Stockholm in February 2016.

“It was a pretty amazing experience,” says McCloy, recalling the adventure in his WSU office last September. “Snowing but not too cold—it was kind of surreal.”

“We walked through some woods with large boulders scattered about. In the distance, we could see the site—it looks like low walls of rubble piled in two rings at the top of the hill.

“As you start to climb up, you appreciate how defensible a position it really was,” he says. “There is only one narrow area you can go up without climbing over boulders. The top area is very flat and that’s where the glass was made; where rocks were melted to fuse boulders together. It was solid—there was no way you could knock it down.”

Although similar sites contain melted rocks resulting from lightning strikes, cooking fires, or enemy attacks, the walls at Broborg appear to have been made deliberately for defensive purposes.

These vitrified ramparts were constructed with chunks of local granite and smaller, greenish rocks called amphibolite that were used as the fusing material. McCloy says the Swedes melted rocks in boxed sections using charcoal to increase the firing temperature. They may have also added moss or other wet material to elevate humidity and create the optimum furnace conditions.

“It was the pre-Viking era and they had been making iron for 1,000 years prior to that,” he says. “For me, realizing what they were able to do at that point made our technology and our self-assessment of our own abilities as humans seem kind of small.

“What will there be in 1,000 years for archeologists to find from our culture and what will they think of us? We don’t build

very much in our society that lasts anymore. We don’t have that mindset.”

Albert Kruger, chief glass scientist for the DOE at Hanford, joined McCloy on the expedition and agrees, “Never underestimate the intelligence of the ancients. The things these people figured out without modern analytical chemistry equipment were incredible.”

It was Kruger who came up with the idea to study vitrified hillfort glass in 2013 while chatting with Swedish waste disposal researcher Rolf Sjöblom during an environmental conference in France.

Kruger, engaging and cheerful in his round glasses and flowered bowtie, leans across a table at PNNL explaining how the chance meeting further led to an introduction with Swedish geologist Peter Kresten. For 30 years, Kresten had collected samples from vitrified forts scattered across Europe and he kindly agreed to share a few from his personal museum.

The artifacts are now under the expert care of Carolyn Pearce who has been sitting quietly next to Kruger. Originally from England, Pearce is now a staff scientist in the geosciences group at PNNL and fellow member of the Broborg expedition. She gives a brief project overview and then escorts us to their laboratory where we don protective glasses.

With gloved hands, Pearce unlocks a small metal cabinet and withdraws a box. “We store the artifacts in museum-grade specimen boxes with special paper,” she says.

Carefully unwrapping a large, brick-like chunk of rock that appears to be glazed with white icing, Pearce explains that two kinds of glass formed at Broborg—clear and dark.

The clear glass, with its high sodium content, is very similar to that used to vitrify low activity nuclear waste or LAW. The dark glass is high in iron and analogous to material used for treating high level waste or HLW.

Kruger and Pearce analyze both types of glass to determine how it degrades through processes like weathering, corrosion, and the microbial action of amoeba, bacteria, and fungi. Their primary focus, however, is on the clear glass.

“By adopting highly abusive tests, we can show that glass is a very durable material,” says Kruger. “Typically, we grind glass into fine powders and put it through 200 degrees Celsius steam, or cut it into wafers and submerge them in water.

“But at Hanford, we’ll eventually be burying glass logs in steel containers that may not experience anything more than 50 degrees Celsius and some humidity. They’re certainly not going to be immersed in water until another Missoula flood comes.”

To better determine how Broborg glass truly degrades over time, Kruger and Pearce are developing a new accelerated aging test in collaboration with Vanderbilt University and the University of Sheffield in England. The goal is to ultimately develop a test that will reflect aging in thousand-year increments.

Once in place, they will test the artifacts and use that data to model what happened at Broborg 1,500 years ago. This will be followed with tests on new glass made from the reconstructed recipe McCloy is developing. If the results match, they’ll be in business.



BROBORG HILLFORT AS IT APPEARS TODAY (PHOTO BENGT FREDÉN/UPPLANDSMUSEET)

McCloy’s chemical synthesis lab dominates most of third floor Dana Hall in the Voiland College of Engineering and Architecture. The old 1930s lab, with its low ceilings and traditional fixtures, is just one of the five laboratories he oversees throughout campus.

Here, with state-of-the-art equipment, McCloy’s graduate students tease out the specific elements and processes needed to concoct a replica of the hardy Broborg glass. One autumn afternoon, he introduces a few of them as they work on various projects.

Kneeling beside a small, boxy furnace, doctoral candidate José Marcial is patiently melting a bit of ordinary glass. Dressed in blue coveralls, heavy red gloves, and a welding helmet, Marcial periodically peers into the furnace’s tiny window. When the temperature reaches 860 degrees Celsius, he opens the door and removes a crucible full of molten glass with a long pair of silver tongs.

Gently, he pours the liquid glass onto a metal plate to cool. McCloy says a similar process is used to melt amphibolite, the glue that fused the granite Broborg boulders together.

“The Swedes had to get to 1,200 degrees Celsius to melt amphibolite,” he says. “It was right at the edge of their iron-making technology. They would have needed bellows or drafting in furnaces to reach that temperature.”

In the lab, McCloy tries to replicate their actions by heating the amphibolite to different temperatures. At 750 degrees Celsius, for

example, it develops a copperish sheen. By 1,000 degrees Celsius, the rock begins to transform and by 1,200 degrees Celsius, he says it appears glassy.

As the texture changes, so, too, does the rock’s mineral composition. They track this metamorphosis by identifying the mineral content of each sample at different stages of melting—noting crystals of quartz, feldspar, mica, olivine, and others. This is followed with a series of high-end tests that zero in on the sample’s chemical structure and physical properties.

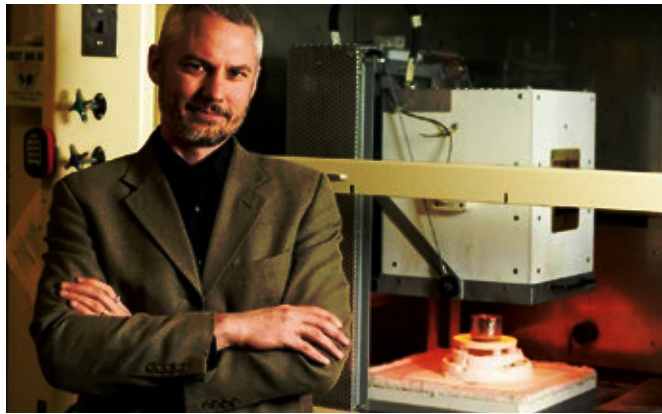
The process is complicated by the fact that the rock’s mineral content also varies depending on where it was located at the Broborg site. Another wild card is determining how water played a role in the melting process.

Though it’s still too early for conclusions, McCloy says he’s starting to get a handle on the sequence of changes that occur as the minerals undergo extreme heating.

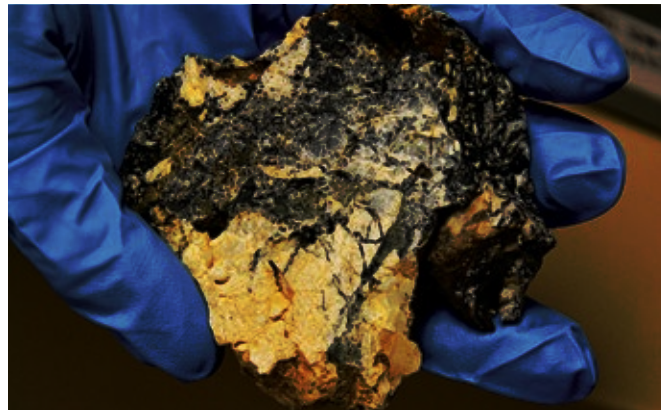
“We’re studying samples from five different sites and trying to find the boundaries—or edges—of what is normal,” he says.

McCloy has no shortage of helping hands—his students are keen to melt, grind, and test the samples in order to extract their secrets. They especially enjoy the “alchemy” of pouring glass.

“They get to take part in what feels like a mystical experience—to see that phase transformation,” he says. “I can only imagine those people making hillforts must’ve had a similar experience. One moment, a rock is solid and the next, it’s liquid. It must’ve been incredible.”



Clockwise, from top left: John McCloy (Photo Robert Hubner). Albert Kruger. Carolyn Pearce. Sample of Broborg rock. José Marcial. (Staff photos)



Last October, McCloy, Kruger, and Pearce returned to Broborg with a team of Swedish archeologists to collect samples directly from the vitrified walls. Their hope is to better understand environmental impacts as well as to gather clues about ancient production methods.

McCloy also went armed with a special drill for obtaining magnetic core samples, on loan from the Pacific Northwest Paleomagnetism Laboratory at Western Washington University in Bellingham. The lab can measure magnetism in the rock's crystals and accurately date Broborg glass production to within 50 years.

Despite a few glitches with the drill, McCloy says they had a productive week at the windy, mushroom-dotted excavation site, patiently watching as archeologists cut their way through the 18-inch-thick wall.

"They found holes that were used to feed the fire and heat up box-like sections of the wall," he says. "Below these boxes was a trench filled with ashes and charcoal. We think they made a wooden framework around the box with a firing hole on each end."

Once his eyes were opened to the landscape, McCloy says the world of the ancients emerged like a 3D image. "I saw firing holes all over the site. There were edges of boxes and charcoal impressions everywhere."

"It felt like the site is still alive with memories," he recalls. "Some days were cold and rainy and it would've been hard to carry boulders. Other days were sunny and nice. There's so much life on the hill—you can almost see them lugging the rocks and building the hillfort."

While McCloy was busy sifting through prehistoric rubble with Kruger and Pearce, Hanford installed two new melters in the Vit Plant's Low Activity Waste Facility, where giant machines will eventually convert nuclear waste into 4-by-8-foot glass logs.

According to DOE, the facility will begin treatments as soon as 2022, and is scheduled to be fully operational for both LAW and HLW by 2036. The bulk of Hanford's radioactive waste is LAW and is slated for burial onsite. The HLW will eventually be shipped to the national nuclear waste repository.

Meanwhile, work will continue on the ancient glass project. Kruger says that within five years, they should have enough data to "support the use of the accelerated aging test with a high degree of confidence." The reverse engineering project is likewise moving toward completion.

The beauty of all this effort is that reconstructed Broborg glass has the potential to trap and hold more nuclear waste than other types of glass, says Kruger. That means more efficient containment of radionuclides and fewer stainless steel containers to bury at Hanford.

Which translates into significant savings for America's collective pocketbook. Not to mention a bit of relief and considerable health and safety benefits for citizens of the Pacific Northwest—especially those who call Hanford's spare, high-desert country their home. *

Cleaning up Hanford's nuclear waste is a tough job any way you look at it. Despite extensive remediation efforts, scientists still struggle to solve a multitude of lingering problems—most related to radioactive material leaking from rusty underground storage tanks.

Among the most critical is the question of how quickly those radionuclides can travel through the soil and when they might reach the groundwater.

It's a question that Jim Harsh and Markus Flury, professors in crop and soil sciences at Washington State University, are trying to answer. Their specialty is studying the way microscopic particles carry chemicals and radioactive elements through soil and water. These colloidal particles, as they're called, can accelerate the migration of contaminants within the environment.

The two were invited to investigate Hanford when troubling core samples indicated a radionuclide called cesium had leached farther into the subsoil than expected. No one knew why.

Working with researchers at PNNL and other national laboratories, Harsh and Flury demonstrated that colloidal particles bind cesium and carry it along "piggyback." It turned out to be a short ride, however, as cesium is quickly stripped off by larger particles in the soil.

Though the finding wasn't the definitive answer Harsh and Flury were hoping for, it did provide a positive outcome. They now know that cesium, with its relatively short half-life, will lose most of its radioactivity before reaching the groundwater. Therefore, cesium-contaminated soil can be left to decay in situ.

It's a different story with technetium-99, a radionuclide with a very long half-life. Technetium-99 is one of the most widespread contaminants at the Hanford site and quite difficult to remove. Unlike cesium, scientists expected the element to move quickly through the soil but instead something is slowing it down.

Harsh and Flury speculated that perhaps a substance called sodalite is holding technetium-99 in place under the storage tanks. Sodalite is a "framework mineral" that acts like a tiny cage to trap other elements and ions. They thought sodalite might trap both cesium and technetium-99.

As it turned out, their studies showed sodalite has little impact on the movement of either element. But Harsh says sodalite cages are probably very important for transport of highly radioactive elements like plutonium and uranium. As an example, he points to the Nevada Test Site, 65 miles north of Las Vegas, where plutonium is mysteriously migrating much faster than anticipated.

One step forward, one step back. The earthy detective work continues. *

soil toil



JOHN MCCLOY AT THE BROBORG HILLFORT IN 2016 (COURTESY ROLF SJÖBLÖM)

McCloy's work with ancient glass is but one example of the robust and rapidly-growing partnership between WSU and PNNL. Other faculty members have joint appointments focused on bioenergy, protecting the power grid, and nuclear research, such as the acclaimed nuclear chemistry program led by Regents Distinguished Professor of Chemistry Sue Clark and chemistry professor Aurora Clark. The WSU-PNNL collaboration benefits students, faculty, federal scientists, and ultimately, Washington state citizens and economy. —Editor



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WSU BASEBALL READIES FOR SPRING TRAINING ON NEW TURF (PHOTO JASON KRUMP)

Living the **fighting** spirit

BY CLAIRE SYKES



COURTESY CHARLES HUDSON

Hunting and rodeoing, playing football and singing in the school choir. For Charles Hudson '84, growing up in the '60s and '70s on the Ft. Berthold Indian Reservation in rural northwestern North Dakota also meant listening to stories from his Hidatsa mother and white rancher father. One of them was about a huge flood—and it wasn't a myth.

Six years before Hudson was born, construction of the Garrison Dam submerged 550,000 acres of Hidatsa, Mandan, and Arikara (the Three Affiliated Tribes) land, resulting in Lake Sakakawea and forcing hundreds of families to flee, including Hudson's. The tragedy only inspired his parents to triumph over it.

He carried the Hidatsa values of community, charity, education, and the

environment with him to WSU. In its Native group, Ku-Au-Mah ("cougar" in Nez Perce), "I immediately found a supportive network of Native people from all over the Columbia Plateau," says Hudson, who first double-majored in forestry and environmental science. He was headed toward a professional path many of his relatives had taken, in Indian law, education, health, and the environment.

A talk by visiting Makah filmmaker and poet Sandra Sunrising Osawa "opened my eyes to the passion for the salmon issue in the Northwest," he says. "The best way I saw to make change was through journalism and filmmaking."

With his bachelor's degree in communication, Hudson worked at Seattle's now-defunct Alpha Cine Labs on post-production for everything from experimental films to Hollywood blockbusters. Fifteen years in, married and raising three sons, he was working on Kevin Costner's *The Postman* when he "became disillusioned with Hollywood's self-indulgence and excess," he says. "To make real change, I knew I needed to make a major course correction in my life."

A good start was the University of Washington's yearlong certificate program in philanthropy, delivering him to the culture

ALUMNI profiles

of mission-driven work. After that, in 1999, he joined the staff of the Columbia River Inter-Tribal Fish Commission, headquartered in Portland, Oregon. It is dedicated to the protection of treaty rights and fisheries resources management for the Yakama, Warm Springs, Umatilla, and Nez Perce tribes. Now as intergovernmental affairs director, Hudson facilitates federal-tribal relations and secures funding and policies for tribal salmon restoration.

"I get to work with people who rely on resilience, inspired by the fighting spirit of salmon and themselves, and the people of the river. And I'm able to take the pain and bitterness from the Garrison Dam's destruction, and turn it into a daily drive to help restore justice."

Hudson's own people got hit again with North Dakota's oil boom in 2000, and the Three Affiliated Tribes voted in favor of developing oil reserves. Given the environmental impacts to the land and water, he wanted to do good with his family's oil income, so in 2016 he added it to his years of savings and founded the Many Dances Family Fund at the Oregon Community Foundation. He named it after his great-grandmother, who was mar-

ried to Chief Old Dog, once photographed by Edward S. Curtis. Overseen by Hudson and his sons, the fund is devoted mainly to indigenous concerns around land stewardship, outdoors ethics, addiction/recovery, homelessness and health, food sovereignty and Indian civil rights, and government accountability.

While the Many Dances Family Fund ties the past to the future, Hudson's visits to the reservation, where his parents still live, keep him connected to the land and the people there—and to himself. "North Dakota's prairie and wide-open sky give me solitude in large, spiritual doses," he says. "There are no trees or mountains in the way. There's only as far as your mind's eye can see." And hunting and fishing trips there "are the cornerstones of my life. But I don't do them for sport. I do them out of tradition, and a desire for a subsistence diet."

Hudson loves his adopted home of the Northwest just as much. "Wherever I am, I want to try to strike the right balance between modern demands and the preservation of all things wild." And always, there's family. "We're the bearers of our people's past, with an obligation to further advance our heritage into the future." ✱



COURTESY CHARLES HUDSON

Wheeling new heights

BY BRIAN CHARLES CLARK

It's a clear, warm Sunday morning in Portland. Sandy Boulevard is nearly deserted and Tom Haig is cruising on his bicycle. He tucks into the teardrop position, thinking, *This is awesome.*

Suddenly, an elderly couple blow through a stop sign. Haig reacts quickly—but he's pissed and, looking back at them, yells something unprintable. A second later, he returns his attention to his direction of travel. Yellow light! And a truck coming at him. Bicyclist and driver lock eyes. Both brake and Haig thinks, *I've got this. That truck has enough clearance for me to lay it down and slide right under.*

Then the unthinkable happens—his brake cable snaps. "I went headfirst into his grill," Haig '09 recalls. "At first I didn't notice I was paralyzed. I put my hands on my legs and thought, *At least I can feel them.* But what I didn't realize in the moment was that my legs were not feeling my hands. My feet were still clipped into my pedals and I tried to move—and then just stopped moving."

That was 1996. Haig says, "Here's the really crazy thing. My brother, Andy, is one of the world's experts on exactly what happened to me. I'd called him lots of times because I used to be a professional platform diver. 'Dude, I hurt my knee!'

"Not this time. 'Um? Andy? I broke my back...'"

Andy Haig dropped what he was doing, caught a flight from Michigan to Oregon Health Sciences University, "and it was like the parting of the seas. All these docs there knew his research."

Twenty-some years later, Haig has arms like tree trunks. His humor is infectious, his laughter raucous, and his spirit indomitable. The athlete, musician, videographer, and broadcast professional never stopped or even slowed down because of his paralysis. He

maneuvers his wheelchair like a fine-tuned driving machine.

Which made going to broadcast school in Pullman interesting. In January 2007, when Haig arrived for the spring semester, it was pretty typical snow, freezing rain, ice storms, and wind chill. And, notoriously, everything was uphill both ways.

"I'd been warned by friends that Pullman was like San Francisco. But I've lived in the Himalayas. How hard can it be? But when I was in the Himalayas it was summer time. And this was ice and I was like, *Oh my god, how am I going to get around?* It was just paralyzing," guffawing at his own pun.

Haig managed, and found the folks in his communications program at the Edward R. Murrow School of Communication warm and welcoming. "They made the Cable 8 studio accessible," he says.

After graduation, Haig got a note from his brother, Dan: the Dalai Lama's Tibetan government-in-exile was looking for someone able to run a small community radio station. Haig raised his hand and got the gig.

"I fly over there and there's a big problem with this radio station. It's not on the highest point in the region but it's on one of them because they want to put the stick way up in the air," Haig explains, using radio engineer jargon to refer to the antenna. "The road to get up there was absolutely inaccessible by wheelchair."

Every day he was picked up and driven to the station—and then carried up the 24 steps to the broadcast booth. "They had a nice set up. But the station was running on someone's iPod playlist of a thousand Tibetan classical songs that just played over and over."

Haig tried to get the locals to read the news in Tibetan but was met with resistance. He was told, "I can go to my mother to give her information, but not my mother's friend." The intricacies of social respect inhibited the locals too much to actually read the news on air. "They also thought their voices shouldn't be so 'big' and heard by that many people. That was the Dalai Lama's role."

So Haig improvised. He scored an interview with novelist Alice Walker. He set up an open mic at a local cafe, then broadcast the recordings. "People from all over the world come to Dharamsala," the home of



Tom Haig in Delhi, India. Courtesy Tom Haig

the Tibetan government-in-exile, "so there are lots of musicians."

After the 2015 Nepal earthquake that killed some 9,000 people, the world traveler was back in the Himalayas. His mission this time was to produce occupational therapy training videos for distribution across the country.

"It's a five-day trip to get to the far end of the country," he says, but the clinics there, with their patients in wheelchairs, badly needed current-practices information. The quake injured 22,000 people. One physician Haig met, Raju Dhakal, said his

rehabilitation facility went from 30 patients to over 100 in a single day.

Haig has become an expert on disability culture. He's done videos on French disability sports. He was alarmed by what he saw in Albania, where people in wheelchairs were largely ignored. In Ghana he was delighted to find one of the most advanced disability cultures he's ever seen.

To date, Haig has visited 62 countries, something his family of seven siblings keeps track of. "I was in the lead for a while," he says, "but then my Mom and Dad retired and now they're crushing me!" ✱

What a time it was

BY REBECCA PHILLIPS

One by one, they share memories of curfews, 42-cent dinner dates at the CUB, the JFK assassination, and the birth of women's lib. A few regale listeners with the infamous tale of the 1964 "Pot Push," which had nothing to do with cannabis.

These are just a sample of the treats recorded at the recent Diamond and Golden Grads digital storytelling workshops, led by Washington State

University English instructor and former assistant director of the Digital Technology and Culture program Rebecca Goodrich.

The workshops, held at the Lewis Alumni Center during the Diamond and Golden reunions, are available to visiting 50- and 60-year graduates who would like to contribute oral histories of their time at WSU. The stories will eventually be archived by Manuscripts, Archives, and Special Collections in the Terrell Library.

Goodrich matches alumni with students who conduct the interviews. She says the project is a win-win-win.

"The grads really enjoyed it and some brought newspaper clippings to share with the students. The old yearbooks were out and it was a great social event.

"It was wonderful for the students too," she says. "They were so interested in

what the alumni were telling them. They asked great questions and later I heard them telling each other about the stories they heard. It was the perfect activity to get generations talking."

Jonathan Wallis, a senior in neuroscience, took part in last April's workshop and says he would gladly do it again.

"I heard stories I wouldn't have known about, like the football stadium bleachers being burned down by an arsonist."

Wallis says it also made him appreciate the aspect of time and how the alumni had contributed to society in many important ways, which all began at WSU.

"There was a civil engineer who worked many years in the field and had fond memories of a particular professor," he says. Fifty years later, "he was still grateful to that professor—it was eye opening." ✨



PHOTOS COURTESY REBECCA GOODRICH

Listen to the stories of these Cougs and others: magazine.wsu.edu/audio

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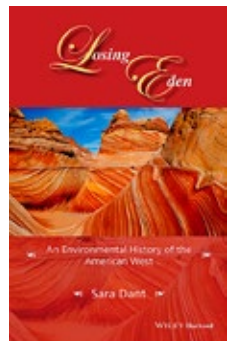
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Losing Eden: An Environmental History of the American West

SARA DANT '91 MA, '00 PHD
WILEY: 2017

The 1893 World's Columbian Exposition welcomed millions of people to Chicago to celebrate the rise of industrial America, the 400th anniversary of Columbus' arrival on the continent, and the romanticization of the "frontier" West. Historian Frederick Jackson Turner presented his thesis that the western advance into a wild and savage frontier defined the American spirit, and the idea took hold in the national imagination.

Historian Sara Dant pulls the curtain away from those oft-spun tales of an unspoiled American West in this book about the interaction between people and nature over time. As she examines "deep" history, it's clear that the myth of virgin territory ignores Native American influence on the region.

"Far from the 'wilderness' described in earlier histories, the West was never an undiscovered 'Eden,' but instead an ancient homeland with landscapes that humans have inhabited, modified, and managed for thousands of years," writes Dant.

Native Americans, for example, used fire extensively to create open spaces, established agriculture around corn and other crops, traded extensively, had economic specialization, and built class-based urban centers. Columbus never discovered America. He and other Europeans arrived in an inhabited land, despite the European and, later, American illusion of an untouched country.

They also saw it was rich with resources. That part was true, and Dant details the

exploitation of the West, particularly in the transition to market economies. As debates continue to rage around who owns the land and who can take its riches, and climate change continues to burn and modify the West, Dant wants to know, "At what cost?"

Written for a general audience in clear prose, *Losing Eden* centers around three themes that have defined the American West: balancing economic success with ecological protection, avoiding the "tragedy of the commons," and achieving sustainability.

In particular, Dant looks at the idea of a commons—land or resources shared by a group—and the tragedy when people deplete those resources to the detriment of society. This is very poignant and relevant in the West, such as the slaughter and near extinction of bison on the Plains.

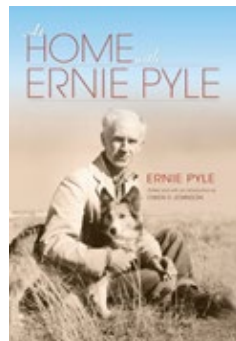
Dant earned her graduate degrees in American studies at Washington State University, and is now a professor and chair of history at Weber State University in Ogden, Utah. Her work focuses on environmental politics in the United States with a particular emphasis on the creation and development of consensus. Dant is the author of several prize-winning articles on western environmental politics and coauthor of the two-volume *Encyclopedia of American National Parks*.

She writes in *Losing Eden* that this book is her valentine to the West she loves. While Dant encourages readers "to lose this conceit of a 'virgin continent,'" she also wants us to care about what we know. Environmental history of the American West connects readers with place. It's a complex symbiotic relationship, and one we need to grasp to get past conservation-versus-preservation ideologies.

For Dant, it's about the ability to achieve sustainability by creating environmental stability and ecological health within the framework of economic development. But that has to be achieved through a clear-eyed look at the true history of a region that's been shaped and adapted over thousands of years.

Losing Eden isn't about loss of paradise. It's about losing the delusion of an Edenic West.

—Larry Clark



At Home with Ernie Pyle

EDITED BY OWEN V. JOHNSON '68
INDIANA UNIVERSITY PRESS: 2016

A glimpse into the life and times of American journalist and Indiana favorite son Ernie Pyle, as seen through an extensive collection of Pyle's folksy newspaper columns stretching from his student days in 1921 until his death by sniper fire during the Battle of Okinawa in 1945.

The homespun Hoosier, as Pyle was known, grew up in small-town Dana, Indiana, where the locals became familiar subjects in his syndicated column that eventually ran in more than 300 weekly newspapers.

Pyle seemed to attract Hoosiers everywhere he traveled and delighted in telling their stories. As a war correspondent in World War II, he provided welcome updates for the families of military members.

"Readers treated his columns like loved ones' letters from overseas, telling what it was like to be in the war," writes Johnson, who also wrote the book's introduction.

Pyle's simple yet poignant accounts of these "dogface" soldiers earned him the Pulitzer Prize in 1944. A sample of his humor and humanity:

January 25, 1944
IN ITALY—(by wireless)—*The several Air Force units I've been with lately are lousy with Hoosiers. I thought I'd take down their names and put them in the column, but the list got so long I realized it would sound like discrimination and the 47 other states might get mad at me.*

So, I decided to compromise and name only one. He is Lieut. James F. Short of Clinton, Ind. He has been in the army four years, and

was a sergeant up until he got his commission a year ago. He calls himself "one of the 90 day wonders." He's only 22, and he is the assistant operations officer of his squadron.

The reason I picked Lieutenant Short out of all the Hoosiers is that he was born and raised five miles from that proud metropolis from which I sprang—Dana, Ind.

—Rebecca Phillips



Hip Hop Ain't Dead: It's Livin' in the White House

SANFORD RICHMOND '11 PHD
MILL CITY PRESS: 2016

Playing While White: Privilege and Power On and Off the Field

DAVID J. LEONARD
UNIVERSITY OF WASHINGTON PRESS: 2017

During his undergraduate years at the University of Southern California, writes Sanford Richmond in *Hip Hop Ain't Dead*, "I began to realize that the world I had experienced as a child was not merely just a sequence of unfortunate coincidences, but a systematic exclusion of an entire population."

Richmond's experiences include the murder of a black junior high school classmate, Latasha Harlins, by a Korean grocer, and the city-burning riots in the wake of the Rodney King verdict. The Harlins murder led to one of Richmond's favorite songs, Ice Cube's documentary-like "Death Certificate."

Richmond celebrates hip-hop's ability to kick against the traces that bind black

American culture to what Washington State University professor David Leonard, in *Playing While White*, describes as "the construction of blackness as criminal."

"The panics," Leonard writes, "surrounding blackness, its scapegoating, and the efforts to source problems to the black community not only replicate longstanding cultural projects that locate broader social and cultural problems through black bodies in general, and hip-hop specifically, but also exonerate whiteness and America as a whole."

Leonard cites historian Robin D.G. Kelly, who writes about the perception that it is the "inner city" that is a source of "social problems" and how the "'ghetto' continues to be viewed as the Achilles heel in American society, the repository of bad values and economic failure" as well as "the source of a vibrant culture of resistance."

Instead of acknowledging the ingrained racism of American society, then, pundits of all colors prefer to locate the problems in the black family, the places black people live and grow up, or the way they play music and sports.

Black celebrities and critics excoriated hip-hop as a source of negative influence on black culture, even as more stereotypically white music got a pass. Bill Cosby, Stanley Couch, Don Imus, Geraldo Rivera all publicly asserted that hip-hop was part of the problem, thus scapegoating the music in the face of overwhelming evidence that racism is a systemic issue rather than one of self-representation.

Like brown-skinned Muslim women who wear burkas or men who wear khalifas, turbans, or beards, are considered suspect, hip-hop culture made the hoodie notorious. As Richmond writes, when black congressman Bobby Rush gave a speech decrying racial profiling on the floor of the House, he was forcibly removed. Why? He was wearing a hoodie. Rush survived that altercation, unlike Trayvon Martin who, as Richmond describes, was murdered because he was a black man wearing a hoodie.

But emerging folkways often come with changes in fashion. The adoption of beads and paisley prints came along with the Grateful Dead and Jefferson Airplane. The donning of sports jerseys and hoodies corresponds

precisely with the rise in popularity of the NFL, the NBA, and hip-hop.

Musicologically and historically, hip-hop is a new folk music, born of African blues and black American jazz. Hip-hop builds on jazz's rejection of the white European idea of originality and structure. The European classical tradition prizes that which has never been heard before, whereas jazz, as blues before it, favors a perspectival contribution that adds a unique voice to an ongoing project of collaboration.

This new folk music is a living poetry that documents the plight of groups of people oppressed by a racist majority culture. The music documents—and also protests loudly. As one critic put it in a review of N.W.A.'s *Straight Outta Compton*, rap "overtuned transnational culture like a police car."

Even as we preach a doctrine of equality, our language betrays us. Reading Leonard, you'd think it was the sportswriters, not the football and soccer players, who had the concussive brain injuries.

It's the banality of racism that is so appalling and frustrating to Leonard. Systemic racism is taken for granted, underanalyzed, and explained away. Sportscasters and sportswriters, no matter the color of their skin, consistently criticize black players for exactly the same behavior as their white colleagues, who get a pass. In example after example, Leonard examines the language of sports pundits to make his case. Perhaps the most telling is his consideration of the reception of Johnny "Football" Manziel, "the once famed college football player turned mediocre NFL star ... who has always liked to talk trash."

Even as sportswriters damned black players for talking trash, Manziel was praised as a smart leader and a cunning competitor. As Leonard points out, trash talking in competitive situations is nothing new; so why are blacks and whites judged differently? "Just shut up and play," the critics say to "Richard Sherman, Beckham, Russell Westbrook, Yasil Puig, Serena Williams and even [Muhammad] Ali," while players like "Johnny Talker and Marshall Heckler [Henderson]" get to "#PlayWhileWhite." When Rob Gronkowski or Tom Brady "dance, taunt opponents, and talk trash" they aren't showing "disrespect" but rather displaying their "passion."

NEWmedia

This isn't even hate. This is a racism so ingrained, so deeply systemic, that it becomes a kind of blinding fog that causes many whites—and others—to fear every black body as a potential crime.

With Richmond and Leonard's army of documentary evidence, though, we should all begin to see ourselves in the mirror.

—Brian Charles Clark

BRIEFLY NOTED

On the Arctic Frontier: Ernest Leffingwell's Polar Explorations and Legacy

JANET R. COLLINS

WSU PRESS: 2017

Arctic explorer and geologist Ernest deKoven Leffingwell (1875–1971) helped determine the edge of the continental shelf—the first solid evidence that searching for land north of Alaska was likely futile. He also left detailed, accurate maps of Alaska's northeast coast, groundbreaking permafrost studies, and charted the geology and wildlife of the region. Collins, a Western Washington University librarian intrigued by Leffingwell's work, reveals a relatively unknown, meticulous, and detailed explorer devoted to the Arctic.

Re-Awakening Ancient Salish Sea Basketry: Fifty Years of Basketry Studies in Culture and Science

ED CARRIERE AND DALE CROES '73 MA, '77 PHD

JOURNAL OF NORTHWEST ANTHROPOLOGY: 2018

Suquamish Elder and master basketmaker Carriere and archaeologist Croes, a WSU faculty member specializing in ancient basketry and excavation of Northwest Coast waterlogged sites (also known as "wetsites"), have spent over 50 years of their lives studying basketry. This memoir delves into their knowledge of thousands of years of traditional basketmaking along the Salish Sea.

Lean Refining: How to Improve Performance in the Oil Industry

LONNIE WILSON '69

INDUSTRIAL PRESS: 2017

Wilson, a consultant and expert in Lean Manufacturing, applies the principles of a culture of continuous improvement and an engaged

workforce to the oil industry. Wilson studied chemical engineering at WSU and managed Chevron refineries for 20 years, where he first started applying Lean principles. In this book, he provides many examples unique to the oil business.

Madeleine's Children: Family, Freedom, Secrets, and Lies in France's Indian Ocean Colonies

SUE PEABODY

OXFORD UNIVERSITY PRESS: 2017

A detailed family saga set against the broader context of South Asian slavery, plantation life, Parisian society, and French colonization, *Madeleine's Children* traces the multigenerational biography of a slave family and the legal battles pursued by Madeleine's son Furcy—a slave who fought for his freedom in court for 25 years and finally won. It uncovers intimate relationships and legal disputes between slaves and free people in the Indian Ocean that have been hidden for two centuries. Peabody, Meyer Distinguished Professor of Liberal Arts and History at Washington State University Vancouver, is a leading authority on slavery in the French Empire.

Materials and Devices for Bone Disorders

Edited by SUSMITA BOSE AND AMIT BANDYOPADHYAY

ELSEVIER: 2016

Written by a cross-disciplinary team of research scientists, engineers, and clinicians, this book bridges the gap between materials science and bone disorders, providing integrated coverage of biomaterials and their applications. The book was edited by WSU materials engineering professors Susmita Bose and Amit Bandyopadhyay, who also contributed to the volume.

Oregon Pioneer Cattle Barons

DORYS C. GROVER '69 PHD

PAGE PUBLISHING: 2017

The lives of four central Oregon cattlemen—John Devine, Peter French, Henry Miller, and William Hanley—from the late 1860s to the 1900s are detailed in this volume, along with brief vignettes of other prominent livestock raisers of that period. This is the fourth book from 96-year-old Grover, who received her doctorate from WSU in American studies and is now an emeritus professor of literature and languages from Texas A&M University, Commerce.

CLASSnotes

60 HENRY WYBORNEY ('62 Anthro.) and ART SANDISON ('70, '73 MS Phys. Ed.) were recently inducted into the Port Angeles High School Roughrider Hall of Fame. Henry set the state record for high jump at Port Angeles in 1957, and went on to break WSU's high jump record three years later. Art held the second-fastest 800-meter time in the history of American track while at WSU, and still holds the state's fastest 800-meter time for college or high school athletes, which he set for the Roughriders in 1965.

70 Former president and CEO of Boeing, and current WSU Regent SCOTT CARSON ('72 Busi.) was presented with the Weldon B. "Hoot" Gibson Distinguished Volunteer Award, the Washington State University Foundation's highest honor. He has given decades of volunteer service and donations to WSU; the Carson College of Business was named in his honor in 2014. ✨ After 40 years in private practice in Colfax, GARY J. LIBEY ('73 Poli. Sci.) took the reins as Whitman County Superior Court judge after being elected last November. His predecessor and classmate, J. DAVID FRAZIER ('73 Poli. Sci.), previously served on the bench first as Whitman County District judge for 18 years, and then Whitman County Superior Court judge for 16 years. He retired in January 2017. Both Frazier and Libey studied political science and served as president of their fraternity, Alpha Kappa Lambda. Libey is also a lifetime Alumni Association member. ✨ BILL WHITE ('74 Busi.) was named the interim president and CEO of Intellicheck, Inc. In addition to his current position as CFO, Bill will take on the additional role as a part of the company's efforts to combat identification fraud. ✨ MICHAEL S. MCGOUGH ('79 Mat. Sci.) joined Saulsbury Industries as the firm's chief nuclear officer. Michael has lent his expertise to a number of nuclear operations across the globe during his 38-year career, most recently as NuScale Power's chief commercial officer.

80 CHARLIE KRONVALL ('80 Chem. Eng.) retired from the Hanford Nuclear Site

after more than 37 years. He served in an assortment of roles during his time Hanford, including vice president at the Richland Operations Center and as the company's chief engineer. ✨ NEIL MCCLURE ('80 Ag. Econ.) was appointed by Gov. Jay Inslee to Yakima Valley College's Board of Trustees. He has served on a range of Yakima organizations in the past couple decades, including the Yakima City Council. He also owns the family business, Firman Pollen Co. ✨ LEE CHEATHAM ('81 MS Elec. Eng.) was appointed the director of technology deployment and outreach at the U.S. Department of Energy's Pacific Northwest National Laboratory, where he will work to widen the influence of the firm's science and technology through improved relationships with industry partners. ✨ BILLY J. WILLIAMS ('81 Crim. Jus.) was nominated to remain as Oregon's U.S. attorney by President Donald Trump. Williams was a Multnomah County senior deputy district attorney until he joined the U.S. attorney's office in 2000. He has been acting U.S. attorney since April 2015. ✨ The Covenant School of Dallas named ROBERT LITTLEJOHN ('83 PhD Botany) its next head of school. Formerly the head of school at Trinity Academy of Raleigh, he is also a published author and dedicated advocate for classical Christian education. ✨ Newpark Resources, Inc. appointed JOHN C. MINGÉ ('83 Mech. Eng.) as a new member to its board of directors. Newpark is a worldwide provider of drilling fluids systems and composite matting systems used in oilfield and other commercial markets. Mingé is chairman and president of BP America, Inc., where he has worked for 34 years. ✨ JEFF BUTLER ('84 Comm.) was chosen to be Alaska Airlines' new vice president of inflight and call center services. He has worked in a range of positions since beginning with Alaska Airlines in 1984, including editorial assistant, sales agent, and managing director of inflight operations, and was named a "Customer Service Legend" by the company in 2016. ✨ MARK JUTILA ('84 MS, '86 PhD Bacterio.), head of Montana State University's Department of Microbiology and Immunology, was

confirmed as a Regents Professor at MSU. Jutila's research focuses on human and animal immunology. His research into the body's inflammatory response has fed into the development of clinical treatments for disorders like psoriasis or inflammations of the gut and nervous system that target the cells causing the inflammation and shut them down at the molecular level. He remains active in the classroom, directs other high-level research programs, and has received grants at MSU totaling more than \$25 million. ✨ GENE DOWERS ('86 Phys. Ed.) was selected as executive director for the nonprofit Pateros-Brewster Community Resource Center. In his new role, Gene will work to find resources for those in need of health care, chronic pain treatment, disaster relief, and insurance coverage. ✨ Hydrogen Advertising of Seattle chose BRENDA COLLONS ('87 Hum.) to be its new vice president and director of strategic communications and public relations. Brenda has worked in the advertising field for almost 30 years, most recently as partner and owner for Seattle- and Portland-based C Squared Advertising. ✨ GLEN SCHUMOCK ('87 Pharm.), professor and head of pharmacy systems, outcomes, and policy, in the University of Illinois at Chicago College of Pharmacy, became dean of the UIC College of Pharmacy. Schumock is co-principal investigator of the UIC Center for Excellence in Comparative Effectiveness Research Education, which is funded by the PhRMA Foundation. He is the founding director of the UIC Center for Pharmacoepidemiology and Pharmaco-economic Research and led the center from 2002 to 2013. ✨ JENNIFER MILLER ('88, '15 PhD Nursing) was recently hired as an assistant professor in the University of Colorado Colorado Springs' nursing and health sciences department. Previously, Jennifer was a faculty member and lecturer at Gonzaga University in Spokane.

90 ROBERT HARDING ('91 DVM) was presented with the 2017 Dairy Quality Veterinarian of the Year award at the fiftieth American Association of Bovine

Practitioners conference. Robert runs a dairy practice in Utah which emphasizes antibiotic responsibility, animal comfort, and management of dairy quality through data analysis. ✨ PATRICK KRAMER ('92 Psych.) was appointed as vice chancellor for Institutional Advancement of the Texas Tech University System and chief operating officer of the Texas Tech Foundation. Patrick's almost 25-year career has led him to a variety of fundraising and leadership roles with WSU and the University of Colorado. ✨ Juanita Bay Veterinary in Kirkland welcomed KARI JOHNSON ('93 DVM) to its practice. Kari has experience as an emergency and rehabilitation doctor. She also teaches undergraduate human anatomy and physiology to college students. ✨ The American Society of Interior Designers (ASID) appointed NICOLE CECIL ('96 Int. Des.) to its national committee, where she will oversee seven of the organization's chapters in California and act as a liaison with its headquarters in Washington, D.C. Nicole currently serves as interior design studio manager at CSHQA, an architecture and engineering firm in Boise, Idaho, and recently completed a term as ASID's Intermountain Chapter president. ✨ MARCUS GLASPER ('97 Eng. Mgmt.) was appointed by Gov. Jay Inslee to serve as acting director for the Washington State Lottery. Currently the deputy director at the Washington State Department of Revenue, Marcus will draw upon years of managerial experience with organizations such as the Department of Corrections and the U.S. Department of Energy. ✨ M. LORENA GONZÁLEZ ('99 Busi.) was re-elected to the Seattle City Council in November for her second term. As an attorney and civil rights activist, she is nationally recognized for her work in anti-discrimination, police misconduct, and wage theft cases. ✨ GREG PETRY ('99 Busi.) has been changing the look of downtown Pullman recently with a number of construction projects around the city. Greg is helping remodel the vintage State Inn hotel, as well as a redevelopment

⊕ also check out class notes online: magazine.wsu.edu/mystory

CLASSnotes



COURTESY FREEDOM SIYAM

It's not easy being an educator of America's future. "I work with over 150 adults every day who go home exhausted, because they are doing everything they can to reach and teach children," says **FREEDOM SIYAM '00**.

Siyam is the principal of Balboa High School in San Francisco's Excelsior district. "This area is the last bastion of the working class family in the city," he says. All over the Bay Area, rents and home prices have skyrocketed as Silicon Valley has swollen and high-paid tech workers price people out of their neighborhoods.

"Regardless of what district, our families are educationally underserved," Siyam says. "There's just not enough money that goes into funding public education. And our students' families are just holding on to whatever they have left. And they don't know that they'll be here the next day."

Siyam is not one to surrender to the inevitable. "Going into education was a conscious, intentional choice to reach students that were just like me. If I could have a positive impact on someone who is apathetic, as I was in high school, and if I can help someone find some sort of purpose, then I can continue to do my job," he says.

In his senior year of high school in Seattle, Siyam says in his calm and understated way, he "went through a pretty traumatic experience where my friend shot this dude. I witnessed the whole thing. It was a significant emotional event in my life. It precipitated a lot of important questioning of my own direction."

Suddenly, he says, he needed to go to college, he needed to be an educator, he needed to make a difference in communities where safety is at a premium and need is rampant.

Siyam says that Multicultural Student Services was critical in recruiting him and facilitating his transfer from Seattle Central Community College to Pullman and Washington State University. At WSU, the Filipino American was an activist and mentor for other underrepresented minorities.

He misses the Palouse but he might soon have reason to visit. "My stepson Derek is applying to universities," he says. "I'm hoping he chooses WSU." *

BY BRIAN CHARLES CLARK

of the old Pullman Building Supply. ✨ Skillspire, a technical academy offering the most in-demand skills training to underrepresented populations in the high-tech sector, added **ERIKA PRICE** ('99 MBA) as its business development manager. She spent over a decade working in product and program management for Microsoft, Symantec, and Intel. Erika recently completed Reboot Seattle, the career accelerator focused on women returning from a career break. ✨ **JEFF SNELL** ('99 MED, '17 EDD) regularly runs marathons to raise money for various charities with his son, Micah, who has a developmental genetic disorder that affects his ability to walk and speak. Jeff started Micah's Miles in 2012, an organization that raises money to support people with cerebral palsy. He's currently superintendent of the Camas School District.

00 The *Vidette* newspaper of Montesano, Washington, recently welcomed **TODD BENNINGTON** ('01 Fine Arts, '10 English) as its newest reporter. In addition to four

years of journalism experience, Todd served four years in the U.S. Army as a paratrooper and intelligence analyst. ✨ Tacoma's BLRB Architects named **JONAH JENSEN** ('02 Arch.) its new associate principal. He has served as a designer, architect, and project manager since beginning at the firm in 2006. During this time, Jonah has worked on a number of K-12 school projects, including the expansion and modernization of Seattle's historic Loyal Heights Elementary, as well as the rehabilitation and expansion of Washington Elementary in Tacoma. ✨ ITS Logistics announced **JIM DINGMAN** ('03 MBA) as the firm's new president of fleet operations. A veteran of the trucking and distribution field, Jim has acquired over 25 years of management and sales experience with a range of companies and served in the U.S. Marine Corps for six years as a diesel mechanic. ✨ Mercer Wine Estates of Prosser recently chose **JEREMY SANTO** ('03 Bio.) to take over as head winemaker. He boasts years of industry experience, creating award-winning wines for Washington estates such as Chateau

Ste. Michelle and Wahluke Wine Company. ✨ **KERITH BURKE** ('04 Comm) will offer in-game interviews, insight, and analysis on social media as NBA Sports Bay Area's new sideline reporter for the Golden State Warriors. During Kerith's sports broadcasting career of over ten years, she reported on the University of Connecticut's women's basketball team for four years, including hosting the *Geno Auriemma Show*, and covered the 2016 Rio Olympic Games for NBC. ✨ Hale Makua Kahului, Maui's largest skilled and intermediate nursing home, rehab center, and adult day health center, hired **TEANA KAHO'OHANOHANO** ('07 MHPA) as its new administrator. She has over 10 years of experience in the industry in California and Hawai'i. Teana will oversee activities, nursing, social services, maintenance, and engineering at the organization. ✨ **JERRY LANGREDER** ('09 Crop Sci.) was selected to be the new director of operations for River Ranch McCall, a 458-acre housing development in McCall, Idaho. Jerry is a 17-year U.S. Marine Corps veteran

and has held positions in landscape and property management at Eastern Washington University and the Manito Country Club in Spokane. ✨ Founded in Pullman by **PAVLO RUDENKO** ('09 Physics, '15 PhD Mat. Sci.), TriboTEX was honored with the Defense Innovation Award at Technology Acceleration Challenge 2017. Pavlo's thesis research at WSU provided the basis for TriboTEX, which uses nanotechnology to combat automobile engine wear. ✨ **LUKE SCHUELER** ('09 Soc. Sci.) was chosen as Top CEO of the Year and "40 Under 40" by the International Association of Top Professionals. Aiming to create safer trampoline technology, Luke and his twin brother founded Shock Trampoline Parks and Flying Squirrel Sports, which builds the largest indoor trampoline parks in the world.

10 Baker Boyer Bank promoted **KAREN BENGE** ('10 Env. Sci.) as the company's new vice president and asset management operations manager. She has worked her way up the management chain, holding a variety of positions at the Walla Walla-based bank since beginning in 2013. ✨ The University of Mississippi recently welcomed **FRANCIS D. BOATENG** ('12 MA, '15 PhD) to its applied sciences department. Formerly an assistant professor at the University of Minnesota Crookston, Francis shares his research findings about criminal justice theories and related fields in speeches across the country and a variety of academic journals. ✨ Former Cougar rowers took gold, silver, and bronze in the women's pair, as a combination of six former and current Washington State rowers competed at the 2017 RCA National Rowing Championships, the Canada Cup, at Burnaby Lake, November 7-12. **LISA ROMAN** ('12 Psych.) won gold, **NICOLE HARE** ('17 Busi.) won silver, and **MORGAN CATHREA** ('16 Neurosci.) won bronze. WSU senior Emily Thomson, sophomore Ivy Elling Quaintance, and freshman Emma Gribbon also represented Washington State rowing at the championships. ✨ The

CLASSnotes



SHERRIDAN AND JEFF POFFENROTH WITH WSU SOPHOMORE BRET POFFENROTH AND RYAN POFFENROTH '17. FAMILY FACEBOOK PHOTO FROM WSU PARENTS' CHAT CAFE

What is the definition of the Cougar family? **WSU PARENTS CHAT CAFE** is a Facebook group where parents of WSU students come together in support of each other. We handle the noncampus types of questions that WSU staff might not have the personal know-how or time to answer. We handle questions around ordering cupcakes, pizza delivery, local medical services, flight and travel information, winter tires and clothing, and many others. I tell new members, those questions that wake you in the middle of the night? We have also had them and we have the answers. There really isn't any question you can come up with that we can't answer.

Check us out: [facebook.com/groups/351823571670041](https://www.facebook.com/groups/351823571670041).

Some of the great things about this group: If you need something delivered to your Cougar, chances are there is another member making a trip to Pullman. If your Cougar is sick, there is probably a parent in Pullman right now that will help out. If your Cougar is stranded, broke down, or in accidents, we created a list of 200-plus volunteers all over the world that are willing to help our Cougs.

Don't get me wrong, this group is not only a question and answer group. We have fun too. Many parents meet for care pack

age creations. They gather to watch televised sporting events. They meet for drinks, dinner, and breakfast to talk about our Cougs. We tell funny and sometimes embarrassing stories of our Cougs. We share our Cougs' successes, stresses, and failures. Some talented parents make WSU types of items and sell them through our page. We ask for parents to post a short biography about themselves, their family, and Cougar

so that we can get to know each other and care more about each other.

We have also cried or grieved together when one of our Cougs has been hurt or killed. We send cards to families dealing with loss, and started a drive for a memorial bench with paving stones to honor additional fallen Cougs.

WSU is truly an amazing community. Jim Walden was 100 percent correct when he said, "I can't define it, I can't tell someone who isn't a Cougar what it's like. There's something that happens at Washington State; you quietly and subtly become infected... Washington State is a passion. Being a Cougar is a passion." ✨

FROM CARLTON "SKEETER" GLENN

Geological Society of America named **MELANIE R. THORNTON** ('12 MS, '17 PhD Env. Sci.) as one of its three 2017-2018 fellows for science policy and communication. She will work with a member of Congress or congressional committee in order to better society through greater efficacy in science and public policy. During her doctoral research at WSU, Melanie collaborated with stakeholders and scientists on water sustainability issues in the Spokane River Basin. ✨ In pursuit of a master's degree from Miami University, **RACHEL HUGHES** ('13 Zool.) recently traveled to Belize to study how communities there work to protect local wildlife, such as coral reefs and howler monkeys. She is currently a reptile and carnivore keeper at the Frank Buck Zoo in Sherman, Texas. ✨ Treehouse recently named **MADDIE MARCH** ('14 Acc.) as one of its twelve Young Professionals Board

members. As a board member, she will work with the Seattle nonprofit to support the academic success and other essential needs of youth in the Washington foster care system. ✨ **LAREESA MARQUETTE-BLAKELY** ('15 Soc.) performed on the quarter-finals of NBC's *America's Got Talent* on August 29 as a part of the 43-member Danell Daymon & Greater Works gospel choir. During her time at WSU, she served as the director of God's Harmony gospel choir and still performs regularly in the Pullman community. ✨ **JACOB MEDLEY** ('17 Elec. Eng.) was hired as the Jefferson County Public Utility District's newest staking engineer. A second-generation public utility worker, he joins the company after working as intern for Tacoma Power in 2016. ✨ DCI Engineers in Seattle welcomed **KYLE MONTZHEIMER** ('17 Civ. Eng.) to the position of project engineer. He will

begin his work for the structural and civil engineering firm designing modular projects in Washington, Colorado, and California. ✨ **ALEXANDER WOLFE** ('17 MAR) recently joined ALSC Architects as an architectural intern. He is working on projects for both the Central Valley and Cheney school districts.

INmemoriam

30 **NECIA BENNETT HUNTLEY** ('35 History), 104, September 24, 2017, Olympia. **LYLE G. NICHOLSON** ('37 DVM), 102, August 9, 2017, Hood River, Oregon. **LUCILE RAMSEY CAVANAUGH** ('39 Home Econ.), 99, July 21, 2017, Winchester, Massachusetts.

40 **SARAH SCHLADEMAN HALL** ('41 History), 97, August 12, 2017, Everett.

AUREA HAYS ('41 Hort.), 100, March 29, 2017, Rancho Mirage, California. **H. ROBERT RIPLEY** ('41 Gen. St.), 94, June 27, 2015, Castro Valley, California. **MAURICE R. SMITH** ('41 Arch., Sigma Nu), 99, November 13, 2017, Yakima. **MAXINE SPENCER GREEN** ('43 Psych.), 95, June 19, 2016, Bellingham. **LENORE JOHNSON HICKS** ('47 Home Econ.), 91, December 8, 2016, San Rafael, California. **JOHN D. GILLIS** ('48 Phys. Ed.), 95, September 2, 2017, Olympia. **BARBARA ANN GJERTSEN** ('48 Arch.), 90, November 9, 2017, Port Orchard. **RICHARD F. KNOX** ('48, '53 MS Elec. Eng.), 97, July 13, 2017, Milwaukie, Oregon. **GLORIA CHAMBERS MYRE** ('48 History), 91, January 11, 2017, Mercer Island. **RALPH E. VAIL JR.** ('48 Civ. Eng.), 91, August 28, 2017, Santa Fe, New Mexico. **ALICE ELLIS** ('49 Elem. Ed., '51 Ed.), 92, July 29, 2017, Richland. **GEORGE W. GOLDSBERRY** ('49 Elec. Eng.), 93, June 14, 2017, Issaquah. **WALTER R. "GUS" GUSTAFSON** ('49 Psych.), 91, October 16, 2017, Olympia. **VIRGINIA L. JORISSEN** ('49 Home Econ.), 92, November 7, 2017, Vancouver. **TOM JONES PARRY** ('49 Phys. Ed., '51 Ed.), 94, November 21, 2017, Moxee.

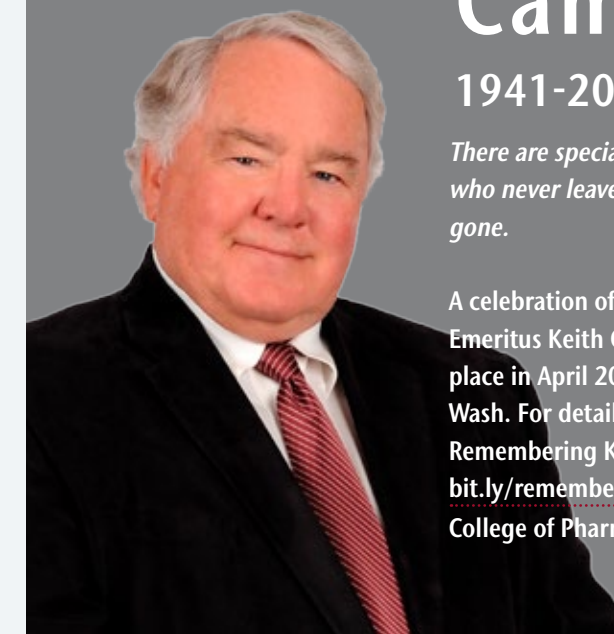
50 **DAVID "BUD" ABBOTT SR.** ('50 Gen. St.), 92, October 28, 2017, Sammamish. **JUD HEATHCOTE** ('50 Phys. Ed.), 90, August 28, 2017, Spokane. **ROLAND C. HINTZE** ('50 Ag. Ed., '54 Ed.), 89, October 9, 2017, Spokane. **ROBERT D. LOWE** ('50 Mech. Eng.), 93, September 12, 2017, Des Moines. **DAVID MCKEEN** ('50 Socio.), 89, November 19, 2016, Nevada City, California. **ROBERT P. WHITAKER** ('50 Ag., '54 DVM), 94, November 5, 2017, Sumner. **RICHARD GEORGE GOSS** ('51 Bacterio.), 91, 2017, Alderwood. **LOIS MAE JONES** (x'51, Delta Delta Delta), 88, November 1, 2017, Seattle. **MARIAN S. NORDQUIST** ('51 Theatre), 88, October 14, 2017, Pullman. **JOHN A. OLIVER** ('51 Pharm., Kappa Sigma), 91, September 30, 2017, San Diego, California. **JO ANN RUNYON** ('51 Gen. St.), 87, August 29, 2017,

Salem, Oregon. **JAMES W. BERGER** ('52 Gen. St.), 88, October 6, 2017, Meridian, Idaho. **GEORGE E. CAMP** (x'52, Sigma Alpha Epsilon), 90, June 2, 2017, Issaquah. **NORMAN R. GRIER** ('52 Civ. Eng.), 88, December 12, 2016, Seaview. **RICHARD M. OLTMAN** ('52 Gen. St.), 89, July 28, 2017, Shelton. **ROBERT M. OTTERAAEN** ('52 Ag.), 86, November 15, 2014, Kelso. **WILLIAM WADE PETERSON** ('52 Wildlife Bio.), 87, August 22, 2017, Olympia. **ALICE O. RICE** ('52 Gen. St.), 83, April 29, 2013, New York, New York. **PAUL ROLAND SELLIN** ('52 History), 87, September 24, 2017, Los Gatos, California. **VIRGINIA "GINNY" (JONES) WHITELEY** (x'52 Busi.), 87, September 3, 2017, Sun City West, Arizona. **KENNETH C. ANDERSON** ('53 Ani. Sci.), 86, June 27, 2017, Lafayette, Colorado. **ROBERT M. FERGUSON** ('53 Busi.), 87, October 30, 2017, Asheville, North Carolina. **WALLIS W. FRIEL** ('53 Poli. Sci.), 86, October 24,

2017, Pullman. **DAVID M. SCOTT** ('53 Arch.), 87, November 11, 2017, Yakima. **BARBARA A. CHRISTENSEN** ('54 Gen. St.), 84, November 16, 2017, Pullman. **REITA PETERSON** (x'54), 85, October 31, 2017, Olympia. **RAYMOND JOHN SCHAAF** ('54 Gen. St., Tau Kappa Epsilon), 92, September 9, 2017, Bothell. **MILT EMERSON SCHWENK** ('54 Comm.), 84, September 21, 2017, Yakima. **HOWARD HENRY WEST** ('54 Elec. Eng.), 92, September 2, 2017, Gig Harbor. **RONALD L. CASEBIER** ('55 Chem.), 83, September 25, 2017, Lacey. **LOLA JANE FINCH** ('55 Home Econ., '73 Ed., Phi Beta Phi), 84, November 6, 2017, Pullman. **ELMER DALE GIBBONS** ('55 Ani. Sci.), 82, October 17, 2017, Medical Lake. **DONALD FLOYD SHEELY** ('55 Civ. Eng.), 86, October 31, 2017, Las Vegas, Nevada. **TED M. TOCHTERMAN JR.** ('55 History), 84, September 24, 2017, Bellevue. **PAUL E. WAGNER** ('55 Ag. Eng.), 84,

IN MEMORY OF

R. Keith Campbell 1941-2017



There are special people in our lives who never leave us, even after they are gone.

A celebration of life to honor Professor Emeritus Keith Campbell will take place in April 2018 in Spokane, Wash. For details, please visit the Remembering Keith Facebook page at: [bit.ly/remembering-keith](https://www.facebook.com/remembering-keith), or call the College of Pharmacy at 509-368-6675.

In Memoriam

June 1, 2017, Huntsville, Alabama. **DONALD BRUCE BUTLER** ('56 Busi.), 81, November 16, 2015, Beaverton, Oregon. **RONALD CLARK OVERBY** ('56 Const. Mgmt.), 82, May 6, 2017, Bellevue, Nebraska. **CLARA LOUISE CARPER** ('57 Nursing), 84, September 17, 2017, Burien. **WALTER ALVIN LYONS** ('57 Civ. Eng.), 88, October 22, 2017, Yuba City, California. **RICHARD LEE GORDON** ('58, '66 PhD Physics), 81, August 16, 2017, Richland. **ROBERT "BOB" JOHN PEARSON** ('58 Psych.), 85, June 6, 2017, Vancouver. **SUE GLENN RICHEY** ('58 Elem. Ed.), 81, August 24, 2017, Lakewood. **JOHN B. SIMPSON** ('58, '64 MS Ag. Eng.), 87, September 26, 2016, Colfax. **ROY LYLE JEREMIAH** ('59 Acc.), 81, September 10, 2017, Spokane.

DIANNE J. MATTLER ('60 French), 79, September 2, 2017, Tacoma. **HARRY DELBERT PERRY** ('60 Busi.), 82, September 9, 2017, Couer d'Alene, Idaho. **GARY E. CHAPPELL** ('61 Psych.), 80, September 30, 2017, Spokane. **GARY KEMP GLAZE** ('61 Ed., '64 MED Ed. Psych.), 82, November 19, 2017, Bellingham. **NEIL WILLIAMS** ('61 Elec. Eng.), 88, September 5, 2017, Anacortes. **ROBERT J. LECOUNT** ('62 Elec. Eng.), 81, October 17, 2017, Spokane. **JOHN R. ERICKSON** ('63 Agro.), 78, October 30, 2017, Pullman. **JOHN F. CAMP** ('64 Busi., '66 MBA), 74, September 19, 2017, Vancouver. **R. KEITH CAMPBELL** ('64 Pharm., '72 MBA), 76, November 11, 2017, Centralia. **WILLIAM B. JENNINGS** ('66 MED), 93, July 13, 2017, Newcastle. **FRANK W. SCHUFLETOWSKI** ('66 PhD Higher Ed. Admin.), 77, September 15, 2017, San Antonio, Texas. **CHARLES V. GENTHE** ('67 PhD Amer. St.), 80, September 8, 2017, Redding, California. **TONI TAYLOR GOODWIN** ('67 Elem. Ed.), 71, October 12, 2017, John Day, Oregon. **DIANE LOUISE SCOLLARD** ('67 Elem. Ed.), 72, October 30, 2017, Seattle. **THOMAS WILLIAM KALLEN** ('68 PhD Chem.), 78, October 15, 2017, Rochester, New York. **JAMES C. BARSOTTI** ('69 Comm.), 77, October 17, 2017, Havre, Montana.

GENE H. NELSON ('71 Civ. Eng., '73 Busi.), 77, September 17, 2017, Seattle. **GORDON D. DISNEY** ('72 Nursing), 66, February 20, 2016, Spokane. **CHERYL JEAN MARSHALL** ('72 Int. Des.), 67, September 16, 2016, Tacoma. **NORMAN B. KING** ('73 Fin., '76 Ag. Econ.), 73, March 7, 2017, Wilsonville, Oregon. **DEAN H. MELVILLE** ('73 Psych.), 69, September 8, 2017, Spokane. **CYNTHIA S. BROOKES** ('74 For. Lang. and Lit.), 65, September 18, 2017, Spokane. **JAN L. RICHARDS CLAYPOOL** ('74 Fine Arts), 65, October 17, 2017, Orlando, Florida. **GILBERT K. DODGEN** ('74, '77 MA For. Lang. and Lit.), 65, April 24, 2016, Trabuco Canyon, California. **DENNIS ROBERT DUFFY** ('74 Gen. St.), 65, October 31, 2017, Concrete. **TOM MUSSER** ('74 Ag., '75 Ed.), 66, October 15, 2017, Spokane. **PAUL ALLEN CASEY** ('75 Busi.), 65, September 30, 2017, Richland. **DONALD G. CODDINGTON** ('75 Civ. Eng.), 65, November 9, 2014, Lakewood. **MICHAEL WESLEY COLE** ('75 Ed.), 64, October 23, 2017, Polson, Montana. **JOHN "TOM" DRUMHELLER** ('75 Hotel and Rest. Admin.), 64, September 16, 2017, Cannon Beach, Oregon. **NANCY JEAN FREDERICK** ('75, '77 Apparel Merch.), 64, October 23, 2017, Tacoma. **RICHARD H. MATTHAEI** ('75 Food Sci.), 65, September 22, 2017, Fircrest. **ROY E. MATTHEWS III** ('76, '87 MS Elec. Eng.), 63, July 31, 2017, Cedar Park, Texas. **KAREN LEE EITREIM** ('77 For. Lang. and Lit., '91 MA Ed.), 61, September 28, 2017, Lacey. **DANIEL L. DEWEERT** ('78 DVM), 69, September 12, 2017, Twisp. **MICHELLE M. EVANS** ('78 Ed., Delta Gamma), 61, November 1, 2017, Richland. **LARRY JAMES BROCKMAN** ('79 Elec. Eng.), 63, October 17, 2017, Richland. **AIMEE S. WITHERSPOON** ('79 DVM), 64, October 8, 2017, Ridgefield.

KATHLEEN ANN MUDGE ('80 Ed.), 59, August 24, 2017, Scottsdale, Arizona. **PENNY SUE BECKER** ('81 Bacterio.), 57, December 8, 2016, Port Angeles. **JEANETTE H. ASHWOOD** ('82 MS Bacterio.), 64, February 7, 2016, El Paso, Texas. **MAUREEN KIT-MAY**

NGAI ('82 Comp. Sci.), 54, April 23, 2012, Escondido, California. **NANCY JAMESON PIEHL** ('83 MED Couns.), 80, October 23, 2017, Whitewater, Wisconsin. **GLEN ANDREW ANDERSON** ('84 Poli. Sci.), 55, October 22, 2017, University Place. **TIMOTHY JOSEPH MURPHY** ('85 Soc. Sci., Delta Upsilon), 50, August 24, 2013, Kirkland. **MARGIT AILEEN RUSTVOLD** ('86 MED Elem. Ed.), 69, August 29, 2017, Vancouver. **J. PERRY HANNAH** ('89 Comp. Sci.), 70, November 11, 2016, East Wenatchee. **LUCILLE H. LEONHARDY** ('89 MCE Human Dev.), 81, November 1, 2017, Moscow, Idaho.

SAMUEL IFEANYI OKOCHA ('91 Arch.), 60, May 21, 2017, Concord, California. **KEVIN M. KRAMER** ('93 Busi.), 48, June 19, 2017, Mill Creek. **CINDY WRIGHT DOYLE** ('94 MBA), 50, October 15, 2017, Kennewick. **DUNCAN LEONHARDY** ('95 Crim. Jus.), 53, October 31, 2017, Moscow, Idaho. **MICHAEL WILLIAM MCCOY** ('95 MS Env. Sci.), 67, April 28, 2016, Richland. **ROBERT "BOB" CLAY NORVELL** ('98 Soc. Sci.), 76, July 13, 2016, Moses Lake. **NATHAN GORDON RICH** ('98 Crim. Jus.), 43, October 13, 2017, Kirkland.

BRENT JONATHAN CARTER ('05 Busi.), 47, March 28, 2017, Tacoma.

FACULTY AND STAFF

REBECCA "ROCKY" BEACH, 59, Facilities Services, 1987–2017, October 24, 2017, Pullman. **JAMES W. BERGER**, 88, Physics and Astronomy, 1973–1993, October 6, 2017, Meridian, Idaho. **RALPH BOWMAN**, 75, Physical Plant, 1963–1999, October 11, 2017, Pullman. **R. KEITH CAMPBELL**, 76, Pharmacy, 1968–2013, November 11, 2017, Centralia. **ORVAL "GENE" CLANTON**, 83, History, 1968–1997, October 8, 2017, Charlotte, North Carolina. **HAROLD CRUMLEY**, 95, Physical Plant, 1970–1982, October 22, 2017, Tekoa.

GENEVIEVE DEVLEMING, 91, Office of the President, 1947–1991, August 22, 2017, Pullman. **RONALD E. FILIPY**, 77, Pharmacy, 1992–2005, September 14, 2017, Richland. **ROBERT N. GRUNEWALD**, 95, Sports Studies, 1965–1993, September 4, 2017, Pullman. **MAZIE-JEAN KELLER**, 83, Veterinary Clinical Sciences, 1973–1997, December 28, 2016, Coeur d'Alene, Idaho. **KARL KIMBERLING**, 80, Libraries, 1970–1995, August 14, 2017, Lewiston, Idaho. **RICHARD KNOX**, 97, Electrical Engineering, 1948–1984, July 13, 2017, Milwaukie, Oregon. **JEROME PETER "JERRY" LANG**, 64, Student Health, 1987–1995, March 6, 2017, Dover, New Hampshire. **LUCILLE H. LEONHARDY**, 81, Pharmacy, 1975–1997, November 1, 2017, Moscow, Idaho. **SANDRA MCGEE-MOCHNERT**, 82, Research Support and Operations, 1970–1998, August 27, 2017, Moscow, Idaho. **ROBERT MINNIX**, 67, Athletics, 2008–2017, November 3, 2017, Pullman. **MELVIN LEE "MEL" MUNDELL SR.**, 80, Housing and Conference Services, 1977–2000, September 17, 2017, Garfield. **RICHARD NELSON**, 88, Compton Union Building, 1949–1989, October 10, 2017, Garfield. **MARIAN S. NORDQUIST**, 88, Integrative Physiology and Neuroscience, 1989–1994, October 14, 2017, Pullman. **ROBERT W. PARKINS**, 68, Veterinary Clinical Sciences, 1973–2009, October 8, 2017, Troy, Idaho. **DAVID W. PRICE**, 81, Agricultural Economics, 1962–2000, August 12, 2017, Pullman. **JOHN J. RAMIREZ**, 74, Counseling and Psychology, 1991–2016, October 27, 2017, Pullman. **IRVING TALLMAN**, 94, Sociology, 1976–1996, September 29, 2017, San Rafael, California.

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The perfect gift for every Cougar

When you choose a gift for a special person in your life, you want to pick just the right one. A gift that will delight when it's opened and make an impact for years to come.

Recently, we received a postcard from a 1947 graduate whose father gave her a WSU Alumni Association Life Membership for graduation over 70 years ago. She told us that she thinks of her dad every time she receives something from the WSUAA. There aren't many gifts that can prompt that kind of gratitude nearly three-quarters of a century later.

Many of our members choose this gift for the Cougar (or Cougs) in their lives. Mike Politeo '79, a Platinum Life Member and devoted Cougar, wanted to provide



KARL AND STEVE HUHTA (COURTESY WSUAA)

a meaningful graduation gift to his oldest son, Spencer '10. Mike recalls, "When we presented him with his Life Membership in the Alumni Association, he was ecstatic. Spence loved it."

Steve Huhta '73 saw a similar opportunity when trying to pick the perfect birthday present for his son, Karl '09. Because Karl's birthday falls during the holiday season, the gift needed to stand out. In addition, since Karl works for WSU Athletics, Steve wanted the gift to radiate Cougar Spirit. As a Platinum Life Member himself, Steve decided to give his son his own Platinum Life Membership. Now their names are both engraved on the Platinum Life Member Wall of Honor in the Lewis Alumni Centre in Pullman.

Whether it's a graduation, birthday, or holiday gift, we hear so many stories of how much the gift of membership means to Cougs. Kristin Vog '89 received annual gift memberships from her father, Wally, for years. "When I graduated, I told him I wanted to stay connected to WSU." Kristin said her dad saw a WSUAA ad in *Washington State Magazine* (true story) and decided membership would be a great way to help his daughter stay in touch with the University. "That year, and every year after, my annual membership card showed up in the mail. It was just something he did for me. This year, I decided to become a Life Member, but I'm so thankful for my father's gift of helping me stay close to my alma mater."

If you would like to give the gift of membership for any occasion, please let us know. We will be glad to help you make someone's day, year, or life. Call us at 1-800-ALUM-WSU or purchase online at alumni.wsu.edu/gift.

cougs give '18

March 28, 2018

On Washington State University's 128th birthday, the Cougar family will come together again to show what makes WSU special. Join us in building a strong future for the next generation of Cougs.

On March 28, 2018, help us show how [#CougsGive](https://www.facebook.com/WSUAA).

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askdruniverse.wsu.edu

WHY DOES HAIR TURN GRAY?

-Darae, age 10

ILLUSTRATION ROB MCCLURKAN

Dear Darae, Hair comes in lots of different colors. There's black, medium brown, auburn, light brown, strawberry blonde, and copper, to name just a few. But in the end, almost everyone will have hair that's gray or white.

Ever since you were born, different cells have been working on your hair. Each hair sprouts from a follicle, a sort of little hair-making factory under your skin. Here, some of your cells are making your hair and others are coloring it.

The cells that color your hair are called melanocytes. They produce a pigment, or natural coloring matter, called melanin. This is the same pigment that gives your eyes and skin their color, too.

I decided to visit my friend Cynthia Cooper, a biologist and researcher at Washington State University, for help answering your question.

Cooper and the other scientists in her WSU Vancouver lab are really curious about cells. They are investigating questions about how some cells end up becoming the kind that produce skin pigment.

As people get older, she said, the pigment-producing cells in their hair follicles gradually die. They can no longer make enough pigment to keep coloring their hair.

If we took out all the pigment from your hair, it would be totally white. So when melanocytes stop producing melanin altogether, your hair turns white.

"Why hair follicle melanocytes die over time, and are not replaced, we don't entirely know," Cooper says. "Our skin doesn't turn gray, so the biology is quite different."

While Cooper works on pigment in skin, she says some scientists are also working on the pigment in hair. These scientists are especially curious about the inner workings of the cells and how gray hair is part of people's DNA.

Perhaps, you've heard someone say their kids are giving them gray hair. But scientifically, if anyone is giving someone gray hair, it's likely their own parents. Those that come before us pass down their hair color to us through our genes. It's the same with graying hair.

Scientists have even pinpointed specific genes and parts of cells that are involved in growing gray hair. The new knowledge is helping us put together a better picture of how pigment works. Still, there's a lot more to discover.

Maybe as you get older and find that first gray hair, you'll remember some of the science that's at the root of it all. If you have a cat or dog, maybe you'll notice that they'll go gray around their muzzles, too.

I've actually had gray and white hair ever since I was a kitten. I think it's pretty great. Our pigment, or lack of it, help make us all unique.

Sincerely, DR. UNIVERSE

"I have not failed. I've just found 10,000 ways that won't work."

-Thomas Edison



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