

Winter16  
vol16no1

# Washington State

MAGAZINE

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## FIRSTwords

**Renewal.** When the leaves disappear from the hardwoods and the last fruits of fall shrivel away in the cold, I'm tempted to call the winter a despondent time. Yet, when it seems like all color has drained away under the snow, a second, more hopeful thought occurs that winter quietly renews the plants. Irish poet and novelist Edna O'Brien summed it up nicely: "In a way Winter is the real Spring—the time when the inner things happen, the resurgence of nature."

So, too, do our communities face their winters, times when they struggle in the face of economic uncertainty. Like the towns around Grays Harbor, dependent in a large part on the timber industry, jobs slip away. But new businesses have grown out of the old, spurred on by innovative industries where wood residuals morph into chemicals, plastics, fuels, and myriad other necessities, thanks to the NARA project led by WSU. The project seeks to build a sustainable bioeconomy to replace petroleum-based products. Some of those lost jobs are returning to Cosmopolis and other timber towns around the state.

After the devastating Oso landslide in 2014, the communities of Arlington and Darrington were also facing a time of despair. Their municipal staffs were stretched thin with disaster relief, just as they were being invited to compete for a lucrative revitalization grant. WSU Extension stepped up to help at a crucial and difficult period. As David Wasson writes in this issue, the experience illustrates Extension's own evolution toward better ways to serve the urban areas of the state.

Back in the rural communities of Washington, sometimes a renewal needs a fresh set of eyes and voices. In Soap Lake, and many other smaller towns, the students and faculty of the Rural Communities Design Initiative pull together residents and their ideas to improve their hometowns, then they help the residents bring it to fruition.

Not all towns survive—witness the ghost towns scattered across Washington—but, at times, a quiet period for communities can mean a chance to rebuild, to maintain their town's character with a new lease on economic life. Sometimes we just need to look toward what can be, and remember, in a more hopeful twist on the popular saying from *Game of Thrones*, "Spring is coming."

**EDITOR:** Larry Clark '94

**ASSOCIATE EDITOR:** David Wasson **SCIENCE WRITER:** Rebecca E. Phillips '76, '81 DVM **STAFF WRITER:** Brian Charles Clark  
**ART DIRECTOR:** John Paxson

**CONTRIBUTING WRITERS:** Jason Krump '93, Sue McMurray, Eric Sorensen, Dr. Universe  
**PHOTOGRAPHERS:** Jacque Q. Garza, Clane Gessel, Matt Hagen, Shelly Hanks, Chuck Hilliard, Robert Hubner, Joe Mabel, Brian Munoz, Tim Nyhus, Andrew Opfer, Dave Skaar, Drew Tarter, Scott Varley, Garret Veley  
**ILLUSTRATORS:** Carlos Caetano, Mariel Everling, Rob McClurkan

**WSU PRESIDENT:** Kirk H. Schulz

**ADVERTISING:** Contact Advertising Manager Jeff Koch at 509-335-1882 or [jeff.koch@wsu.edu](mailto:jeff.koch@wsu.edu).  
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## TALKback

### Spirit of '25

The reference in William Stimson's article (Fall 2016) on the 1925 rally for the Cougar football team to students as forerunners of "The Greatest Generation" struck a chord. As a history department T.A., I researched the 1938 student strike for Dr. George Frykman. Issues may seem trivial to postmodern eyes (Dean Fertig's proscription of blankets on picnics is one example), but students' experience in campus mobilization was not. What started as pique over parietal rules became an experience in leadership. Indeed, some student organizers became war heroes within the decade. I remember that Lt. Col. Jerry Sage responded to my queries with a helpful note (no emails then!) from his home in Alabama. The strike and its aftermath show that disputes over local, parochial issues can nurture skills useful in the wider world.

**SANDY SMALL '76 PH.D.**  
AMERICAN STUDIES

The article "Spirit of '25," appearing in the Fall 2016 edition, brought back memories of a story my Cougar brother Dick and I occasionally heard as we grew up in Wenatchee. As the article reveals, our father, John, caught that game winning pass to upset the USC Trojans in the Los Angeles Coliseum, ending the 1925 season in high style. We had heard there was an impressive celebration in Pullman upon their return, but until reading William Stimson's article did not realize the tumult it created. We'll look forward to Dr. Stimson's depiction of the 1932 retrieval of the stuffed Cougar from the felonious Huskies.

A reminder to those perhaps "not in the know," the Cougar quarterback who played a key part in that winning touchdown was "Butch" Meeker, for whom all subsequent Cougar mascots have been named.

I believe the news clippings of that game are now framed and hanging in a place of honor in Wenatchee on the wall of the "Man Cave" of Dad's grandson, David.

It's likely that the following year Dad may have related that game to his newly pledged Kappa Sigma fraternity roommate, Edward R. Murrow. Our father was honored to serve as president of the WSC Alumni Association during the time that brother Dick and I were on campus and continued through life as a dedicated True Coug.

**MACK PARKHILL '56**  
Dublin, Ohio

### The Epidemic

I want to thank you for publishing the sobering piece on the heroin epidemic in the Fall 2016 issue. Kudos to Rebecca Phillips for the well-written and well-researched article.

In my former newspaper life, one of the most rewarding projects I was part of covered the heroin epidemic. That series can be found online in the *Keizer Times*. The series was named "Chasing Dark," a take on the drug's street name "Chasing the Dragon," which is the title of a great video the FBI and DEA released in February.

Your story does an excellent job detailing how indiscriminate the drug is, how hard it is for people to get off the drug, and so much more. As the story points out, heroin can grab ahold of anyone, regardless of things such as family life, affluence, etc.

When our stories started coming out in print, my fervent hope was other publications would do stories on the topic as well. Thank you so much for doing just that.

**CRAIG MURPHY '99**  
Springfield, Oregon

"The Epidemic," by Rebecca Phillips, touches on the recent uptick in deaths commonly referred to as "heroin overdoses." Phillips quotes an addict who expressed gratitude toward a methadone clinic in Spokane: "This program saved my life."

That's true for every addict lucky enough to have the addiction treated medically. That's

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how it was in America, under the Harrison Narcotic Tax Act, 1914. Doctors were keeping addicts alive (alive!), stabilized, and active in their life pursuits, living normal, productive lives. And that's how it will be again, once we have ended the so-called War on Drugs, which is also a war on doctors.

The U.S. Treasury Department pretended that the act had a prohibitory intent, and wrote code to enforce that pretense. They arrested tens of thousands of doctors, many of whom appealed, including Charles Linder, a respected doctor in Spokane. The U.S. Supreme Court has ruled—unanimously and repeatedly—that the act is a pure revenue measure, and that the department's code is unconstitutional. The decision in *Linder v. U.S.*, 1925: "They [addicts] are diseased and proper subjects for such treatment."

Let doctors, once again, treat addicts. It's the law of the land.

**WILEY HOLLINGSWORTH '81**  
Pullman

### The Glassblowers

I enjoyed the piece by Brian Charles Clark in the fall issue of *Washington State Magazine*, "The glassblowers."

It should be noted that scientific glassblowing has a long history at WSU. In the 1980s and 90s the glassblower was Bill Ryan. Dating back to 1952, George Harris was glassblowing many fuses and bulbs and tubes on the WSU campus. Many of Mr. Harris' pieces were sent by WSU to Hanford for nuclear research.

I was delighted to read that, "... glassblowers still play a crucial role in the lives of chemists, engineers, geologists, and all researchers doing benchwork." At WSU, this crucial role has been going on for decades.

Mr. Harris' great grandson, Zachary, is a fourth-generation Coug and a sophomore studying biology and education at Washington State University's Pullman campus.

**ARLEN HARRIS '93**

## UPfront

# Main Street, USA

BY BRIAN CHARLES CLARK

Standing on the beach at Smokiam Park, I dip my hand in the lake. The water is soft, slippery, almost squishy feeling. It's full of sodium carbonate—washing soda. It's a tiny lake, and on its southern beach is Soap Lake, a town experiencing a little renaissance.

Locals credit Washington State University's Rural Communities Design Initiative for assisting their town of 1,500 in the eastern Washington scablands with improvement efforts. Soap Lake declined from fame and modest prosperity to a near ghost town but has recently rediscovered its pulse.

"Smokiam" is a Tsincayuse word that means "healing waters," so maybe the sense of renewal in Soap Lake is not so surprising. This is a quirky place, a weird mashup of the human desire for health and harmony and Mother Nature's power to cataclysmically shape the landscape.

More than 10,000 years ago, flood waters repeatedly burst through the Glacial Lake Missoula ice dam over the course of 2,000 years. With a flow rate 60 times that of the Amazon, water cut like a mad sculptor across eastern Washington.

One of the sculptural results is the Grand Coulee, carved out of repeated floods and stretching 60 miles from the eponymous dam in the north to Soap Lake in the south. As water moves through the Coulee, it picks up minerals and salts and then just stops here, leaving a shallow layer of mineral wealth at the bottom of this meromitic lake.

This nature's soup of mineral-rich waters has for thousands of years made the lake a destination for aching souls seeking a healing bath. And while the claims for its medicinal powers are many, and the evidence is scarce, the town that sprang up around the lake has a magnetic attraction that brings people from all over the world to bake like lizards in the sun



after caking their joints in sulfury black mud.

Among those who immigrated to Soap Lake is Trudy Black who, along with her family, has been coming up to Soap Lake from Moses Lake for decades. The waters, she makes clear to me, really do help cure what ails one. The former health care professional now works with townspeople to improve infrastructure and parks.

Andy and Nell Kovach, part-time residents from the Seattle-Tacoma area, are eager to help make Soap Lake more attractive. They bring serious skills to the town, as Andy's an architect, and Nell helps him run his practice.

Then there's Raymond Gravelle. The former North Bend resident discovered Soap Lake on a motorcycle trip, fell in love, moved there, got involved in the town's civic life—and then ran for mayor. He won on a promise of renewal—a promise that resonated with the town's beleaguered residents.

Gravelle likes to tell how, soon after he was elected in 2011, a couple of retired friends

drove their RV from Missouri for a visit. "I gave them the mayor's tour," he says.

A couple years later, when they paid a return visit to the town, the couple was initially confused. The town's Main Street was unrecognizable. Gone was the drab street that pedestrians avoided and along which cars had drag raced. In its place was a xeriscaped street with wide sidewalks that invited pedestrians to explore the small businesses that lined its length. And instead of a straight and narrow speedway, the redesigned Main Street calmed traffic with bump outs and a center island sporting a flagpole and new plants.

"Did we miss a turn?" Gravelle remembers the couple asking. "They thought they were in the wrong town!"

For Gravelle, that story embodies the pride of accomplishment he shares with his community as they completely renovated their town's Main Street. Like many rural communities in eastern Washington and elsewhere, residents are fighting to remain



SOAP LAKE'S REVITALIZED MAIN STREET (STAFF PHOTO)



viable and relevant as economic sands shift beneath their streets.

Soap Lake is no stranger to economic hard times. In the early twentieth century, the lake was already famous for its healing waters. One story has it that a buckaroo died out on the range and was buried on the shore by his friends. A few days later, he rode back into camp, thanking his friends for burying him where they did: the healing waters had seeped in and revived him.

In 1905, a sanitarium and hotel was built. Nationally advertised, the Siloam (named after the pool where Jesus restored the sight of a blind man) thrived for 15 years. Then, according to local historian Bennye Rushton, it went up in a blaze accidentally started by the owner.

More hotels sprang up, dance bands were imported from Spokane, and life was good. But popularity is fickle, and health fads

come and go—and Soap Lake has been on a long, slow decline for decades. In the 1970s, the population was around 1,750, and Roxie Thorson had a 20-room hotel with seven bungalows—“but no one to rent them to,” according to a 1973 *New York Times* article.

More recently, local artist and architect Brent Blake thought a giant 60-foot-tall lava lamp would enlighten people about the wonders of Soap Lake. The lava lamp idea has lain dormant since the mid-2000s, though it’s never died. Gravelle and others think the lava lamp could still happen.

But first things first: downtown sidewalks hadn’t been redone since the 1950s, and shuttered businesses on Main Street gave passing tourists little reason to stay over.

“We needed help,” Gravelle says. It was proving difficult to get townspeople to agree on a path forward for the town’s infrastructure renewal.

A Rural Communities Design Initiative team brought their design and negotiation skills to bear on the challenges facing Soap Lake. Codirected by WSU interior design faculty members Bob Krikac and Kathleen Ryan, RCDI’s student-led teams have for years helped rural communities conceptualize the possible, find the common threads among competing interests in order to make and act on decisions, and assist preservation and revitalization organizations win grants to fund the work.

“I went to a small community development workshop at an Association of Washington Cities conference and there was Kathleen talking about RCDI,” says Gravelle. “And as soon as it was over, I made a beeline for Kathleen and said, ‘We’ve got to talk!’”

It was actually Krikac who made the first trip to Soap Lake and, in a community meeting, described RCDI and what it could



potentially do for Soap Lake. “The main thing we do is facilitate conversations so communities can sort through their ideas. We help them imagine possibilities, help them make plans—and then turn it back over to the community for them to make it happen,” he says.

It takes a lot of moxie to make change happen. Money has to be raised—Trudy Black helped raise \$2.4 million for the downtown

with real people. They have a budget, and they’re worried about it. Maybe all they have is a small grant or community funds. So a lot of this is negotiating with the clients—and that’s creative thinking in its own way. And when you get out in the real world—well, is the sky ever the limit?”

The RCDI team helped Soap Lake residents work through several disagreements.

Renewal of a rural community, like physical or emotional healing, is an ongoing process. Soap Lake continues the process, working with RCDI to develop plans for connecting the beach parks with a system of trails. With clearly articulated plans comes funding to implement them. Gravelle is optimistic about the future. “Our engineer says, ‘I’ve never seen a town with so many plans!’” \*



revitalization—which means plans have to be made, which means the community has to come together and actually agree on the way forward. RCDI students helped with both planning and consensus building.

“One of the critiques of this type of service learning is that it stifles creative juices,” says Lucas Vannice ’14 of his RCDI experience.

He disagrees: “The sky is not the limit, the guy in the back constantly complaining is the limit. The flipside is that you’re working

One of the techniques they use is visualization. Talented design students sketch residents’ ideas on the fly. That’s one of the best ways to get past competing agendas, Vannice says. “We put images to the ideas and budgets to the drawings.”

“It’s just amazing, the level of detail that had to be attended to,” says Black. “They walked us through the options. And when one idea got thrown out, they were back with two more. They had our backs.”

The waters of Soap Lake are perhaps unique on Earth, but not in the Solar System. The lake has been studied for clues to extraterrestrial life.

**Opposite, from top:** Early view of Main Street. Courtesy Soap Lake School District. View of Soap Lake by drone. Courtesy Keith and Sadie Dolge

**This page:** “Calling the Healing Waters” sundial sculpture by David Govedere and Keith Powell, originally commissioned by the Soap Lake Garden Club. Photo Garret Veley

## Ice control of a different color

BY REBECCA PHILLIPS

As snowstorms gather in the Cascades, highway safety crews traditionally turn to salt and chemical deicers to clear the roads. The corrosive arsenal keeps traffic moving but is damaging to both vehicles and the environment. Now, thanks to the culinary genius of a Washington State University engineer, deicers are getting a green makeover with a distinctive local flavor.

Apple, grape, and cherry skins—waste products from Washington’s fruit and wine industries—are being reborn as sustainable ice melt in an effort to reduce the amount of salt used for snow and ice control.

The transformation is taking place in a basement laboratory where associate professor of civil and environmental engineering Xianming Shi cooks up green chemicals and materials like ice-free pavement with the help of an industrial size mixer.

Shi is also assistant director of the Center for Environmentally Sustainable Transportation in Cold Climates, a collaboration between WSU, the University of Alaska Fairbanks, and Montana State University. It is the only center in the United States devoted to studying cold climate “road ecology,” which includes green snow and ice control plus issues with wildlife crossings, fish passages, dust, and the use of recycled materials in pavement.

Stepping around bags of concrete, Shi leads me through his laboratory to a small refrigerator where he removes a jar of “apple pomace” deicer. The applesauce-like mixture is made from scrap skins that have been ground, seeded with bacteria, and left to rest.

“We’re using a natural fermentation process; no heat, no pressure,” he says. “Once the pomace is fermented, it can be blended directly with salt brine for road maintenance.”

The pomace decreases salt use by 25–30 percent while still providing the same level of performance, says Shi. The solution is also less caustic to roads, bridges, and guardrails.

Shi previously developed an ice melt made of the barley residue from vodka distillation. Just recently, he filed patents on one using the leaves and stalks of sugar beets.

“We’re looking at all kinds of strange things,” he laughs as he points out other concoctions in the refrigerator made of Concord grapes, Alaska peony leaves, dandelions, and even Kentucky blue grass.

Shi’s holistic approach to snow and ice control reaches far beyond green deicers however. As a leader in the field, he warns that short-term fixes often carry unintended consequences. For one, the “social dilemma” of using salt.

In the past, Americans relied mainly on chains and studded tires to navigate winter weather. But over the last 50 years, Shi says our nation has become “kind of salt addicted, like with petroleum, as it’s been so cheap and convenient. The public wants to travel fast, safely, and efficiently but there are significant hidden costs.”

The problem with salt is that it doesn’t degrade. “It just moves from the road into the vegetation and soil, and then into the groundwater,” he says. The United States applies 20 million tons of salt for snow and ice control each year. For highways alone, the cost runs \$2.3 billion plus another \$5 billion to mitigate “side effects” like contamination and corrosion.

“In 2013, the U.S. Environmental Protection Agency reported alarming levels of sodium and chloride in groundwater along the east coast,” says Shi. “Once salt exceeds the legal threshold there are increased health risks and you can’t use it for drinking water. If the trend continues, in another 50 years our grandkids could be drinking salty water.”

Shi says to their credit, “state and county road crews are doing a very difficult balancing act. They have to look at safety first and sustainability second, especially with budget constraints.”

His goal is to make that job easier by giving agencies the tools to apply precisely the right amount of salt at the right location at the right time. \*

IN SHI’S CROWDED KITCHEN-LABORATORY, HIS TEAM OF 12 ASSOCIATE AND STUDENT RESEARCHERS COOKS UP A BLIZZARD OF INNOVATION:



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“**Reactive powder**,” the powdery dust that accumulates when concrete buildings are demolished, can be used as a reactive filter media to remove deicers from stormwater runoff. Like a sponge, the dust can absorb 30 percent of the salt in road runoff, preventing it from contaminating groundwater. Once saturated with salt, the dust can then be put into new concrete where it will be chemically and permanently bound.

## Saving citrus from a sour end

BY BRIAN CHARLES CLARK

An invader is sweeping like fire through the citrus groves of Florida. The *Candidatus Liberibacter asiaticus* bacterium causes citrus greening, a disease that blocks trees’ nutrient and water channels and prevents fruit from ripening.

“It’s like choking the tree from the inside out,” says David Gang, a Washington State University molecular biologist and biochemist who is collaborating with a large, multi-institution, interdisciplinary team to combat the disease. If left unaddressed, the entire U.S. citrus industry could be wiped out and, as Florida Senator Bill Nelson said a few years ago, “We’ll end up paying \$5 for an orange—and it’ll have to be one imported from someplace else.”

The disease is thought to have spread from China in the early 2000s. Citrus greening has already destroyed the citrus industry in Jamaica, and has recently been detected in California and Texas.

“In five years there may not be any citrus orchards left” in the United States, Gang says. “I like orange juice too much to let it die without a fight.”

Figuring out how to culture the bacterium in the lab is a critical step in understanding its life cycle, its weaknesses, and what can be done to stop its spread. Gang’s WSU team includes Anders Omsland, an international expert on culturing the otherwise unculturable.

Attempts to culture *Liberibacter* to date have involved all the usual—and a few unusual—techniques. The basic approach is feed the organism something to feast on and, all things being equal, watch it reproduce like mad. None of that has worked—not even the grapefruit juice diet one researcher thought might do the trick.

Omsland, though, is undaunted. He has cultured some recalcitrant organisms, including Q fever, which hits sufferers like a very bad—and potentially fatal—case of the flu. And he’s close to culturing the sexually transmitted bacterium, chlamydia.

*Liberibacter* and the bacteria that cause Q fever and chlamydia have something in common. They’re all types of parasites that invade host cells. Parasitic bacteria often only divide in the cells they invade, thus presenting researchers with a tough challenge. It took Omsland four years to culture the Q fever-causing bacteria—but that’s nothing, as something like 99 percent of all bacteria remain unculturable in the lab.

Another member of Gang’s team is chemical engineer Haluk Beyenal, who is investigating the possibility that *Liberibacter* is defending itself during the dry season as a biofilm. Instead of always floating freely in a liquid, bacteria like to wrap themselves in a slimy mesh of sugars, DNA fragments, and proteins. The resulting film coats a handy surface—such as the inner surface of an oil pipeline, where it corrodes infrastructure, or the surface of our teeth, where it causes decay.

Gang says his team conjectures that a hypothetical *Liberibacter* biofilm may cling to the roots of citrus trees, avoiding desiccation. In this scenario, once the rains (or, in California and Texas, the irrigation waters) return, the bacteria spread through

the trees’ vascular systems, creating havoc as they go.

The really devious thing about biofilms is that they are often able to resist penetration by antibiotics. Even if applied during the wet season, when the bacteria are actively circulating through the tree, “you apply it and see if they do anything,” Gang says. “But that is really slow and it’s hard to know how well it works. People are still doing that because, at this point, there is nothing else you can do.”

*Liberibacter* is not only a pathogen of citrus trees, but of its vector, a tiny insect called the citrus psyllid, as well. Infected psyllids live fast and die young. So one way to beat *Liberibacter* might be to develop a “nupsyllid”—a new variety of Asian citrus psyllid—that doesn’t transmit the bacteria. Such a psyllid would be healthier and would out-compete, and then replace, populations of infected ones.

Time is of the essence for citrus and growers are depending on researchers to find a way to stop the damage caused by *Liberibacter*. Gang and the team are determined to save citrus, with millions of orange and lemon lovers rooting for a solution, as well. \*

A bug-borne bacteria causes devastation: citrus greening disease literally strangles the tree from the inside out. Courtesy USDA, ARS, U.S. Horticultural Research Laboratory



SERVICEScenter

# When Jermiha marched home

Military homecoming is usually a time of immense joy and relief, but for many veterans the weeks that follow are daunting. Each month in Washington state alone, 1,000 service members transition from active duty to civilian life—moving from a structured, often traumatic environment into the looser routines of home. Along the way come unexpected challenges, especially when returning to college or entering the job market.

Jermiha White '16 served eight and a half years as an Army cavalry scout on the front lines of Iraq and Afghanistan. As a combat veteran, White began experiencing anxiety when he enrolled as a student at Washington State University in 2013.

"Being in a classroom of 400 people with only two exits was kind of stressful," he says. "The large amount of homework and juggling school and a personal life was extremely stressful."

"In the military, someone comes in every day and tells you what to do. In school, you get a syllabus saying a paper is due in three months. No one reminds you of it and one night you look again and say, 'Oh, God, it's due tomorrow!' It's something I think many vets face."

White sought help from the WSU Veterans Affairs Office and enrolled in the "Rucksacks-to-Backpacks" class where he gained the confidence and skills to successfully complete his degree. WSU Pullman, Tri-Cities, and Vancouver are all certified as Partners for Veteran Supportive Campuses, a Washington State Department of Veterans Affairs (WDVA) transitional program.

White must now confront the equally difficult task of finding a well-paying job. He's not alone, according to WSU Vancouver associate professor of sociology Alair MacLean, who studies the long-term effects of combat on veteran employment rates.

Her research suggests combat veterans experience higher rates of unemployment than those who don't engage in combat. For example: In 2010, during the recession, the unemployment rate among 18- to 24-year-old veterans was nearly 21 percent compared to 17 percent for comparable nonveterans. The high rates were partly attributed to stigma associated with media reports of PTSD and violent behavior from veterans returning from Iraq and Afghanistan.

MacLean decided to put that theory to the test. She designed a study to specifically look at stigma and employment. The results, published in 2014, showed an unexpected paradox—people actually discriminate in favor of combat veterans.

MacLean says stigma is a process that begins with labeling and negative stereotypes, which evolves into avoidance and reluctance to provide help. People are less likely to discriminate against someone,

however, if that person has a large amount of social or symbolic capital such as prestige, celebrity, or honor.

That's the case with veterans. MacLean's findings showed that although people do often label and stereotype male combat veterans as having more problems with mental health, substance abuse, and violent behavior, they don't necessarily discriminate.

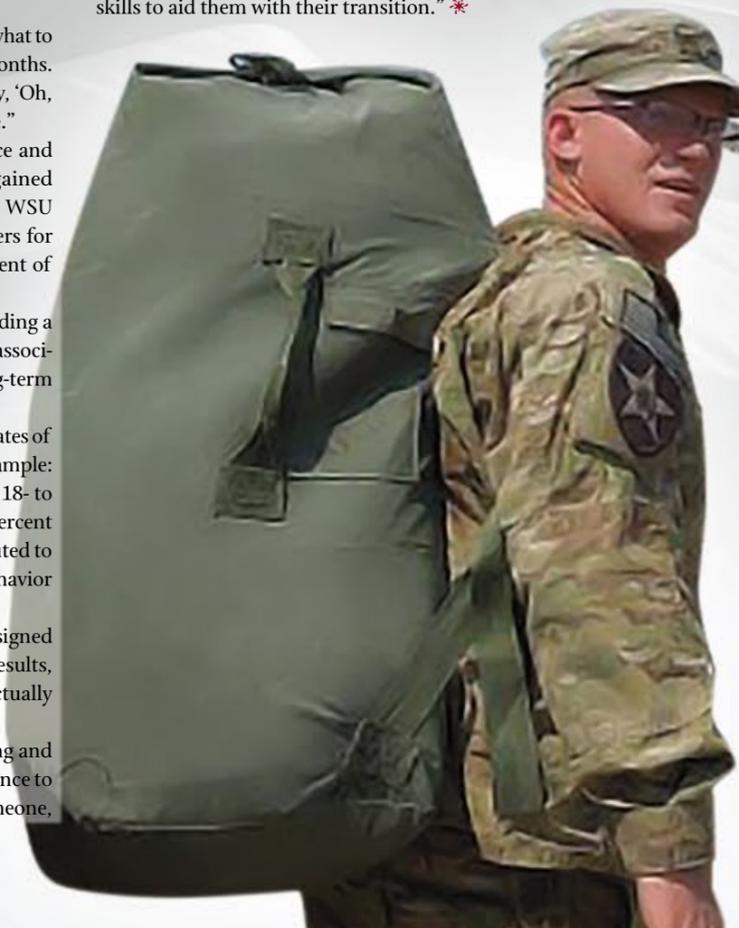
"People are more likely to want to be friends, neighbors, and coworkers with them than with nonveterans or those who didn't experience combat," she says. "Due to the benefits of symbolic capital, combat veterans may be stereotyped but they are not stigmatized."

Her research has implications for national policy decisions. MacLean has served on several National Research Council panels that provide input on the readjustment needs of returning veterans.

"If we thought employers were discriminating against combat veterans, we might put a lot of money toward trying to stop that discrimination," she says. "But if we say it's not discrimination, that money will go toward policies that directly help the veterans themselves, such as mental health services and job training."

Providing, for instance, WDVA internships like the one White completed last July, which offered alternative "ecotherapies" to veterans dealing with PTSD, depression, and other issues.

"Research has shown that connecting vets to nature is healing," says White. "We set vets up with the Veterans Conservation Corps, Veterans Farm, and outdoor adventure therapy, all of which teach skills to aid them with their transition." \*



COURTESY JERMIHA WHITE

# The currency of challenge coins

Rooted in World War I lore, and popularized with dramatic references in books and TV shows, military challenge coins have become a powerful symbol of camaraderie and support.

Beginning this spring, they also will help recognize the sacrifice and determination of student veterans at Washington State University. The newly minted WSU challenge coins will be handed out to all graduating veterans, and to faculty and staff with military service.

"This was one of our first projects," says WSU Veterans Coordinator Blaine Golden, noting the expanded student Veterans Center opened in 2014. "We wanted something that would show veterans we value their contributions... and are proud to be a part of their future."

One side of the coin bears the official seal of WSU, which requires presidential approval to use, and the other side has a carefully designed logo of the University's Office of Veteran Affairs.

The logo was designed by Marine Corps veteran and 2016 WSU graduate Courtney Hall-Mullen, who was pleased it was chosen for the challenge coin. It reinforces the military tradition of honor, courage, and commitment, which is a Marine

Corps motto but one that she felt summarizes the dedication found in all branches of the U.S. military.

"I know that's something we all have in common," she says.

Military challenge coins date back to at least World War I but their history is largely anecdotal. One of the most commonly told stories involves a wealthy officer who led volunteer American pilots in Europe prior to official U.S. entry into the war and handed out custom-designed coins to his troops to build unity and morale. Later, one of the unit's pilots was shot down behind enemy lines, escaped capture, and used the coin to convince suspicious French troops he was an ally rather than a saboteur.



Ever since, they've been a symbol of membership and accomplishment.

Military service runs deep at WSU. The Pullman campus has hosted a continuously operating military training program in one form or another since 1892, when all male students

were expected to participate in cadet drills.

Historian William L. Stimson '89 MA, '99 PhD notes that when the Spanish-American War broke out in 1898, the Student Cadet Corps petitioned Governor John R. Rogers to be federalized. When he declined, several students enlisted in the military instead.

During World War II, portions of the the Pullman campus were converted to military training sites.

And following the war, Washington State saw its first big enrollment boom as veterans sought to transition into peacetime careers using their new GI benefits. Currently, veterans are about 4 percent of the total undergraduate enrollment.

Golden believes the Veteran Affairs office can help smooth the transition from military service to academia.

Historical significance and symbolism also can be found in the new challenge coin. The official WSU seal includes a depiction of founding father George Washington, himself a military veteran and one of the first advocates for U.S. veterans.

Obtaining permission to use the seal was one of Golden's top priorities throughout the project. That permission came in May 2015 from then-President Elson S. Floyd, just two weeks before he took unexpected medical leave and lost his battle against cancer a short time later.

"We gave one of the first coins to Dr. Floyd's family," Golden says. "He was a big supporter of veterans and made sure he approved it right before he took his leave." \*

## SHORTsubject

**In a windowless room** some 20 miles outside Chicago, five scientists in jeans and shirtsleeves are preparing to glimpse something that until now has been hidden from human view: the nearly instantaneous, atomic-level transformation of a material under intense pressure. Since the dawn of time, such changes have gone hand in hand with some of the most extreme of moments: the creation of the universe, the heat and pressure in the Earth's core, the failures of bridges and buildings, and the business end of a bullet.

Until now, no one has seen them in such detail.

On this day at Argonne National Laboratory, Stefan Turneaure, a senior scientist in Washington State University's Institute of Shock Physics, is subjecting a piece of quartz to about 30 gigaPascals. That's more than 4 million pounds per square inch and enough to turn carbon into diamond. Working with a collaborator at Princeton University, he aims to tease out the structural changes of a meteor impact and if they happen during the impact's compression or release.

Ten computer screens are arrayed before him, including the views from four cameras that will capture images of the impact only millionths of a second apart. Another screen shows a nearby lead-lined room just big enough to hold a high impact velocity launcher that will send a plastic .50 caliber bullet into the quartz sample.

"Things will move fairly rapidly at this point," says Paulo Rigg '99 PhD, manager of the facility.

Turneaure and the actual facility operator, Drew Rickerson '15, start conversing in the deliberate, redundant code of a final sequence in which nanoseconds actually count.

"Five seconds."

"Ready to go?"

"Ready."

"Ready to close pumps."

"Close pumps. Close pumps."

"Ready to fire. Ready to fire."

"Fire. Fire."

The gun, muffled by a door so massive it has to roll on overhead wheels, sounds like a mallet striking a large block of very dense wood. It belies the violence that has just taken place. The camera screens in front of Turneaure are now mottled with light, indicating that the sample has indeed been smashed. Hidden from view is a brief torrent of information that, once deciphered, will offer new clues into the heretofore unseen heart of the matter around us.

Some of the most important moments in the career of physicist Yogendra Gupta '72 PhD can be measured in millionths of a second. For decades now, he has smashed materials in a field called shock physics, the study of how condensed matter responds to intense, immediate pressures and temperatures.

"If it's not a very high pressure, it's not a very high temperature, it's not a very short time scale, I'm not interested," he says.

For years, he operated out of the basement of the Physical Sciences Building on WSU's Pullman campus, firing projectiles into samples backed by piles of rags and a 700-pound steel plate. The impact could turn eight feet of rags into a six-inch wad of felt.

The work is consistently sponsored by the U.S. Department of Energy and the

Department of Defense, making Gupta one of the most highly funded WSU researchers. In 2003, the Institute for Shock Physics, which he directs, moved into a 33,000-square-foot building that is the first at WSU dedicated solely to research. Four years later, in his eternal quest for shorter time frames and greater insight, he started talking with the Department of Energy about establishing a

facility at the Argonne National Laboratory and its stadium-sized Advanced Photon Source.

Argonne itself famously began in a lab under the stands of the University of Chicago's Stagg Field, where Enrico Fermi in 1942 created the world's first controlled, self-sustaining nuclear reaction. The lab was eventually relocated to a wooded 1,700-acre campus west of the city, where it grew to include a wider range of scientific research outside its first focus of "nucleonics."

Gupta was interested in the Advanced Photon Source synchrotron, a two-thirds-mile diameter ring that produces brilliant x-ray beams by hurtling electrons at nearly the speed of light and deflecting them with magnets. The beams are then corralled into laboratories, called "sectors," that work out of sawtooth-shaped offices arrayed on the edge of the ring.

A timeline on display in the Advanced Photon Source describes 20 Nobels awarded to x-ray researchers since Wilhelm Röntgen's 1901 award. Two prizes, in 2009 and 2012, stem from work on the Argonne beams. That's in part because the x-ray can do so much more than pass through materials or image things like broken bones and dental caries. Tuned to the right frequency, they can characterize the atomic structure of materials a scientist wants to analyze: photoactive materials in solar cells, lightweight alloys, viral proteins, plant hormones, even something as quotidian as the dulling razor blade. The research, while largely basic science, could inform work to

develop stronger car bumpers, lighter body armor for soldiers, and lighter, stronger alloys.

This August, the Institute for Shock Physics and dignitaries from the Department of Energy's National Nuclear Security Administration, the Department of the Army, Congress, Argonne National Laboratory, and WSU dedicated Sector 35 as the "Dynamic Compression Sector."

The sector is actually four labs, or hutches. In one hutch, a gun fires a projectile at up at 2.5 kilometers per second—more than 5,500 miles per hour. In the second, a gun combines a gunpowder load and pressurized gas to reach more than twice that speed. The third hutch holds a laser that uses the momentum of photons to shock materials. The fourth hutch is for experiments using specialized experimental platforms.

Even before the sector's opening ceremony, which included accolades for coming in ahead of time and under budget, the facility was already seeing results.

Earlier this year, a team from Lawrence Livermore and Los Alamos national laboratories measured for the first time the effect of shock waves on additively manufactured, or 3D printed, materials. The experiments studied lattice structures in the material, including how they bent, stretched, and deflected under pressure.

The finding is a clear step towards fulfilling additive manufacturing's promise to engineer a more ordered structure into otherwise randomly porous materials.

"This will open up the possibility of designing and engineering material properties to precisely meet the demands of the intended application," wrote the researchers, led by WSU Associate Professor James Hawrelak, in *Scientific Reports*.

The work, says Gupta, "was not possible before. Yes, you can take a 3D structure, hit it, and look after the fact at what happened. But now we can watch in real time how things are actually happening. Now that we know how things really fail—we're not just talking about the end product—we know exactly how things are damaged and how things are breaking up."

Another experiment led by Turneaure provided an extremely elegant demonstration of what the facility can do. It involved silicon, "the lifeblood of all modern society," notes Gupta.

Using the more powerful two-stage gun, the researchers subjected a piece of silicon to the impact of a plastic projectile moving nearly 12,000 mph. While the photon source x-rays hit the sample in pulses, a detector captured images of the diffracted rays every 153.4 nanoseconds—the equivalent of a camera shutter speed of a few millionths of a second. The resulting images were an echo of Eadweard Muybridge's three-second silent film of a galloping horse, but much smaller and faster.

"We're making movies," says Gupta. "We're watching them in real time. We're making nanosecond movies."

The "movie," in this case, captured a phase change, like the more common transformation from solid to liquid, or liquid to gas. But here the material makes a relatively inscrutable transition from solid to solid.

"The big mystery is how does a material change into this new phase, and at what time scale?" says Rigg, the facility manager. "If you can't look at the atomic structure, you can never be certain as to what the structure of that new phase is."

Computational physicists have tried their hand at the question, but the process is so complicated that it challenges the most powerful computers. Even when they do develop a model, it's just a model.

BY ERIC SORENSEN

"Are they wrong? Are they right?" asks Gupta. "Who knows?"

Writing in *Physical Review Letters*, one of the leading physics journals, the WSU researchers in effect say that the computational people, at least in this case, are wrong. Referring to several experiments that lacked the ability to see silicon change in real time, Turneaure, Gupta, and detector physicist

Nicholas Sinclair say long-standing assumptions about the pathways of silicon's transformation "need to be re-examined."

That's because the researchers captured the exact moment that their silicon sample transformed from its common cubic diamond structure to a simple hexagonal structure. Their observations were so precise that they could see both structures as the shock wave traveled through the sample.

"For the first time, we can pinpoint what the structure is," says Gupta. "We didn't know that. We've been assuming some things but we had never measured it."

The critical, revelatory moment took less than half a millionth of a second. \*



**From top:** WSU heads up the Dynamic Compression Sector at Argonne National Laboratory. WSU Physics Professor Yogendra Gupta. Setting up the high velocity, high impact launcher. Photos Robert Hubner

## Power to the patient

The health care system has long been focused on finding ways to improve patient care.

But to pharmacist Josh Neumiller and other members of an interdisciplinary research team at Washington State University Spokane, too often something was missing.

Patient perspectives.

"We flipped that around," explains Neumiller, an associate professor at WSU's College of Pharmacy who studies medication lapses and other adverse conditions among those who take multiple prescription drugs. "There's been this realization... that the people these improvements were supposed to be for weren't being included in the decision-making process."

Neumiller, along with researchers from the WSU College of Nursing and Providence Health Care, has drawn national attention for the decision to put patients alongside scientists on the research team. They helped design the study, used their own experiences to assist in identifying pertinent issues, and worked with experts to pose questions in ways that folks without extensive medical backgrounds would be most likely to understand.

The result is a study that has given researchers detailed insights into the day-to-day challenges faced especially by older Americans trying to follow often complex medical regimens while coping with multiple chronic conditions.

Those findings now are being used to develop new strategies for reducing medication errors and adverse side effects, particularly in outpatient settings. The first large-scale test of this "educational toolkit," designed to improve the way patients and health care providers interact, is expected in the months ahead.

Neumiller says the study showed that while patients generally consider their doctors among the most important people in their lives, effective communication is lacking—not purposely but



Research teams studying patient care now include patient perspectives. Photo Jacque Q. Garza

because medical issues can be extremely complex.

Patricia Benson of Spokane, who takes multiple prescriptions herself and was among the patients recruited to serve on the research team, believes the quality of those interactions can help improve outcomes.

"I think one of the things we, as patients, really helped them to understand is that it's hard for us to know what questions we should even be asking when the doctor gives us a new prescription," says Benson.

With that in mind, researchers began crafting the educational toolkit.

The centerpiece is a small card with the types of questions patients should consider asking during exams and consultations. Examples include determining whether the medication should be taken with or without food, understanding common side effects, and how they might best be mitigated.

"I came away from this experience with an understanding that we, the patients, need to let our doctors know what's happening, and whether there are negative side effects that make us not want to take a particular medication," says Benson.

Study participants were given tablet computers with a series of questions to answer each day so researchers could get a better sense of how errors or lapses might occur.

Nationally, medication errors and adverse side effects are major concerns. An estimated 1.5 million people are harmed by adverse medication encounters each year, and about 7,000 die. Studies indicate

about 25 percent of adverse effects are preventable.

Health care research at WSU began moving toward greater patient involvement about 10 years ago. Then, in 2010, Congress allocated federal funding designed to promote patient-centered research and the WSU Spokane study of medication errors in 2012 was among the first projects to receive financial support.

Former WSU nursing professor Roxanne Vandermause, now at the University of Missouri-St. Louis, was a principal investigator along with Neumiller.

"In the past, we've always talked about community-based participatory groups," says Vandermause. "The idea was to listen but the problem was the patient wasn't always at the center of the project."

The Spokane study pushed the patient focus to new levels.

"We didn't even write the proposal without having patients right there at the table with us," she explains. "As academics we had this idea of what we thought should be asked, but patients were able to explain what makes sense to them."

Neumiller hopes others will embrace the approach.

"In our minds, we always think we're doing what's in the patient's best interest," he says. "We counsel people on a new medication, why they are taking it, and what it does. That's just part of what we should be doing. We also need to be asking the patient what they want." ✱

BY DAVID WASSON

BY REBECCA PHILLIPS

## Your skin crawls

Skin. Our interface with the world. When something goes wrong with skin, people notice. Scars, acne, a change in pigment. Wounds that refuse to heal and chronic conditions like psoriasis. When skin doesn't behave properly, it hurts.

For over 25 years, molecular biologist Jonathan Jones has been looking for ways to help speed the epidermal healing process. As a child in Wales, he'd suffered from itchy red patches of eczema, an annoying condition that eventually got him thinking about skin in a scientific way. Recently, that interest paid off with the surprising discovery that skin cells "walk" during wound healing. The finding could provide new treatment options for injuries, skin cancer, and other disorders.

Now a professor and director of the Washington State University School of Molecular Biosciences, Jones showed that individual skin cells called keratinocytes move step-by-step to bridge and repair damaged tissue.

Skin is a multilayered organ and keratinocytes form the protective outer layer. Further down lie the basal cells, some of which "button" the skin to underlying connective tissue by tiny structures called spot wells. In 1991, Jones began studying the proteins in spot wells as a way to improve skin grafting for burn victims. The idea was to coat a burn site with the proteins before placing the graft in hopes that it would attach more effectively.

"What I didn't realize was that those proteins also play a role in the migration of skin cells," he says. "The finding was unexpected as we thought spot wells were only good for holding skin to connective tissue... that they'd actually inhibit cell movement."

The revelation refocused Jones' efforts. Since 2006, he has painstakingly dissected spot well proteins to pinpoint their exact method of action. The work promised to explain how skin cells move both during wound healing and in the spread of squamous cell carcinoma, a form of skin cancer.

The breakthrough came recently when Jones, postdoctoral research associate Sho Hiroyasu, and graduate student Zachary

▶ Watch skin cells (literally) crawl: [magazine.wsu.edu/extra/skin-cells-on-the-move](http://magazine.wsu.edu/extra/skin-cells-on-the-move)

Colburn found that the proteins act like quarterbacks, deciding which end of the keratinocyte will be the front and which the rear. They then generate signals telling the cell to "walk" from point A to point B.

The proteins do this by activating muscle-like forces in the keratinocyte necessary to march across an abrasion or laceration. During this process, Jones says spot well proteins temporarily release the cell from the underlying connective tissue, allowing it to "lay" new skin over the wound.

The system tends to break down in diabetics and the aged, he says. "Their skin cells don't move very efficiently over the wound surface so they develop chronic ulcers which don't heal properly. Secondary infections contribute to the poor healing."

In time, Jones hopes to develop ways to enhance the activity of spot well proteins to promote faster, more effective healing for all types of wounds, including grafts.

"The irony is the same proteins also promote migration of tumor cells," he says.

Skin cancer cells have co-opted the same mechanism to migrate through skin and to other parts of the body.

"So, it's a bit of a two-edged sword. There is a lot of interest in these mechanisms for blocking the spread of tumors but you don't want to stimulate them too much or skin cells go mad. And, if you inhibit them too much, it prevents normal wound healing."

While Jones's findings came through the study of individual skin cells, in the body they move as collective sheets of millions. His laboratory is now using 3D modeling to better understand how these sheets behave during skin repair. So far, it appears leader cells at the front edge of a wound express the proteins necessary to get the whole sheet moving to repair itself.

The potential applications for mending skin and other tissues have Jones and his colleagues excited. Already Colburn is investigating lung diseases and the role of spot well proteins in recovery from pulmonary injury and infections like influenza. ✱

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# Surreal Rio

By making it to the Olympics, there comes the realization that you are one of a special few.

BY JASON KRUMP '93



**IT WAS AT THE CLOSING CEREMONY,** among thousands of her fellow athletes and cheering spectators inside Maracanã Stadium, when the realization of her achievement after years of rigorous practice hit Lisa Roman '12.

"When you're there with all the athletes, you realize, 'Wow, I am an Olympian.'"

Roman, who rowed for Washington State from 2010 to 2012, was a member of Team Canada's women's eight boat that finished fifth at the Olympics in Rio.

Speaking from London, Ontario, the site of the Canadian National Training Centres, just a day after she returned from Rio, Roman described the Closing Ceremony as "surreal."

"When you don't get a medal, you get caught up in, 'Well, I didn't win a medal, what am I?' It made me realize it was amazing. There's not very many of us."

A hemisphere away, WSU senior Nicole Hare was watching the Closing Ceremony from her hotel room in Belgium.

"It was weird watching the Olympics" from a distance, she says.

Like Roman, Hare is a fellow Cougar rower and raced for Canada at the Olympics, finishing 14th in pairs.

But unlike her Canadian teammate, Hare did not stay in Rio for the Closing Ceremony, leaving the city for the World Rowing Under 23 Championships in the Netherlands.

It was there Hare captured gold in the women's pair. "It feels great to be a world champion," she says. However, it was in the Netherlands when she also realized how special it was to compete in Rio.

"My teammates on the Worlds team were congratulating me and I view myself as the same level as them," explains Hare. "They are rowing

equals to me. Then it hit me, 'Hey, I went to the Olympics.' If I put myself in their shoes, that's pretty cool."

Back in Pullman, Hare finally has a chance to sit down and reflect on her whirlwind month of travel and competition.

Just two days earlier she attended her first class in 15 months. A native of Calgary, Hare would have graduated last spring but instead is in her senior year.

She received her invitation to train with the Canadian team in August 2015, which is "a big deal in itself," says Hare.

However, an invitation was no guarantee she would make it to Rio.

To pursue her Olympics dreams, Hare decided to take a year off from school. She says the decision was worth the risk of possibly not making the Canadian Olympic team.

"If you do your best every day, people will feed off that and they'll get faster," says Hare. "I don't think it was risky because I love rowing so much. My goal was team; it wasn't about me as an individual."

Hare found out she was going to Rio in June.

For Roman, who also captured gold at the 2011 U23 World Championships, the

commitment to the Olympics dated back much longer.

Roman, whose hometown is Langley, British Columbia, was invited to join the Canadian team and moved to London to train in January 2013.

Training is year round, she explains, Monday to Sunday, with sessions that Roman describes as heavy and medium days.

"A heavy day would be two rowing sessions and another session of some sort: core, weights, or something along those lines," Roman explains. "A medium day would be two rowing workouts. A medium day would be four hours of training and a heavy day would be five to six hours."

And hours, Hare explains, is calculated by moving time.

"How our coaches measure time is when you're actually moving," Hare explains. "If you

row 20 minutes, stop, take a drink of water, time stops. When you are taking that sip of water that's not practice time."

The commitment to training is all-encompassing.

"You give up a lot," Roman admits. "You put your life on hold to do this."

In September 2013, Roman was able to take a respite from training and return to WSU. She joined the team for a ceremony at the team's practice facility at Wawawai Landing along the Snake River, for the dedication of a boat in her name.

Roman credits her experience at WSU as a reason why she can call herself an Olympian.

"I truly believe if I didn't go to Washington State I wouldn't be here. Washington State is everything for my career and where I've gone," Roman says.

Roman and Hare joined Klay Thompson x'11 (gold medal, USA, basketball), Aron Baynes '09 and Brock Motum '15 (Australia, 4th, basketball), and Bernard Lagat '01 (USA, 5th, 5,000m) as fellow Cougars who competed in Rio.

While her fellow Olympian Cougs have all completed their WSU careers, Hare returns to a Cougar rowing team that has advanced to the NCAA Championships four consecutive years, six times in the past seven years, and ten times overall.

"When you have your maple leaf on the uniform you have the Cougs in your heart," Hare says. "You are always representing the programs you've been a part of. The Cougars have been a huge part of my development going into my senior year."

"I was proud to be a Cougar at the Olympics." ❄️



ABOVE: LISA ROMAN '12 OPPOSITE, FROM LEFT: WSU OLYMPIANS LISA ROMAN AND NICOLE HARE WITH OTHER MEMBERS OF TEAM CANADA (PHOTOS COURTESY LISA ROMAN)

# Wagyu

BY DAVID WASSON

**SEATTLE CHEF THOMAS DODD'S CUSTOMERS DEMAND THE BEST**, so the only steak on the menu is marbled, tender, and flavorful American wagyu.

He sees orders climb each week for the breed developed largely from Washington State University research to help Northwest ranchers compete with Japan's famed Kobe beef and other specialty brands.

"When people were tasting it for the first time, they were kind of freaking out over how flavorful it is, saying things like it's the best steak they'd ever had," says Dodd, executive chef at Liam's. "Now we're starting to see this expectation because people know... or have heard about American wagyu."

Basically, wagyu is to beef what Cougar Gold is to cheese.

"The flavor and quality is great," Dodd says. "I think people are more into what they are eating now, how it's taken care of, and where it comes from."

Indeed, wagyu herds in the United States are different from the traditionally dominant Angus and Hereford. They take longer to reach maturity, are a bit smaller and tend to be picky eaters themselves. But instead of carrying a lot of saturated fat that must be trimmed before serving, wagyu are instead rich in the healthier unsaturated fats that give the beef a highly marbled appearance and its unrivaled flavor and tenderness.

Although it still represents barely a fraction of the U.S. cattle industry, American wagyu has essentially taken control of the high-end domestic market. According to researchers, just 2 percent of all beef carries the USDA's top grade, and wagyu typically accounts for about 95 percent of it.

Scientific development of an American wagyu breed began largely in the late 1980s.

WSU was alerted by then-Speaker of the House Tom Foley that Japan, under pressure in trade negotiations, was preparing to ease its import quotas on beef. The University's IMPACT program assembled a team of researchers to explore how Northwest ranchers could best take advantage of the new export opportunities.

"We realized very quickly that Japan's beef market was very different," explains Jerry Reeves, a retired animal sciences professor who was part of the WSU research team sent to Japan in 1989. "At that time we thought our USDA choice meat was really good. But when we saw their meat, it was amazing."

Wagyu is the dominant breed in Japan, where beef is a delicacy and consumers pay a premium for its superior flavor, tenderness, and marbling. Reeves, fellow animal sciences professor Ray Wright, and rural sociology professor Ray Jussaume, who speaks Japanese, knew U.S. cattle ranchers would have to boost quality to have any chance of competing.

Back in Pullman, Reeves and Wright put together plans for creating a super breed by crossing Japanese wagyu bulls with Angus heifers and then tracking the genetic traits. But bureaucratic reluctance in Japan to allow any wagyu to leave the country put the effort on hold.

Until a bull named Alvin was found in rural Texas.

"Alvin is quite famous in our circles," says Oregon rancher Julie Barnes, who serves on the governing board of the American Wagyu Association and raises wagyu cattle along with her husband, Ken. "WSU was instrumental in developing American wagyu."

Back in 1989, with efforts to obtain a wagyu through official channels bogging down, WSU turned its attention to the southwestern United States. The research team had learned that a Texas rancher was able to import four head of the prized Japanese cattle back in the 1970s. Reeves and Wright traveled to the Longhorn State in search of the offspring.

That's how they discovered Alvin.

Odd-looking by U.S. cattle standards, Alvin wasn't necessarily the best specimen, the researchers now acknowledge with a chuckle, but he contained the genetic roots WSU needed to get the project under way.

Researchers used Alvin and several generations of his offspring to quickly develop cattle that were  $\frac{15}{16}$  wagyu, which in genetic terms can be considered pure blood. Additional wagyu specimens were added to the mix and in 1992 ranchers eager to start building their own specialty herds paid \$50,000 or more per head for the first cattle auctioned off by WSU.

Jussaume, now at Michigan State University, traveled with the first shipment of American wagyu to Japan in the mid-1990s. The cattle had been purchased by a Tokyo-based supermarket chain and Jussaume remembers visiting with the company's head butcher.

"He thought they were Japanese," Jussaume says. "When he found out they were from the U.S., he said, 'Wow, this isn't what American beef usually looks like.'"

American wagyu steadily built market share in Japan until December 2003, when a dairy cow in Mabton, tested positive for bovine spongiform encephalopathy, also known as mad cow disease.

Although it had no connection to American wagyu, Japan along with several other nations banned all beef imports from the United States. Australia, which had been developing its own wagyu herds, took over the U.S. share of Japan's lucrative beef market.

"We thought it was over," Reeves recalls. "The mood was terrible. You had all these ranches that had put their money into developing wagyu herds for export to Japan and all of a sudden they had nowhere to send it."

In retrospect, however, it turned out to be the impetus the industry needed to expand into an even bigger opportunity: the domestic market.

"As tough as things were, it turned out better for the industry overall," says Reeves, who raises wagyu breeding stock along the Snake River and earlier this year sold his first bull to Germany. "The share of the American market for wagyu is now bigger than Japan ever was."

Many ranchers, chefs, and restaurateurs believe American wagyu has helped improve the overall quality of U.S. beef.

Chef Dodd says wagyu has become his first choice when it comes to beef. The restaurant is part of the Sugar Mountain family of businesses, which includes its own wagyu brand, Mishima Reserve, drawn from Northwest herds.

"One of the things about wagyu is that it's really taken care of at every level—what they're fed, how they're raised," he says. "That's important to people and the difference in flavor, appearance, and preparation is part of that overall experience." ❄️



## Preparing wagyu beef

Be prepared to move quickly when cooking wagyu beef.

The unsaturated fats that give wagyu its world-renowned marbling, flavor and tenderness melt fast. Restaurant chefs and others recommend cooking it at hotter temperatures with noticeably less time on the grill, stovetop, or under the broiler than other beef.

"If you try preparing wagyu the same way you would, say, a medium well Angus steak, you'll probably be disappointed," says Fred Reeves, who serves American wagyu at his San Francisco restaurant, the Brickhouse Cafe. "Wagyu is delicious but needs to be cooked fast because if it's overdone it can taste kind of dry and chewy."

Reeves, whose father was part of the WSU research team that helped develop American wagyu, suggests searing each side of the meat first, then cooking it over high heat for about four or five minutes: "You want to go with the highest heat you can and get it on and off the cooking surface really quickly."

It helps to use smaller cuts of meat, which is customary for wagyu because of its richer taste. Experts suggest cooking ground wagyu more like you would a steak rather than a typical hamburger.

In Japan, where wagyu beef originated and often sells for \$150 per pound, the meat is typically cut into thin slices and cooked in oil-coated pans. Because wagyu contains unsaturated fats, also known as good fat because they're easier for the human body to break down, the meat provides a fuller, richer meal even with smaller portions.

With the holidays approaching, WSU Premium Beef—the retail arm of the University's animal sciences department—is preparing for the customary seasonal increase in orders for campus-raised wagyu and other high-end beef.

"I tell people you have to keep an eye on the wagyu... because it cooks fast," says research associate Jennifer Michal, who periodically is asked by folks placing orders for the University's beef whether they should be aware of any special preparation needs. "It's really rich."

More at [ansci.wsu.edu/facilities/beef/wsu-premium-beef](https://ansci.wsu.edu/facilities/beef/wsu-premium-beef)

# WOOD TAKES WING

BY BRIAN CHARLES CLARK

The most complex chemistry lab on the planet is growing in your neighborhood. There might be a tree in your own backyard, cranking out chemicals as it converts sunlight to food, wards off pests, and circulates water and nutrients through its roots, branches, and leaves.

So diverse is the chemical compendium produced by trees that we get aspirin (willow bark is a natural source of salicylic acid and has been used to treat pain since ancient times), the ink Leonardo used in his notebooks (from leaf galls produced by wasp larvae), and natural antibacterials (the fiber in cedar chips is used to make hospital gowns).

And now we get jet fuel from trees.

That's been the mission of NARA, the Northwest Advanced Renewables Alliance, a \$40 million, USDA-funded project led by Washington State University. Using readily available biomass from timber in the Pacific Northwest, this international collaboration of private industry and research universities has spent the past five years figuring out how to bootstrap a bioeconomy into existence—one that would fuel our jets, meet our needs for plastics, medicines, and fabrics, and teach us new ways to sustainably manage our forests.

Regionally based chemical and energy production will also do wonders for the American economy, as we revitalize old mills,

and repurpose refineries to process plants grown locally. One such biorefinery in Cosmopolis could herald the timber industry's future.

The story of NARA's five-year journey, its challenges and its successes, begins more than a hundred years ago, when timber towns like those in the Grays Harbor area were in their heyday.

## NATURAL PLASTICS

A hundred or more years ago, we had plastic—but it wasn't a byproduct of the petroleum industry, it was made from cellulose. And cellulose comes from trees.

Like cow horns, elephant tusks, turtle shells, and your muscles and skin, cellulose is a polymer. Susan Freinkel, in her book *Plastic*, describes these ubiquitous and essential substances as "long, flexing chains of atoms or small molecules bonded in a repeating pattern into one gloriously gigantic molecule." She continues, "Whether a polymer is natural or synthetic, chances are its backbone is composed of carbon, a



ILLUSTRATION MARIE EVERLING

strong, stable, glad-handing atom that is ideally suited to forming molecular bonds.”

It’s that glad-handing carbon that we’re trying to get, well, a handle on. As carbon dioxide, methane, and a host of other gases, carbon is creating a way-too-cozy blanket in the earth’s atmosphere and warming the whole place up. One cause of this greenhouse effect is the ancient carbon we’re taking out of the ground—as oil and coal—and turning into fertilizers to grow our food;

plastics, fuels, fabrics, and a lot more. If you show a pile of sugars to a horde of hungry yeast, you’ll soon have a tank full of alcohol to, say, produce the fuel to fly a jet.

**THE NEW WOOD WORKING**

I sat down with NARA director Mike Wolcott in his office in the PACCAR Environmental Technology Building on the Pullman campus to talk about the NARA project. Wolcott’s a big guy with big ideas, and he’s known as one of the top wood

Northwest economy: aviation and forest products. Recombines because, as Wolcott points out, the first planes were made of spruce grown in Washington.

“Any industry,” he says, referring to a broad swath of them, from forest products and the building trades to aviation, “that stays around for generations and generations cannot continue to just do the same thing. Because society doesn’t sit still.”

We’ve always relied on forests for their solid products—for timber and pulp. Wolcott

passion to make change happen and to lead the world into a bio-based future.

Wolcott riffs on that idea, saying, “One of the strong outcomes of NARA has been huge support within the region” for a more bio-based economy. “It’s resulting in actions like SeaTac Airport and Boeing and Alaska Airlines going forth and saying, ‘We are going to develop infrastructure to handle biofuels at SeaTac. We’re making this investment now because this has to be part of our future.’”

The sugars in cellulose make fuels and other chemicals, but lignins are also available to make a wide variety of coproducts, as they are known in the NARA world. Lignins are the scaffolds that allow plants to defy gravity, grow

could get off the ground. Now, the push is to make wood the new black—to mimic, in a sense, the business model of the petroleum industry. That’s why USDA’s National Institute for Food and Agriculture (NIFA) funds projects for “bioproducts that enable the fuels development,” Wolcott says.

As we transition from an oil-based economy to the new bioeconomy, we’re going to need to retool and reopen the currently shuttered infrastructure of the old timber industry. It could restore a lot of jobs in regions that were hit hard by the long, slow deindustrialization of America.

engineering at the University of Minnesota, has figured out how to make “materials that are better than polystyrene” with lignins. Polystyrene is used in packing materials, DVD cases, to-go boxes and millions more products.

When you drive into Kurt Cobain’s hometown, a large sign with his lyric greets you: “Come as you are.” Another fifty yards down the highway is a much smaller sign. It reads, “Aberdeen, lumber capital of the world.”

is not mad at you.” In Aberdeen, Cosmopolis, and Hoquiam, we roll past shuttered mills and deserted brownfields where once flourishing mills were ripped out by their roots. God’s not mad but you can see why people might be harboring doubts.

When you drive into Kurt Cobain’s hometown, a large sign with his lyric greets you: “Come as you are.” Another fifty yards down the highway is a much smaller sign. It reads, “Aberdeen, lumber capital of the world.”

railroads. In 1935, at the peak of the Depression, unions in the region attracted some 70,000 timber workers. By the 1990s, timber employment in the region had declined by about 50,000 jobs.

If there’s a cloud hanging over the Grays Harbor area, Cosmo is a silver lining. In 2006, Weyerhaeuser owned this pulp mill in the heart of Cosmopolis—and then shut it down. In 2011, an equity firm bought the mill, reopened it, and created about 200 jobs, mainly for workers who’d been

OPPOSITE: NARA DIRECTOR MIKE WOLCOTT (PHOTO SHELLY HANKS)

BELOW: NARA IS FUELED BY ITS 121 MEMBERS WHO HAIL FROM 31 ORGANIZATIONS (COURTESY NARA)



pesticides to keep bugs, fungi, and bacteria from getting our food before we do; fuel for our cars, trucks, boats, and planes; and plastics plus a million other useful chemicals. With plants, though, we are recycling carbon already in circulation in the biosphere.

All those products and chemicals we depend on can come from trees and other plants. Cellulose is full of sugar, and sugar is a great source of easily accessed carbon. Sugars can be used to make medicines,

composites people in the world. That’s saying something at WSU, considering researchers here commercialized or invented plywood and many other types of composite wood materials that are now staples of the building industry.

With NARA, “we’ve come full circle,” says Wolcott, a Regents professor in civil and environmental engineering.

Jet fuel from forest slash—the residues made up of the branches, bark, and other bits left after logs are harvested—recombines two major threads of the Pacific

recalls seeing an educational poster used in classrooms that describes the many uses of timber, “and molecules were always on the tail end of that.”

The thing about energy, as both a topic and an industry, Wolcott says, is that it is fiercely political because it is so essential to who we are and the way we live. Getting traction for change is difficult and requires “a lot of activation energy.”

He argues that the Pacific Northwest has the resources, knowledge base, appetite, and

The economics of bioenergy, specifically, but a bioeconomy more generally, are tricky. “The chemical needs are a lot more plausible than the energy needs because we artificially keep energy cheap,” says Wolcott.

That means an emergent bioeconomy must find value in areas other than fuels. “And that’s exactly what the oil industry does. It makes chemicals, it makes plastics—that’s the value chain.”

Five years ago, when oil was around \$100 a barrel, it looked like a fuel-centric bioeconomy

vertically, and compete for sunlight. They’re the woodiness of plants as they moved from aquatic to terrestrial environments.

Lignins are used in a huge range of chemical products in industrial and agricultural processes, including dispersants, surfactants, adhesives, emulsifiers, binders, thermosets, as well as, in highly purified forms, cosmetic and food additives.

Simo Sarkanen, a NARA team member and a professor of bioproducts and biosystems

**PULP NONFICTION**

I am riding around in a pickup with Larry Davis, director of fiber resources for Cosmo Specialty Fiber, a NARA partner. Davis is telling me about Cosmo’s operation, which uses locally sourced hemlock chips to make cellulosic raw materials for manufacturers.

We pass a church on a corner, and the marquee proclaims, “God

Davis drives along the Chehalis River, pointing out the rotting pilings sticking out of the water. “This really was once the timber capital of the world,” he says.

“A hundred years ago,” he continues, “those pilings would have supported decks. And the decks would have been piled high with logs.” In Grays Harbor alone, between 1906 and 1907, nearly 500 million board feet of timber shipped out on 600 steam and sail-powered ships. Millions more board feet moved east on

laid off when the mill closed a few years earlier.

The mill takes wood chips and makes “dissolving pulp,” Cosmo’s contracting and purchasing manager Sandy Corrión tells me. It’s not made into paper. Instead, this pulp is dissolved into a homogenous solution, making it ideal for subsequent processes requiring a high cellulose content. Cosmo sells their pulp to manufacturers who spin it into textile fibers, mainly viscose, as well as other products.

BELOW: WISHKAH AND CHEHALIS RIVERS CONFLUENCE AT ABERDEEN (PHOTO JOE MABEL/WIKIMEDIA COMMONS)  
 OPPOSITE: ALASKA AIRLINES IS DEVELOPING AN INFRASTRUCTURE TO SUPPORT BIOFUEL USAGE (COURTESY ALASKA AIRLINES)

I'd heard her talk at a NARA-hosted biofuels and coproducts conference a couple months before we meet and was fascinated by the concept of "byproduct synergy" she presented. It turns out that not all waste is trash. Like the logging residuals the NARA partnership turns into fuel and coproducts, Corrion wants Cosmo's residual outputs to be another company's raw materials. For Cosmo, moving into the biochemicals market is smart.

It can't be taught in a classroom, either, which is why WSU's Integrated Design Experience (IDX) tackles real-world projects in a community-based course. IDX brings together students and faculty from landscape architecture, interior design, architecture, the engineering disciplines and construction management, business, bioregional planning, and agriculture with community members. Working with NARA researchers, IDX students from

and industry mentors, gathered and presented findings on everything from how government policy affects an emerging industrial bioeconomy to recommendations for mill and depot siting. Students interviewed community members in likely refinery and depot locations to ascertain local willingness to support retooled mills. Most communities are enthusiastic about breathing new life into those facilities.

Plus, Wolcott says, students don't see the same limits as seasoned professionals. "We're hampered by what we think is possible—and what we think we can't do," Wolcott says. "So students come in with this incredibly refreshing point of view because they don't know they can't do something! And everybody is quite tolerant to let them play around. But, every time, something comes from the

down on a piece of paper. You're showing that there is actual merit behind the idea."

**FUEL FOR THE FUTURE**  
 NARA's capstone project was to produce a thousand gallons of jet fuel and have a major airline fly a commercial flight with it. It was a daunting task, because previous "proof of concept" work was at the lab-bench scale.

NARA's commercial-scale production partners had to get creative by tweaking machines and processes. Critically, too, the fuel had to be certified by an international standards board. And, finally, NARA had to find an airline willing to fly on the stuff.

It's all coming together. The fuel was made. The fuel was certified. And Alaska Airlines has agreed to fly from Seattle to Washington, D.C., to demonstrate that Pacific Northwest wood can indeed once again take wing.

But a commercial flight is really just the leading edge of something much more important and world changing.

Massive amounts of brainpower, along with private and public money, have gone into investigating plants' abilities to supply us with fuel and the starter chemicals required by key industries. The prospects are positive, both economically and environmentally. We can produce fuels and chemicals that won't compete with food production.

The market for alternative fuels is growing. The U.S. military wants to steam a green fleet and fly a green air force on biofuels. Airlines want alternative fuels in order to continue offering service to countries, like those in the

European Union, with increasingly stringent carbon-footprint regulations. Environmentalists want alternatives to cumulative toxins released by the manufacture and degradation of plastics. Communities throughout the United States, like Aberdeen, want stable and sustainable economic foundations that offer living wages. Bill Goldner, USDA-NIFA's acting director for sustainable bioenergy, says, "I've got a six-year-old. When I look at the future of everything we're doing, we're doing it because of them. We

are asking themselves, "What am I going to do?" Their musings bring his own past to mind. "I've always been a maker," he says, but with a strong love of the environment, too. Wolcott was gradually pushed and pulled towards trees' inner chemistry set and wood's energy potential. From work in forestry, "I finally went into materials engineering and got more interested in making a variety of things from that raw material rather than this," he says, rapping the wooden top of his desk.

funded projects explore the use of available biomass for energy production: pines killed by beetles in the Rockies, energy cane (a variety of sugar cane bred for high fiber content) and sweet sorghum in the Southeast, switch grass in the Midwest, shrub willow and other woody crops in the Northeast. The USDA didn't just pump money into research but put millions into education on energy literacy, as well. "We want young people to know about this stuff from an early age, and to think

⊕ lignins, a.k.a. the "bones" of wood, have great chemical potential: [magazine.wsu.edu/extra/lignins](http://magazine.wsu.edu/extra/lignins)  
 ▶ aviation biofuel from renewables: [magazine.wsu.edu/video](http://magazine.wsu.edu/video)



They've got valuable sugars in their waste stream. Finding ways to get those sugars into the market would increase revenues and reduce effluent treatment costs.

**GETTING REAL**  
 "Sustainability cannot be studied in a laboratory because it is inherently a function of communities," says Wolcott.

WSU and the University of Idaho analyzed regional supply chains for biofuels. As the Pacific Northwest continues to move towards a bioeconomy, where will mills and biorefineries be sited? And where will raw materials be extracted and gathered? And do locals even want that once thriving infrastructure brought back to life? Undergraduate and graduate students, along with faculty

Wolcott makes a couple great points about involving IDX students in NARA's work. First, he says, who doesn't want to help a student? "Giving back to students is motherhood and apple pie. So students can waltz in and get people's attention and assistance far better than I can." Community members move from passive clients to involved partners in the project.

students' work that I never thought of." Not that the IDX students' work is just playing around. The product of the class is innovation, Wolcott says. But, "innovation has to be articulated in the language of the discipline. So if you're an engineer, you've got to do enough calculations and enough design around that to show that you're not a wacko, that it's not just an idea you're writing



want them to have a world that's worth living in, environmentally. "We want them to understand that food doesn't just come from a supermarket, and fuel doesn't just come from a gas pump. We want them to understand there are social and environmental costs for whatever you do." Wolcott runs a hand through his shock of pale-spruce hair, and reflects on the winding path that brought him to this project. Like Goldner, he says his kids are at an age where they

That's a familiar refrain among members of the NARA project. Doug Rivers, director of research and development for Kansas-based biorefinery ICM, a NARA partner, recently said that when he worked for Gulf Oil in the 1970s, they built a prototype biorefinery because they were not going to be held hostage by anybody. Wolcott, too, talks about the oil embargo of the 1970s as a strong motivator of the course of his own and others' careers. All over the United States, NARA and similar USDA-

about careers, not just as scientists, but also as practitioners, farmers, and processors," says Goldner. The next time you walk past a tree in your neighborhood, maybe you'll look at it in a new way. Trees—and, more generally, plants of many kinds—provide the renewable resources that bring us pleasant shade, treehouses for our children, and tall timber buildings for our businesses, as well as the chemicals we need to maintain our energy-intensive civilization. ✱

The massive Oso landslide killed 43 people, caused extensive flooding, and destroyed a key highway north of Everett in 2014, pushing the communities of Arlington and Darrington to their breaking point.

For months, grieving residents and community leaders remained so immersed in the search and recovery demands that nearly everything else had to be put on hold. That's why, when they were **invited to participate in a national competition** that could funnel up to \$3 million or more toward desperately needed economic revitalization efforts, Arlington Mayor Barb Tolbert was practically on the verge of tears, again.

"It was this rare opportunity but we had no one left," Tolbert recalls, explaining economic revitalization has been a top priority for the once-thriving logging communities trying to forge their place in Puget Sound's ever-expanding urban reach. "It couldn't have come at a worse time. Our capacity was tapped."

At Washington State University offices in Seattle, Everett, and Pullman, though, an idea was taking shape. The University already was assisting with various recovery efforts, and it **sent a team from WSU Extension** to help with the competition as well.

What followed was a joint Arlington and Darrington entry that has survived two elimination rounds, already brought in more than \$150,000 in grants, and is among just eight of the more than 350 original entries still in contention for the top prize.

"I never, ever had any inclination of the resources that were available at my fingertips," says Tolbert.

## Call it the **Urban Extension**

Long recognized as the authority on everything from gardening and vegetable canning to livestock care and other staples of a traditionally rural lifestyle, WSU Extension is evolving for a new era marked by rapid urban growth.

Now, Extension is helping research more efficient strategies for protecting natural resources and assisting communities dealing with socioeconomic challenges ranging from poverty and homelessness to wage stagnation and economic diversification.

"The root of Extension is in our link to the University's knowledge base and having a way to effectively reach into and deliver that to the communities we serve," explains Richard Koenig, associate dean and director of WSU Extension. "Considering what Extension was built on, its origins, we're vastly different today and we're continuing to evolve."

The goal is to make sure WSU, as the state's land-grant university, continues to provide practical and relevant expertise communities need, particularly as they face diverse and increasingly complex challenges.

Formally established in 1913, the WSU Extension service grew from an earlier state-funded effort to deliver practical knowledge through what were known as traveling Farmer's Institutes. It put Washington at the forefront of the applied research movement, having an organizational structure and key staff already in place when federal legislation authorizing Extension outreach programs was approved by Congress in 1914.

At the time, one of the greatest challenges nearly every community faced was developing and maintaining a reliable food supply, which is why much of the early Extension focus was on agricultural issues.

Then, as reliability and yields increased, many communities also saw greater economic stability and Extension's outreach began to include programs focused on the family and communities, such as nutrition, parenting, and youth development through the 4-H program.

"A lot of what Extension did historically was community and economic development," Koenig says. "We just didn't call it that."

Meanwhile, the population of America's cities continued to swell, creating large and complex metropolitan regions. Globally, the number of people living in cities overtook the rural population for the first time in 2008, according to the United Nations. That shift is even more pronounced in developed nations, where an estimated 86 percent of the population is expected to live in urban areas by 2050.

In the Pacific Northwest, specifically the Puget Sound region, community leaders grappled with the environmental and social strains of increasingly dense population centers. Suburbs sprawled and new cities sprung up, creating a patchwork of local governing and policy-setting boards.

Extension offices in urban areas adapted. WSU, for example, modified programs to focus on topics seen as more relevant to big city lifestyles, such as small-scale farming, container gardening, and



PHOTOILLUSTRATION CARLOS CAETANO



other urban horticultural pursuits. Additionally, Extension began teaming up with other agencies to focus on improving nutrition and healthy lifestyles, while launching awareness initiatives to bring greater public attention to the importance of preserving clean water and forest resources.

“That emphasis started about 20 years ago and has been well received,” Koenig says.

But it remains tightly intertwined, both in practice and in public perception, with Extension’s agricultural origins.

To fully evolve, Extension leaders realized in 2009 they needed a new, separate framework that would complement traditional programs while improving community access to the expertise available within all 11 of WSU’s colleges.

“Extension has always been about our direct connection to the end user,” explains Brad Gaolach, who is leading WSU’s metropolitan Extension effort. “What we needed was a way to bring applied research benefits from throughout the University to new groups of end users.”

Among them are state lawmakers, city councils, school districts, nonprofit and other community organizations—all with policy-developing roles that can sometimes conflict or overlap. King County alone is home to 39 separate cities and towns, for example, and while Extension has long enjoyed healthy working relationships with the state’s counties, its connections to other governing boards are less developed.

The first major step toward that new approach came earlier this year. The WSU Board of Regents authorized development of the new Metropolitan Center for Applied Research and Extension.

Based at WSU North Puget Sound at Everett, it’s built on the University’s experience with delivering practical research directly to those who can most benefit from it. Unlike traditional Extension services, the Metro Center focuses on targeted projects rather than the development of ongoing programs.

“Land-grant universities understand the importance of applied research. It’s what we do,” says Gaolach, who served as Extension director in King and Pierce Counties before being named director of the new Metro Center. “Urban problems can be incredibly complex and, given the historical perceptions of Extension, we need to make sure we’re recognized as a valuable resource to metropolitan communities.”

Awareness of Extension’s evolving metropolitan services already is beginning to grow in neighborhoods such as Seattle’s historic Beacon Hill, where a vibrant community herb and vegetable garden thrives alongside a renovated commercial office building.

It was inside that office building over the summer that Donna O’Connor, a financial coach with a nonprofit organization serving low-income families, got a first-hand look at Extension’s urban focus.

Growing up, she and her brothers helped raise livestock as members of a 4-H group operated by the county Extension office. They’d learned how to plant a garden, turn fruit into jam, and how to safely preserve food for winter.

*Opposite:* Arlington Mayor Barb Tolbert is optimistic about the city’s revitalization plans.

*Below:* Beacon Hill’s renovated 2100 Building was the location of a WSU Metro Center’s poverty immersion workshop, here pictured through the neighboring Green Plate Special educational garden. *Photos Matt Hagen*

So when she showed up for a half-day poverty immersion workshop designed to help boost awareness among community leaders of the challenges faced by the working poor, it came as a bit of a surprise when she heard it was being conducted by the Extension service.

“To me, Extension was always about 4-H and agriculture ... rural kinds of things,” says O’Connor. “But what they were able to do here in one afternoon, simulating the kinds of stress and difficult choices that have to be made—without any time to fully think things through—is incredibly valuable for understanding what’s going on with so many people right now.”

Whether it’s affordable housing or homelessness, these are all things that cities are dealing with.”

Elsewhere, WSU researchers as part of a potential Extension-based project are preparing to help evaluate strains on the Puget Sound region’s food, energy, and water resources. All three are linked, meaning any policy changes designed to influence one will affect the others.

And, efforts are underway to help track impacts of differing municipal minimum wage requirements on restaurant and catering companies that operate in multiple Puget Sound cities.



The simulations are led by Martha Aitken, the Metro Center’s project specialist, who conducts the workshops in an effort to raise awareness of how policies can affect vulnerable, often-overlooked populations. She usually opens each workshop with an introduction to WSU Extension and its commitment to metropolitan issues.

“Land-grant universities are the people’s universities,” she explains. “We generate knowledge, interpret knowledge, and disseminate knowledge.”

The city of Renton is among the municipalities that has brought in Aitken and her colleagues to work with department managers.

“It was something I thought could help raise our awareness ... which it has,” explains Preeti Shridhar, who oversees Renton’s inclu-

“We can provide the research and information that enables data-driven decisions,” Gaolach says. “The WSU faculty has a wealth of expertise.”

Developing an effective urban Extension model has been a major topic among land-grant universities nationwide.

The first push came in the 1980s, followed by another in the 1990s, recalls Fred Schlutt, vice provost for Extension and outreach at the University of Alaska and chairman of a key policy-setting committee with the Association of Public and Land-grant Universities.

Extension leaders began to notice differences in the types of services eastern and western U.S. programs identified as critical to urban areas.

In the eastern United States, the major challenges involved combatting urban decay, while metropolitan regions across the west were struggling to manage growth. Additionally, many western U.S. population centers still are surrounded by vast rural areas.

"It's evolved in stages," Schlutt says. "All of us are trying to figure out how Extension adapts for big cities while still continuing to deliver our traditional services."

WSU already had a potential plan taking shape in Seattle that appealed to western land-grant universities because it took an "urban engagement" approach, Schlutt says.

The transformation in Seattle began during the economic downturn that followed the collapse of the nation's real estate markets,

ter Sims, now a member of the WSU Board of Regents, was tapped by President Obama to serve as deputy secretary of Housing and Urban Development.

"We continued to work toward a new model but when Ron Sims left, that put things on hold for a while," Gaolach says.

By 2011, though, the push was extending beyond the Northwest. The Western Extension Directors Association was aware of WSU's efforts in Puget Sound, and by 2014 land-grant universities in Alaska, California, Colorado, Idaho, and Oregon teamed up with WSU to create a regional research center focused on metropolitan issues.

"I think it's important to invest in it," says Schlutt. "We no longer can be the lone ranger."

Also eager to continue transforming Extension services is WSU's new president, Kirk Schulz.

"In the last 15 years there've been some substantial cutbacks in Extension across the country," says Schulz, who has a long history with land-grant universities. "We're having to evolve... and at Washington State we'll continue to evolve."

That evolution already is obvious to many in Arlington and Darrington.

Tolbert, the Arlington mayor, recalls an early conversation with Bob Drewel, then a senior advisor at WSU North Puget Sound at Everett who was helping coordinate the University's various assistance efforts following the landslide.

He told her about Extension's expertise with community and economic development, and suggested it might be a way to take advantage of the invitation to participate in the America's Best Communities competition without pulling city staff away from landslide recovery efforts. Tolbert and others agreed.

Extension sent them Aitken, who along with others reviewed economic revitalization ideas that were being discussed before the landslide, and met with leaders in both communities to get a better sense of how they hoped to preserve their quality of life as they diversified for the future.

Although the history of both communities is tied deeply to the region's natural resources, their economies have become increasingly intertwined with Puget Sound's technology and aerospace industries. Overall economic recovery, however, has been much slower on the urban fringes and community leaders have struggled to find the best ways to move forward while preserving their own sense of place.

The proposed plan that WSU Extension helped develop would encourage, among other things, continued diversification along an economic corridor, and left many feeling that even if they lost out on the competition's \$3 million top prize, they finally had a solid vision to help guide them forward.

"When I look back on it and think about the work that was done, in the timeframe that it was done, if anyone had told us that's what we'd be doing I'd have said, 'Great, where are the magic beans?'" Tolbert laughs.

"WSU was the magic beans. They brought this depth and breadth that I don't think any of us realized was available to us all along." ✱



COURTESY WSU EXTENSION

forcing state and local governments to cut spending to help balance their budgets. One target of those cuts was Extension services.

Although WSU provides the Extension staff and administration, each of Washington's counties typically contribute toward a portion of the local costs. The deepest cuts in local contributions came in urban counties, where Gaolach and others were told by government leaders that, in the painful budget-balancing decisions, there was a feeling that Extension services no longer were as relevant to metropolitan lifestyles.

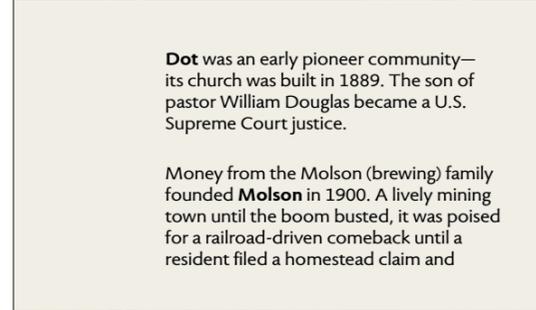
Gaolach, who had helped spearhead many of the early efforts to develop urban-style programming in Pierce and King Counties, says it was then that he realized the struggle was as much about metropolitan perceptions of Extension as economic uncertainty.

With help from Ron Sims, who served as King County executive at the time, local allocations for Extension services began to rebuild. But as plans for a new metropolitan-focused Extension service started to take shape in 2009 they were abruptly stopped af-



Many ghost towns began with a boom and ended with a crash due to radical shifts of economy, access, or natural disaster. Here are just a few Washington examples:

Starting as a logging camp in the 1890s, **Bordeaux** was a successful town with stores, a hotel, and a school until timber ran out and workers moved away in 1941.



**Dot** was an early pioneer community—its church was built in 1889. The son of pastor William Douglas became a U.S. Supreme Court justice.

Money from the Molson (brewing) family founded **Molson** in 1900. A lively mining town until the boom busted, it was poised for a railroad-driven comeback until a resident filed a homestead claim and



KLICKITAT COUNTY



MOLSON

ordered everyone out of town. It is now an open air museum to a bygone era.

Glittering deposits in 1889 led to a frenzy of claim staking that became **Monte Cristo**—claimed to be the first mining camp on the western slopes of the Cascade Range. When the boom peaked in 1894, the town numbered 1,000. By 1900, most of the miners had left for the Klondike.



MONTE CRISTO

SNOHOMISH COUNTY

# GHOST TOWNS OF WASHINGTON



GOVAN

Because of a large sandbank nearby, **Govan** became a boomtown for the construction of the Central Washington Railway in 1890. Later the scene of several unsolved murders, Govan's fate was sealed when the community was bypassed by newly built U.S. Route 2 in the 1930s.

Explore these and other abandoned-but-not-forgotten Washington towns at [pinterest.com/wsmscrapbook/washington-state-ghost-towns](https://pinterest.com/wsmscrapbook/washington-state-ghost-towns).



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## Breaking through

Paul Henning '98 didn't set out to be a professional musician. "I swore up and down I wasn't going to be a music major or study music—but then, look what I did!" he says.

He moved to Los Angeles where he made a lot of phone calls looking for work as a session player, orchestrator, or proofreader of musical scores—and ended up working with John Williams on the music for *Star Wars: The Force Awakens*.

Over the course of 60 years, John Williams has scored over 100 films and taken home five Oscars. All his scores, Henning says, start with Williams at the piano with a pad of score paper, writing out everything by hand.

"These sketches are very complete," Henning says, with all the parts for woodwinds, horns, strings, piano, and percussion written out "down to the tiniest detail."

"Williams writes this incredibly complex and amazing music that he doesn't hear until it gets to the scoring stage," Henning says.

"It's just in his head and there's not many people who can do that anymore."

As a first step towards a final score, Henning engraves the sketches using software before completing final orchestrations. From there, the score passes through many hands, returning multiple times to Henning for proofing and fine-tuning of the orchestration. Henning continues to work with the Academy Award-winning composer, most recently on *BFG*, the film adaptation of the beloved Roald Dahl story.

Henning is an aspiring composer himself. He's written the score for a film, *The Town that Was*, and is about to release an album of original orchestral music. Called *Breaking Through*, the compositions feature Henning on his first instrument, piano.

As if that weren't enough, Henning is also a successful studio musician. He's played violin on Barbra Streisand and Neil Young albums, a slew of TV shows such as *Family Guy*, as well as the songs in *Frozen* and the latest *Ice Age* and *X-Men* films.

BY BRIAN CHARLES CLARK

**HENNING WAS WELL PREPARED FOR SESSION WORK.** The fifth-generation Pullmanite started on piano when he was 8, and studied violin with WSU associate professor Meredith Arksey when he was a teen. Despite that, Henning planned to go into civil engineering until a flute player friend he met at *Alive!* new student orientation encouraged him to take music classes. Henning and Amanda (Bullock) Grider '98 played in marching band and Crimson Company together.

"It was her friendship at *Alive!* that helped me make the decision to go into music," Henning says.

Even with all his experience, Henning says sessions are still extremely demanding.

"You are usually sight-reading everything" at recording sessions, "and the music is sometimes ferociously difficult. Sometimes almost to the point of panic: How am I going to get this in the next 10 seconds?"

"But then they say, 'OK, violins, here we go,' and you have to pick it up and just nail it." ❄️



samples of Henning's music: [magazine.wsu.edu/extra/breaking](http://magazine.wsu.edu/extra/breaking)

PHOTO ANDREW OPPER

## Storming the clouds

Flying into a hurricane might be the stuff of nightmares for the average person, but for Devon Meister '14 MBA, it's just another day on the job.

A meteorologist and pilot in the U.S. Air Force Reserves, Meister routinely flies a WC-130J into the heart of some of nature's biggest storms, where the best data can be collected and used to help save lives.

But nothing prepared her for the danger of her first hurricane mission.

Flying at night, Meister and the crew were headed toward Hurricane Rafael in 2012. But because meteorologists have limited ability to analyze satellite data during darkness, there was no way to predict what happened next. The wind shifted suddenly from a 90-knot crosswind to a 90-knot tailwind. People in the back of the aircraft reported it felt like they had stopped moving forward and were suspended in midair.

Suddenly, the plane lost a lot of lift and airspeed, even though the throttles were all the way up. Although the radar showed an interesting notch of dry air shaped like a V, there were no other indications of dangerous weather, she recalls.

The autopilot tilted the nose of the aircraft upward in an attempt to maintain altitude, but this maneuver flooded both engines on the right side with water from the heavy rains, forcing the right wing to dip down suddenly. The aircraft commander took control and pointed the nose down, trading altitude for airspeed.

"We immediately maneuvered into the center of the eye, which provided calm weather conditions and gave the crew time to understand what was happening," Meister says. "After further analysis following the flight, meteorologists determined we flew too close to a mesocyclone, which is like a tornado in a hurricane."

Even after surviving a tornado in a hurricane, Meister calmly regards her job as a "controlled risk."

"The Air Force taught me one of the most important skills is grit," says Meister. "I may not be the most talented individual in a field, but a never-give-up attitude pushes me to develop the skills needed to get the job done and, most importantly, not let my team down."

Meister applied that same resolve, while serving her country and raising a son on her own, to earn an executive MBA quickly through WSU's online program. Its business plan component gave her the foundation to launch her own nutrition and fitness business.

"The program allowed me to remain mobile," she says. "I accomplished assignments from New York, Hawaii, St. Croix, Washington D.C., Florida, California, Yellowstone National Park—and on airplanes everywhere in between."

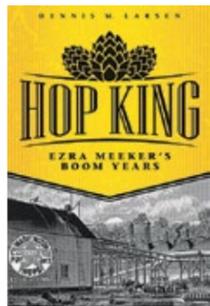
Meister recently became an aircraft commander. She plans to grow her business, and eventually work as an instructor pilot. ✨



PHOTO: DREW TARTER/TARTER PHOTOGRAPHIC SERVICES

[alumni.wsu.edu/EasyAs123](http://alumni.wsu.edu/EasyAs123)

## NEWmedia



### Hop King: Ezra Meeker's Boom Years

DENNIS M. LARSEN '68  
WSU PRESS: 2016

The demands of craft brewing in the last few years, along with declining European hops production, have driven the price of hops up as much as 50 percent, creating a windfall for growers in Washington. It's not the first time in state history that hops brought a grower financial success.

Puyallup Valley pioneer Ezra Meeker first started planting hops as a cash crop in 1867, and continued for decades after that. His father Jacob Meeker had obtained hop cuttings and soon the Meeker family was selling hundreds of tons a year, including through a lucrative and mutually beneficial relationship with Portland brewer Henry Weinhard.

After the British hops crop failed in 1882, Ezra Meeker earned his moniker "Hop King of the World" as he moved into the international market, became the largest hops exporter in the country, and sold 100,000 pounds that year. Meeker later made inroads with the expanding beer industry in Japan, increasing his wealth even more. Other farmers on both sides of the Cascades began to jump into the hops industry when they saw Meeker's success.

Raising hops was a risky proposition because of high start-up capital costs and fluctuating hops prices, writes Dennis Larsen in *Hop King*, but that suited Meeker's character. Meeker was certainly not meek, infuriating his business and political rivals with his tenacious nature. Meeker's pugnacious spirit led to his part in 51 civil court cases in Washington Territory.

As a pioneer at the birth of Washington state, Meeker not only introduced a successful crop, he also ran for several political offices, founded the town of Puyallup, and advocated for women's suffrage. But, as Larsen notes in the biography, Meeker faced his share of trouble.

Meeker lost his mother to cholera, a younger brother drowned, a second brother died in a shipwreck off of California, and he faced several other family tragedies. The Puyallup Valley hops industry founded by Meeker collapsed after hop lice destroyed his and other's crops in 1892. While the hops industry remains very strong in Yakima and central Washington, it never recovered west of the mountains.

Larsen's biography of Meeker portrays a complex and important figure in state history. Meeker's influence on one of Washington's signature crops, his political ambitions, and even his later advocacy for preserving the Oregon Trail show the pioneer sensibility that built Washington.

—Larry Clark

### Glacier is for the Birds: A Trail Guide to the Birds of Glacier National Park

DAVID P. BENSON '99 PHD  
HABITATS FOR ALL PRESS: 2016

*Distant cries of a loon penetrate the evening twilight. A dozen faces lean toward the campfire, eyes on the park ranger who enchants them with tales of the wild. As if on cue, a great gray owl hoots at the rising moon...*

Such were the poetic thoughts of this reviewer while reading Ranger David Benson's charming trail guide. Unlike the typical dry guidebook, his stories and descriptions capture your imagination as if you, too, are part of his audience at Glacier National Park.

The book not only provides an entertaining directory of the park's resident birds but also points out history, fossils, mammals, wildflowers, and hazards along the way. The pages are packed with interesting tidbits and lighthearted anecdotes meant to enrich the visitor's experience.

Drawing on his 20 summers working as a ranger naturalist in the Many Glacier area of



the park, Benson presents an impressive list of 48 hiking trails complete with roundtrip distance, difficulty, elevation gain, and habitat. He includes likely locations of celebrity birds such as the white-tailed ptarmigan, three-toed woodpecker, northern hawk owl, harlequin duck, and boreal chickadee.

As a professor of biology at Marian University in Indianapolis, Benson studies the habits and adaptability of white-tailed ptarmigan. One of his favorite places to spot them in Glacier is on the Grinnell Glacier Trail, a difficult, 12-mile roundtrip hike offering an abundance of wildlife and other uncommon bird species like the Cordilleran flycatcher, Clark's nutcracker, and American pipit.

Since dense vegetation makes it difficult to see some of these birds, Benson says visitors might have better luck identifying many species "by ear." He suggests Thayer's "Birds of North America" software as a good learning tool.

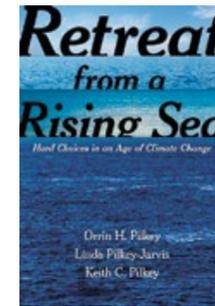
—Rebecca Phillips

### Retreat from a Rising Sea: Hard Choices in an Age of Climate Change

ORRIN H. PILKEY '57, LINDA PILKEY-JARVIS, AND KEITH C. PILKEY  
COLUMBIA UNIVERSITY PRESS: 2016

Our planet's rapidly changing climate will make the bursting of the real estate bubble look like a picnic on a sunny spring day. Upside-down equity and underwater mortgages don't begin to describe the scope of what rising sea levels are going to do to us.

The grim picture painted and the solid evidence presented by the Pilkeys in



*Retreat from a Rising Sea* is one of inexorable foolishness and inequity.

Instead of buying people out of their repeatedly flooded coastal homes and businesses, the National Flood Insurance Program forks over billions of taxpayers' dollars to enable people to rebuild in the same spot. And then we do it again, after the next storm, and again, in a grotesque Groundhog Day.

"We'll be back because we are Americans and we don't give up" is the cry often heard after a big storm has blown by," the Pilkeys write. Fortitude is an admirable trait—if an outcome other than the inevitable can be expected.

But the results won't be different; there's going to be more of the same, more frequently, and worse, much worse. Miami and New Orleans are doomed, the authors argue. New Orleans is sinking, and Miami sits on top of a limestone sponge. There is no escaping the waters.

"Like it or not, we will retreat from most of the world's nonurban shorelines in the not very distant future. Our retreat options can be characterized as either difficult or catastrophic," the Pilkeys write.

It comes down to this: Nature bats last, and nature bats 1,000.

—Brian Charles Clark

#### BRIEFLY NOTED

##### Light in the Trees

By GAIL FOLKINS '85

TEXAS TECH UNIVERSITY PRESS: 2016

Folkins draws on her experiences growing up in rural western Washington to weave a coming of age tale for both the narrator and the place. The memoir, touching on everything from serial killers and Northwest



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## NEWmedia cont'd

volcanoes to Sasquatch myths and runaway livestock, glides through past and present while exploring cultural and environmental topics illustrating the changing American West.

### The Expanding Universe: A Primer on Relativistic Cosmology

By **WILLIAM D. HEACOX '72 MA**  
**CAMBRIDGE UNIVERSITY PRESS: 2015**  
Cosmology, the science of the universe, has seen a renaissance in recent decades. This textbook by Heacox, an emeritus professor of astronomy at the University of Hawaii at Hilo, discusses new understanding of the physical principles underlying the theories and the observable consequences of models of universal expansion.

### Send Me a Postcard

By **KRISTALYN SIMLER '97**  
**2016**  
Gloriana Lopez, a teenage Latina in the Yakima area, faces problems at school and with friends, as grape growers and wine makers line up against hop farmers and beer brewers, in this first young adult novel by Simler.

### Three Summers: The Greatest Game

By **DN MAYNARD '92 MS**  
**TATE PUBLISHING: 2016**  
Cousins Nathan and Dennis strengthen their relationship over three summers, spread over a couple of decades. Hitchhiking and conversing, the two wander through Washington, Oregon, and California as they learn more about each other and their world.

### Patched & Repaired

By **MARCIA HARVEY '95 MFA**  
**DODO PRESS: 2016**  
Painter and sculptor Harvey pulls together imagery from Manet's paintings to beaded caps into a chapbook of her poetry that explores love and disillusionment.

### Tape Breakers

By **JIM AKERS '81**  
**2016**  
Akers mixes stories, research, and personal experience in his inspirational book, written to equip people with the tools they need to finish their goals with impact. The author draws on

examples such as legendary WSU basketball coach George Raveling, now Nike's director of international basketball, to inspire readers in their endeavors.

### The Educational Significance of Human and Non-Human Animal Interactions

Edited by **SUZANNE RICE AND A.G. RUD**  
**PALGRAVE MACMILLAN: 2016**  
The essays investigate the ethics of animal and human interactions, while refuting anthropocentrism, in this volume from different disciplinary educational perspectives edited by WSU Education Professor Rud and his colleague Rice from the University of Kansas. Rud's own contribution calls on the philosophies of Albert Schweitzer and John Dewey to consider a "rewilded" education with reverence for life.

## Alumni Association News

### Road rave

We have a bunch of ways to express our pride: waving the flag, joining the Alumni Association, yelling "Go Cougs!" But considering how much time we spend in our vehicles, what better way to tell the world you're an alum than a crimson Washington State University license plate?

You certainly won't be alone. WSU plates outnumber every other specialty plate in the state, and can be spotted all over the Northwest. Almost 21,000 plates grace the roads and highways—more than all state collegiate plates combined, and more than twice as many as the University of Washington.

It's not just about pride. Each license plate sends money to WSU scholarships. Last year license plate sales broke another record, with \$603,000 going to support students.

Although special license plates go back many decades, the legislature passed the Collegiate Plate Bill in 1994, which allowed the six major public universities to use license plates to raise funds for scholarships. The first two plates, for WSU and UW, were issued beginning in 1995.

WSU changed its plate to the new crimson look in 2012, after a three-year effort by the Alumni Association. The bold color proved popular, and more Cougs each year show their pride on the road.

For information about getting a WSU plate, visit [alumni.wsu.edu/license](http://alumni.wsu.edu/license), or the Washington State Department of Licensing.

Total registered special vehicle plates as of August 1, 2016 for Washington public universities and college: WSU—20,893; UW—9,641; EWU—1,237; WWU—767; CWU—628; TESC—133.



# THE BEST ALUMNI ASSOCIATION IN THE WORLD NEEDS VOLUNTEERS

We love our volunteers—they are the best. But we need more! If you love WSU, and are dedicated, passionate, and a die-hard Cougar, we need you. Contact the WSU Alumni Association at **1-800-ALUM-WSU** or [wsua.volunteers@wsu.edu](mailto:wsua.volunteers@wsu.edu) to speak with a member of the Alumni Engagement team about ways you can help us help WSU.

**Go Cougs!**



**ALUMNI ASSOCIATION**

Members Make the Difference.

## CLASSnotes



GEORGE HOLLINGBERY (IN HAT) WITH GABE KAPLAN, AKA MR. KOTTER (COURTESY GEORGE HOLLINGBERY)

**GEORGE HOLLINGBERY '76** studied education at an interesting time, as the profession underwent significant change in the 1970s. Teachers began asking where the classroom began and ended, and how could they better reach and help students who learn in different ways.

During that time, Hollingbery says they all faithfully watched the TV sitcom *Welcome Back, Kotter*. Set in a Brooklyn remedial high school class, the show offered a glimpse into how “difficult” students could defy expectations.

Hollingbery, a fourth-generation Cougar and grandson of legendary WSU football coach Babe Hollingbery, started teaching high school sociology and other classes in Lacey. Although he had all kinds of students, he says, “I was fascinated by the kids in the back, the tough guys. How do I connect with them?”

He helped start the innovative New Century High School, a night school where he taught career and technical education. At one point, his friend Jeff McQuarrie '98—director of the *Legends of the Palouse* documentaries that Hollingbery narrated—stopped by, saw him in the class, and said, “You were like Kotter in there with those kids.”

Hollingbery retired to the San Diego area in 2013 with his wife Cindy '76, also a counselor and teacher. They moved into a condo and the previous owner said their neighbor is a celebrity, not really a surprise in southern California.

Except the neighbor is Gabe Kaplan, Mr. Kotter himself.

Naturally Hollingbery introduced himself, telling Kaplan, “What you did on TV, I did in real life.”

Comedian and actor Kaplan not only starred in *Welcome Back, Kotter*, he also wrote and produced it based on his own experiences as a Brooklyn teen. Hollingbery says he enjoys Kaplan’s dry wit and stories of New York, and the contrast with his own small town upbringing in eastern Washington.

“Gabe asked me, ‘How did I do as a teacher?’” he says. “I wanted to know what it was like growing up in Brooklyn. And what it was like to fly on John Travolta’s jet.”

It’s almost unbelievable, he says. “With 30 million people in California, the guy who inspired me ended up being my neighbor.” ✱

BY LARRY CLARK

**50** **KEN SCHMAUDER** ('54 Ag., '70 EdD), retired superintendent of the Evergreen School District, was designated as the early learning champion by Educational Opportunities for Children and Families (EOCF) of Washington, for his work with southwest Washington public schools. ✱ Ornithologist, artist, and emeritus professor at the University of Nebraska **PAUL JOHNSGARD** ('55 MS Wildlife Bio.) received the WSU Alumni Achievement Award in recognition of writing and teaching that has expanded public understanding of natural history, conservation, and pressing environmental issues.

**70** PeopleAdmin awarded the Inspired2Educate award to **JAMES ROBERTSON** ('72 MA History) at the annual PeopleConnect conference last June in Austin, Texas. The award honors an essay detailing the person who most inspired the educator. Robertson is an adjunct professor of history at Montgomery County Community College and at Esperanza College in the Philadelphia area. ✱ **DEAN A. RADFORD** ('73 Comm.) retired June 30 after a nearly 45-year career in journalism. His most recent post was editor of the *Tukwila Reporter* for the last five years. Radford was editor of *The Daily Evergreen* for a year at WSU, before moving west to Port Angeles and then to south King County for the *Reporter* newspapers. ✱ The Precast/Prestressed Concrete Institute elected **CHUCK PRUSSACK** ('76 Civ. Eng.) as chair for the technical institute for the U.S. precast concrete structures industry. Prussack, the manager of sales, engineering, and quality control for Oldcastle Precast in Spokane Valley, has been in the business for 40 years. ✱ **SUE STOVER** ('76 DVM) was selected for induction into the University of Kentucky Equine Research

Hall of Fame. The professor of veterinary anatomy at University of California, Davis has advanced the field with work on musculoskeletal injury in performance horses. She was the ninth recipient and first female surgeon to be recognized by the American College of Veterinary Surgeons Founders Award for Career Achievement. ✱ The Washington State Auto Dealers Association gave **GARY GILCHRIST** ('77 Gen. St.), Tacoma’s Gilchrist Auto Center, the “Robert P. Mallon Dealer of the Year” award. Gilchrist is a third-generation auto dealer and Tacoma-area native. He and his wife Gwen are also involved with children’s health charities.

**80** WSU track phenom **HENRY RONO** ('81 Gen. St., '83 Psych.) was selected in May as the Pac-12 Men’s Track & Field Athlete of the Century. Rono’s steeplechase and 5,000m times are still the best in collegiate records through the 2016 season. He won four Pac-10 titles, six NCAA titles, and won numerous awards in the late 1970s. A member of Kenya’s 1980 Olympic team, he did not compete due to a political boycott. ✱ Wood products company Boise Cascade chose **ERIN NUXOLL** ('83

Forest & Range Mgt.) as vice president of human resources. Erin previously served as Boise Cascade’s vice president of human resources from 2003 to 2005 before leaving to join the J. R. Simplot Company. ✱ **RICHARD BAUSCHER** ('84 EdD) was selected as one of the three 2016 Idaho High School Hall of Fame inductees. He retired as the Middleton School District superintendent in June after 15 years. In August, he became a professor of school leadership for the University of Idaho Boise. He was also chosen as Idaho’s superintendent of the year in 2010. ✱ **GREG COPELAND** ('84 Acc.) announced his resignation as Linfield College’s men’s golf coach after 15 seasons. He guided the Oregon college’s team to four Northwest Conference men’s golf championships. He will continue in his position as Linfield’s director of budget and financial analysis. ✱ Vonage Holdings Corp. elected **GARY STEELE** ('84 Comp. Sci.) to serve as a member of its board of directors. Steele was the founding CEO for computer security-as-service company Proofpoint. He has more than 30 years experience in software and business technology. ✱ **DANIEL J. BERNARDO** ('85 PhD Ag. Econ.) was honored with the WSU Alumni Association’s highest award—the Alumni Achievement Award—in recognition of his leadership as interim president, provost, and dean. ✱ **MAJ. GEN. CHRISTOPHER BENCE** ('86 Elec. Eng., '93 MEM) took command of the U.S. Air Force Expeditionary Center in August. The Expeditionary Center, located at Joint Base McGuire-Dix-Lakehurst in New Jersey, is the Air Force’s center of excellence for advanced mobility and combat support training and education. ✱ Orexigen Therapeutics, a biopharmaceutical company focused on obesity treatments, promoted **THOMAS CANNELL** ('86 DVM) to executive vice president, chief operating officer, and president of global commercial products. He’ll be accountable for global revenue and key marketing activities. ✱ **IVAN COOK** ('89 Phys. Ed.) joined Bibby Transportation Finance as a business development officer. He’ll provide customers with asset-based

lending solutions for transportation and freight. Cook was previously with Amerisource and Comdata Financial Services.

**90** **SCOTT BLEEKER** ('91 Ag. Econ.) joined Spokane Teachers Credit Union as commercial lending manager. Bleeker began working in financial institutions in 1991, most recently as senior vice president at Bank of America. ✱ The Olympia Police Department has a new deputy chief, **AARON JELCICK** ('91, '92 MA Crim. Jus.) He joined the Olympia Police Department in 1992, serving as walking patrol officer, training officer, Thurston County Narcotics Task Force detective, Olympia Police Department detective, patrol sergeant, detective sergeant, and most recently, special operations lieutenant. ✱ **MARK JOHNSON** ('91 Ag. Eng.) has been named executive assistant to the CEO and COO of Bechtel, a global construction and engineering firm based

in San Francisco. Johnson has worked at Bechtel since 1998 and held engineering positions of increasing responsibility at the Yucca Mountain project in Nevada, a chemical weapons demilitarization project in Kentucky, and the waste treatment and immobilization plant in Richland. ✱ Cardiac Science, Los Angeles-based manufacturer of automated external defibrillators, appointed **DEV DATT (DEV) KURDIKAR** ('91 MS Chem. Eng.) as chief executive officer. Prior to joining Cardiac Science, Kurdikar was general manager of the Boston Scientific men’s health business. ✱ The Walla Walla Community College board of trustees chose **DEREK BRANDES** ('92, '94 MA Comm., '13 EdD), to succeed longtime President **STEVEN VAN AUSDLE** ('66, '68 MA Ag. Econ.) at the college. Brandes, previously vice president of instruction at Green River College in Auburn, started his tenure as college president on July 1. He grew up in the Tri-Cities and served as a

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## CLASSnotes



SCOTT VARLEY/DAILY BREEZE

A teenaged **MARVIN MACKIE '63 DVM** was working all summer on the family farm at the end of the rail line in Buhl, Idaho, wondering what to do with his life.

"One day I saw a cloud of dust coming down the gravel road. It was the veterinarian and he was going to go save an animal. And the light came on." Off Mackie went, first to the University of Idaho for his undergraduate degree, and then next door to Washington State University for his doctorate of veterinary medicine.

Mackie ended up in southern California, where he loved the weather and found lots of work. One thing he hated, though, was euthanizing pets.

"After 13 or 14 animals," he says, "you're getting ready to give the next dog the shot when he reaches out and licks the back of your hand... And you think, this sucks!"

Mackie says that, by the early 1970s, 19 million small animals were being euthanized every year. "There was a need for everybody involved with small animals to do something about overproduction."

In 1976, Mackie opened a spay clinic in a suburb of Los Angeles. "When I started doing early-age surgeries, it created a bit of a

firestorm," he says. Until Mackie and a few others came along, spay and neuter procedures weren't done until animals reached puberty at 6 months or older. But that, he says, meant too many females had "oops" litters.

Researchers backed up the efficacy and safety of early-age spaying. Meanwhile, Mackie developed his "quick spay" technique and began teaching it to other practitioners. Through experience, Mackie figured out how to streamline the entire sterilization process, from scheduling and intake and the procedure itself, to recovery and check out. And because the animals are younger, the procedure and drugs used are simpler, and the recovery process quicker.

The numbers tell the rest of the story: despite an overall increase in total number of pets, the number of euthanizations has dropped to fewer than 3 million per year, according to the American Society for the Prevention of Cruelty to Animals.

Over 5,000 copies of Mackie's DVD, *QuickSpay*, have been distributed free to practitioners all over the world in both Spanish and English. \*

BY BRIAN CHARLES CLARK

dean at Columbia Basin College in Pasco, and in various positions at WSU Tri-Cities in Richland. ✨ The *Oregon Super Lawyers* magazine noted **VICTORIA BLACHLY** ('93 Biol.) among the outstanding attorneys for 2016. She works for Portland's Samuels Yoelin Kantor law firm in estate and trust litigation. ✨ **KYLA SAWYER** ('93, '95 MA Comm.) stepped in as head of the Mini-Cassia Chamber of Commerce in southern Idaho. She will be the spokeswoman for two counties, 12 cities, and thousands of businesses. Sawyer previously worked as a radio and television broadcaster, as well as a marketing entrepreneur. ✨ Retirement community developer Touchmark promoted **KEN ALEXANDER** ('94 Anthro.) as executive director of their Spokane retirement facility on South Hill. Alexander has more than 14 years of experience in skilled nursing, rehabilitation services and retirement-community living. ✨ **MIKE FOLKERS** ('94 MBA) left his position as finance director for the city of Hoquiam to take the same position with the city of Aberdeen. ✨ **RANDY FRISCH** ('94 MBA), a former executive

with the *San Diego Union-Tribune* and *San Diego Business Journal*, has been named president of City University of Seattle. ✨ The Bellevue College Board of Trustees voted to appoint **GITA BANGERA** ('96 PhD Microbio.), interim vice president of instruction, and Aaron Hilliard, vice president of Human Resources, as acting copresidents. ✨ **NOAH JARRETT** ('96 English) was named transportation, ports, and maritime group leader at Portland, Oregon law firm Schwabe, Williamson & Wyatt. ✨ **ANTHONY PATON** ('98 PhD Pharm.) joined the Okorocho criminal defense law firm as an expert witness and consultant on forensic toxicology. Patton has 15 years of experience in toxicology and pharmacy as a clinical pharmacist, college instructor, and researcher in many fields. ✨ Bates Technical College President Ron Langrell announced the appointment of **JOSH CLEARMAN** ('99 Math.) as campus dean of the Advanced Technology Center at their Central/Mohler campus. Before Bates, Clearman was the dean of trades and technology at Green River College, where he led workforce development, and

supervised and provided leadership to 65 employees for two academic divisions and two programs. ✨ The Bainbridge Island School District hired **ERIN MURPHY** ('99 Ag. Ed., '02 MS Ag.) as its new assistant superintendent of administrative services. Murphy was the principal of Alderwood Middle School in the Edmonds School District. After graduating, she worked for her first eight years in education as a science and leadership teacher at Poulsbo Junior High School. She then spent four years as assistant principal at Mountlake Terrace High School.

00 Lawyer and veteran of 1991 Operation Desert Storm **VIOLA ALEPUYO** ('01 Women's Studies) was the grand marshal of the Northern Marianas Island's 71st Liberation Day celebration on July 4. She is currently the senior vice president for legal affairs of Imperial Pacific International/Best Sunshine International. Alepuyo was the deputy attorney general from November 2012 to April 2013 and later served as acting attorney general. ✨ Veteran distance runner **BERNARD**

**LAGAT** ('01 MIS) competed in the 5,000 meter race at the 2016 Olympics in Rio. The 41-year-old took fifth place. Lagat is a thirteen-time medalist in world championships and Olympics, including five gold medals. ✨ **JESSICA HAGAN** ('03 Comm.) was promoted to director of sales for Seattle NBC affiliate KING-TV, after working several years in sales and marketing roles for Tegna, the station's parent company. ✨ The Aberdeen School District selected **AARON ROIKO** ('04 Ed.) as athletic director. He was a sixth-grade teacher at the Cosmopolis School District since 2004, and a coach for basketball and golf. ✨ **ALPINE BANK** in Rockford, Illinois, hired **EMILY KEILBACK** ('05 Comm.) as its new vice president of education and development. She has over 12 years of experience in change management, adult learning, nonprofit fundraising, and strategic planning. ✨ **AMBER PEABODY** ('05 Comm.) took the helm as editor of the *Cody Enterprise* in Wyoming. Peabody joined the *Enterprise* in 2005 as a reporter. She later served as the special sections editor and then as news editor. ✨ **ZACHARY PURVIS** ('06 Math.) had his first book, *Theology and the University in Nineteenth-Century Germany*, published by Oxford University Press this year. He credits his WSU Honors College, Fulbright, and German exchange experience with his success at the University of Oxford that led to the book. He now teaches at Scotland's University of Edinburgh. ✨ Investment advisory firm Golden State Wealth Management welcomed its newest wealth manager, **JUSTIN VESTMAN** ('06 Sport Mgmt.) of Santa Monica, California. He specializes in providing financial planning, retirement planning, and asset preservation to small business owners, individuals, and families. ✨ The Downtown Pasco Development Authority has a new executive director: **LUKE HALLOWELL** ('07 Int. Bus.), a Kennewick man with experience working in the nonprofit sector and the Latino community.

10 **ED ANEGON** ('10 MA Poli. Sci.) was honored as Teacher of the Year at Jenkins High School in Chewelah. He's in his

second year at Jenkins, where he teaches U.S. history, world history, civics, and current world affairs. ✨ **JULIA CULP** ('10 Land. Arch.), ASLA, joined Bernardo|Wills Architects as a landscape architect. The Spokane architecture firm has given Culp projects that include the City of Spokane's combined sewer overflow tank and plaza, the master plan for Edwidge Woldson Park in Spokane, and work in Idaho and Nevada. ✨ Kirkland resident **NATE SCHOOT** ('10 Busi.) has been promoted to director of business services at life insurance company Altig in Redmond. ✨ The Washington Interscholastic Activities Association chose **CASEY JOHNSON** ('11 Comm.) as their new sports and activities information director. He will be primary media contact and manage production of WIAA publications. ✨ JLT Specialty USA, a subsidiary of one of the world's leading providers of insurance, reinsurance and employee benefits-related advice, brokerage, and associated services,

appointed **JASON MCCARRICK** ('11 Hist.) as a property broker, specializing in real estate, retail, and hospitality. ✨ **GREGORY ALLEN KEARBY** ('12 Biol.) of Yakima received his doctor of osteopathic medicine from Philadelphia College of Osteopathic Medicine at the college's 125th commencement in June. He will continue his medical training in surgery at Travis Air Force Base-University of California, Davis in Sacramento. ✨ The Fox affiliate in Little Rock, Arkansas, hired **BEN CREIGHTON** ('14 Comm.) as their new sports reporter and weekend anchor. He went from the ABC affiliate in Eugene, Oregon, where he covered the Oregon Ducks and Oregon State Beavers. ✨ **SARA SPANGLER** ('16 DVM) returned to Pocatello, Idaho, as a veterinary doctor at Alta Animal Hospital after receiving her veterinary degree at WSU. She was recognized for excellence in the areas of radiology and soft tissue surgery during her clinical rotations.

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## INmemoriam

**30** **LOIS ELEANOR HENKINS** ('35 Office Admin.), 103, July 28, 2016, Spokane. **THOMAS A. GOLDING** ('39 Zool.), 97, March 29, 2016, Sequim.

**40** **HARRY L. HOKANSON** ('40 Ag.), 98, April 7, 2016, Chehalis. **EDITH THURLEY SCHEEL** ('40 Pharm.), 98, August 15, 2016, Vancouver. **DOROTHY E. STREET** ('40 Socio.), 99, May 1, 2016, Portland, Oregon. **RAE G. MCCAIN** ('41 Home Econ., '54 Ed.), 96, June 7, 2016, Spokane. **PAUL BERGQUIST** ('42 Elec. Eng.), 96, August 22, 2016, Upper Saddle River, New Jersey. **JACK P. MEINERS** ('42 Agro., '46 PhD Plant Path.), 96, April 24, 2016, Silver Spring, Maryland. **MARY MCCOLL NEILSON** ('42 Socio., Kappa Delta), 95, May 15, 2016, Olympia. **FRED ROBERT PEASE** ('42 Agro.), 96, July 25, 2016, Othello. **PETER G. HUPPERTEN JR** ('43 Gen. St.), 94, January 12, 2015, Anchorage, Alaska. **WARREN HARDING IMUS** ('43 Civ. Eng.), 95, June 6, 2016, Sedona, Arizona. **DOROTHY E. (DAY) SMITH** ('43 Phys. Ed.), 94, February 24, 2016, Shoreline. **WARREN K. SMITH** ('43 Busi.), 94, May 15, 2016, Seattle. **E. DARLENE MCLELLAN** (x'44, Alpha Chi Omega), 94, August 9, 2016, Spokane. **H. VIRGINIA DONALDSON** ('45 Busi., Kappa Delta), 92, July 21, 2016, Palouse. **HENRY RAYMOND ZIMET** ('45 DVM, Sigma Alpha Epsilon), 94, July 25, 2016, Issaquah. **MARILYN LOUISE CONE** ('47 Comm.), 88, April 30, 2016, Portland, Oregon. **BETTY GAIL GRAVETTE** ('47 Gen. St., Kappa Alpha Theta), 90, July 15, 2016, La Jolla, California. **PATRICIA A. MARTIN** ('47 Socio.), 91, August 9, 2016, Edmonds. **JAMES WILSON** ('47 Mech. Eng.), 94, December 8, 2015, Longview. **VIRGINIA MARIE ASAN** ('48 Phys. Ed., '57 MAT), 90, July 3, 2016, Spokane Valley. **HELENE PREHM HEGLUND** ('48 Socio.), 89, May 13, 2016, Seattle. **JOYCE MARJORIE LEE** (x'48 Home Econ.), 89, May 16, 2016, Los Gatos, California. **CAROL ANN ALBOUCQ** ('49 Rec.), 86, May 26, 2016, Spokane. **HENRY H. BASSO** ('49 Ag., Alpha Gamma Rho), 93, December 24, 2015, La Grande, Oregon. **EVERETTE F. BAKER JR** ('49, '55 MS Bacterio., '63 DVM), 88, April 25, 2015, Shoreline. **DELMAR F. BICE JR** ('49 Gen.

St., Sigma Alpha Epsilon), 90, December 11, 2015, Yakima. **THOMAS EDWARD BUSCH** ('49 Busi.), 92, June 8, 2016, Spokane Valley. **ROBERT LORIN FOSTER** ('49 Pre-Med.), 89, June 23, 2016, Lake Oswego, Oregon. **FRANKLIN G. HIGGINS** ('49 Elec. Eng.), 98, July 14, 2016, Everett. **LORETTA MARCH** ('49 Home Ec., Alpha Chi Omega), 92, August 7, 2016, Spokane. **CHEREE HOPE RAUGUST** ('49 Gen. St.), 88, August 14, 2016, Davenport. **ROBERT W. ROBBINS** ('49 Socio.), 91, October 11, 2014, Tacoma. **PATRICIA M. ROBINSON** ('49 Fine Arts), 87, July 19, 2014, Liberty Lake.

**50** **WILLIAM T. BEALE** ('50 Mech. Eng.), 88, July 24, 2016, Athens, Ohio. **DAVID T. KIRK** ('50 Business), 87, January 15, 2016, Olympia. **JEAN KLOPFER** ('50 MA Home Econ.), 93, June 3, 2016, Renton. **PANOS C. KOUTLAS** ('50 Ag.), 87, May 23, 2016, Mukilteo. **WILLIS G. PEHL** ('50 Busi.), 91, June 24, 2016, Chehalis. **DOROTHY FAY SCHOLZ** ('50 Home Econ.), 87, July 19, 2016, Redmond. **SIDONIE LOIS K. WARNE** ('50 Fine Arts), 87, June 8, 2015, Poulsbo. **DONALD S. BARTLETT** ('51 MS Hort.), 88, May 27, 2016, Montreal, Canada. **DIANE JOYCE CRIEZ** ('51 English, Alpha Chi Omega), 87, May 11, 2016, Kirkland. **KENNETH J. MEERDINK** ('51 Elec. Eng.), 86, January 26, 2016, Seattle. **ALAN ADAMS MONROE** ('51 Elec. Eng.), 86, March 24, 2016, Camano Island. **NAOMI MAEVANN** ('51 Home Econ.), 87, June 25, 2016, Des Moines. **RODNEY RIME ELLIOTT** ('52 Mech. Eng.), 86, June 2, 2016, Bend, Oregon. **GALE WARREN MITCHELL** ('52 Psych., '56 Busi.), 85, July 6, 2016, Seattle. **MIKELL M. RACY** ('52 Math.), 90, July 10, 2016, Kennewick. **GEORGE JAY ROSSER** ('52 Phys. Ed.), 86, June 22, 2016, Bellingham. **JAMES RAYMOND BOYTZ** ('53 Elec. Eng.), 87, June 8, 2016, Eugene, Oregon. **ROBERT EARL HOSKINS** ('53 Busi.), 85, July 11, 2016, Boise, Idaho. **HOWARD S. MCALISTER** ('53 Geol.), 85, February 19, 2016, Denver, Colorado. **BETTY MARIE ANDERSON** ('54 Home Econ.), 84, May 31, 2016, Salem, Oregon. **ALBERT K. SOLOMON JR** ('54 HBM), 85, February 21, 2016, Sun City, Arizona. **MONA LIV HOWELL** ('55 English), 84, December 27, 2015, Everett.

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**JOHN D. MUELLER** ('55 Agro.), 83, August 15, 2016, Visalia, California. **ROBERT W. BIGNOLD** ('56 Arch. Eng.), 83, July 28, 2016, Colville. **MARY ANN (OVERMAN) DURAND** ('56 Ed.), 82, February 26, 2016, Edgewood. **LELAND GLENN HUTSELL** ('56 Ed., '63 MAT), 82, November 9, 2015, Moses Lake. **LARRY OWEN BAGNALL** ('57 Ag. Eng.), 80, June 29, 2016, Gainesville, Florida. **DONALD LEE BROOKHART** ('57 DVM), 90, April 23, 2016, Monroe. **MELVIN K. DAVIS** ('57 Poli. Sci.), 82, June 7, 2016, Sebastopol, California. **RUSSELL G. FAHLAND** ('57 HBM), 84, July 13, 2016, Spokane. **JERRY JOE OLSON** ('57 Police Sci.), 82, June 7, 2016, Davenport. **L. DEAN MILLER** ('58 DVM), 94, December 15, 2015, San Jose, California. **LURENE B. REED** ('58 Gen. St.), 80, April 23, 2016, Carmichael, California. **E. ANN BEEMAN** ('59 Home Econ.), 79, June 14, 2016, Sandy, Oregon. **CARL FREDERICK FETZER** ('59 Materials Sci., Pi Kappa Alpha), 79, July 28, 2016, Woodbridge, Virginia. **G. EDWARD**

**SHARMAN JR** ('59 Comm.), 78, June 13, 2016, Spokane. **JACK N. ARMSTRONG** ('60 DVM), 86, July 3, 2016, Carson City, Nevada. **PAUL ROGER CARSON** ('60 Pharm.), 82, August 31, 2015, Poulso. **RALPH KONU** ('60 Arch. Eng.), 63, June 24, 2016, Chico, California. **PAMELA OATES** ('60 Elem. Ed.), 78, July 19, 2016, Lincoln, California. **NORMAN C. STAEBER** ('60 Soc. St., '69 MAT), 83, August 1, 2016, Everett. **CHARLES H. STRANGE JR** ('60 Vet. Sci., '64 DVM), 83, August 15, 2016, Glendora, California. **EDWIN MICHAEL "MIKE" BROOKES** ('61 Ag.), 79, July 22, 2016, Queen Creek, Arizona. **MARIAN (MCKEIRNAN) HONSINGER** ('61 Soc. St.), 76, July 15, 2016, Los Alamos, New Mexico. **RICHARD BRUCE MORSE** ('61 History), 78, August 6, 2016, Vancouver. **MERCH A. DEGRASSE JR** ('62 Arch. Eng.), 80, April 4, 2016, Pacific Beach. **HARVEY L. LOW** ('63 EdD), 94, June 3, 2016, Corvallis, Oregon. **BARBARA**

**A. BLANDFORD HELM** ('64 Poli. Sci.), 72, March 30, 2015, Alexandria, Virginia. **DONALD JAMES MCKAY** ('64 Ani. Sci.), 74, July 4, 2016, Blaine. **JACQUELINE J. OSBURN** ('64 Bacterio.), 73, September 29, 2015, Scottsville, Arkansas. **PHILIP ARTHUR RUDE** ('64 Arch. Eng.), 74, August 10, 2016, Portland, Oregon. **JERRY VAUN SCHREUDER** ('65 MAT), 78, July 23, 2016, Boise, Idaho. **MERILYN J. DAGGETT** ('66 Fine Arts, '69 MFA), 72, August 23, 2015, Rathdrum, Idaho. **LEE BERNARD PLEIMAN** ('66 MS Elec. Eng.), 76, July 1, 2016, Union, Kentucky. **ROY M. BRECKENRIDGE** ('67 Geol., Farmhouse), 71, August 1, 2016, Moscow, Idaho. **JACK DONALD CONWAY** ('67 Econ.), 72, July 4, 2016, Guntersville, Alabama. **MARYALIS KLICKER** ('67 Gen. St.), 88, May 10, 2016, Walla Walla. **VIOLET SCHROCK AANDRES** ('68 Anthro.), 72, March 27, 2016, Nederland, Colorado. **DANIEL SCHLEGEL DAHL** ('69 DVM), 70, May 25, 2016, Post Falls, Idaho.

**70 DON GARRY ALLEN** ('70 Ani. Sci.), 71, July 21, 2016, Ontario, Oregon. **JEANNE CAROL CAMPEN** ('70 Busi.), 65, February 23, 2014, Gig Harbor. **LARRY DALE DEBRULER** ('70 Ed.), 68, July 11, 2016, Auburn. **JACK EDWIN THORNTON** ('70 DVM), 71, August 6, 2016, Port Angeles. **THOMAS MARTIN LEES** ('71 Int. Des.), 68, July 25, 2016, Spokane. **STEVEN CLAUDE AUBERT** ('72 Pharm.), 67, June 16, 2016, Bellingham. **ELRAY JOHN HENDRICKS** ('72 DVM), 71, May 26, 2016, Boise, Idaho. **TONY F. MARQUEZ** ('72 Acc.), 67, July 28, 2016, Vancouver. **MARK JOSEPH STROH** ('72 Ani. Sci.), 65, August 20, 2016, Arlington. **JOHN LA MONT BARITELLE** ('73 PhD Ag. Econ.), 75, July 23, 2016, Sequim. **PATRICK G. COOLEN** ('73 Comm.), 66, June 19, 2016, Olympia. **ERIC ROLAND KERRIN** ('74 Comm.), 64, January 20, 2016, Phoenix, Arizona. **GARY DEAN YAMAMOTO** ('74 Poli. Sci.), 64, June 5, 2016, Othello. **JENNIFER MARGARET GRAY REITER** ('75 Kinesio.), 61, April 5, 2015, Lakewood. **LUTZ JUERGEN KETHLER** ('77 DVM), 80, April 7, 2016, Baker City, Oregon. **CINDY MCINTOSH** ('77 Ed.), 60, July 21, 2016, Gig Harbor. **THOMAS E. CALLAHAN** ('78 Accounting), 61, August 23, 2016, San Geronimo, California. **BARBARA ANN CLARK** ('78 MA, '82 PhD), 64, July 2016, Roseburg, Oregon. **PHILLIP HECTOR DURAN** ('78 MS Comp. Sci.), 79, May 16, 2016, El Paso, Texas. **WILLIAM LEROY BIRK** ('79 Forest & Range Mgmt.), 83, June 1, 2016, Spokane. **NIKI A. ELD** ('79 DVM), 63, July 24, 2016, Boise, Idaho. **RONALD "RON" DEAN JONES** ('79 Busi.), 58, December 24, 2015, Vancouver. **PATRICIA ANN SESSA** ('79 Anthro.), 73, June 15, 2016, Colfax. **GEORGE ANTHONY YARNO** ('79 Crim. Jus.), 58, August 8, 2016, Spokane.

53, June 20, 2016, Phoenix, Arizona. **DAVID SCOTT BEHRMANN** ('89 MBA), 56, July 2, 2016, Pasco. **90 LORI RAE BELOW** ('90 Apparel, Merch., & Text.), 50, July 22, 2016, Seattle. **RICHARD ERIC CARTER** ('90 Acc.), 47, March 29, 2016, Camas. **JOYCE CASEY** ('93 Nursing), 50, May 23, 2016, Portland, Oregon. **00 MICHAEL TYSOR** ('01 Psych.), 39, July 5, 2016, Spokane. **GARY LEE BENNETT** ('02 Comm.), 36, April 8, 2016, Olympia. **ROBERT ARTHUR RAMSAY** ('02 Soc. Sci.), 42, August 4, 2016, Moscow, Idaho. **SOLOMON CAULIN DAUGHTREY** ('05 Arch. St., '06 Const. Mgmt.), 39, July 30, 2016, Seattle. **JOY PATRICE HRUSKA** ('05 Anthro.), 56, March 14, 2016, Vancouver. **ALISA BAIRD RASMUSSEN** ('05 MEd), 41, June 23, 2016, Camas. **MARY ELLEN ST HILAIRE** ('06 Soc. Sci.), 70, June 3, 2016, Kennewick. **KLARA SHAMS BOWMAN** ('08 MIT), 33, June 6, 2016, University Place.

**10 BRANDON JAMES MESERVEY** ('11 Busi.), 29, June 8, 2016, San Bernadino, California. **FACULTY AND STAFF** **PATRICIA SESSA**, 73, Admissions, 1982-2009, June 15, 2016, Colfax. ✨ **JACK KENNEDY**, 81, WSU Prosser IAREC, 1981-1999, June 14, 2016, Grand Coulee. ✨ **DONNYE HARRIS**, 80, Human Resource Services, 1977-1991, June 15, 2016, Moscow, Idaho. ✨ **FREDA SEMINGSON**, 88, WSU Extension, 1962-1987, June 7, 2016, Pullman. ✨ **EVERETT ANGELL**, 79, Transportation Services, 1984-2000, May 28, 2016, Phoenix, Arizona. ✨ **HARLIE GUNTHER**, 91, Physical Plant, 1953-1981, June 10, 2016, Moscow, Idaho. ✨ **JEAN KLOPFER**, 93, Apparel Merchandising and Design, 1950, June 3, 2016, Renton. ✨ **HARVEY LOW**, 94, Education, 1963-1982, June 3, 2016, Corvallis, Oregon. ✨ **DAVID NOWAK**, 56, University Publishing, 2007-2016, June 8, 2016, Coeur d'Alene, Idaho.

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**80 MARK ROY NOCERINI** ('82 MS, '84 PhD Pharm.), 61, April 12, 2016, San Francisco, California. **NANCY (SCHMIDLIN) MEENGs** ('83 Child & Fam. St.), 54, May 1, 2016, Friendswood, Texas. **DONNA MARIE RODEWALD** ('83 Elem. Ed.), 55, June 7, 2016, Vancouver. **JEFFREY R. MEADOWS** ('84 Hum.), 59, July 2016, Tacoma. **DOUG ALAN GROVES** ('88 Soc. Sci., '08 Hum.),

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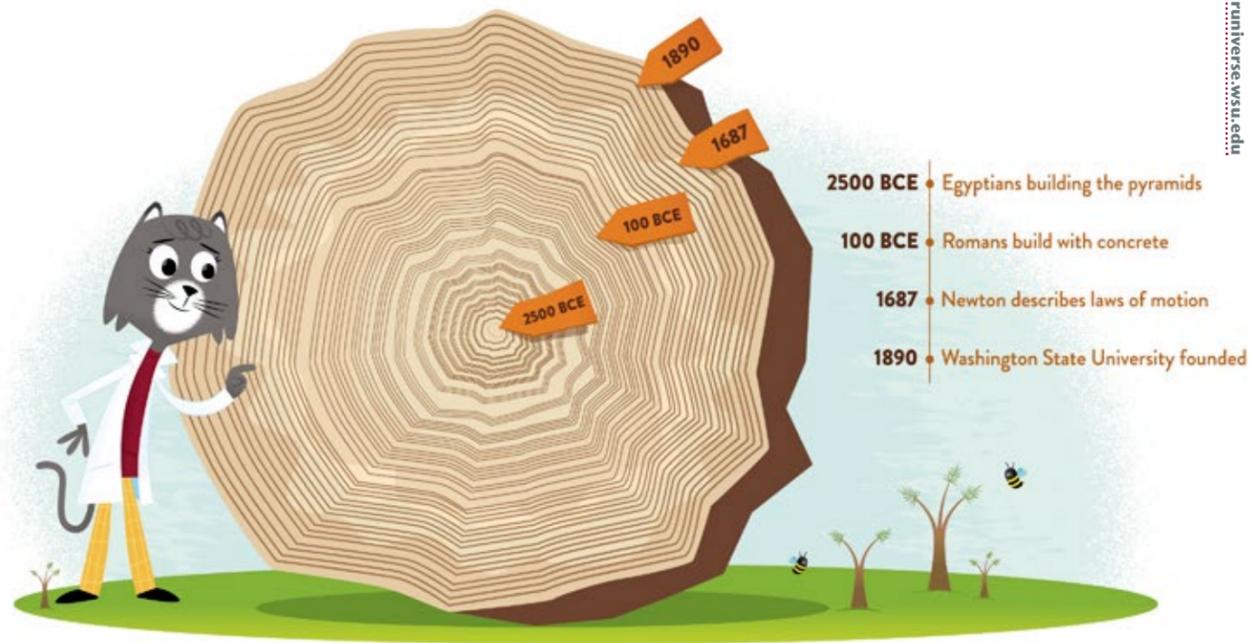
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HOW LONG CAN TREES LIVE?

—Jessy, 8, Seattle

ILLUSTRATION ROB MCCLURKAN

Dear Jessy,

As I was hiking through the bristlecone pine forests of the Sierra Nevada recently, I stumbled upon a tree barely six inches tall. It was growing—slowly, but surely. I was surprised to find this tiny pine tree was already about 40 years old.

Some trees will stop growing once they reach that age. But others live much longer. In fact bristlecone pine trees aren't just the oldest trees, they are some of the oldest living things on our planet. They can live for about 5,000 years.

"These trees were growing when the Egyptians were building the pyramids," said my friend Kevin Zobrist, a forester at Washington State University.

Zobrist knows a lot about different trees and told me a bit about bristlecone pine trees.

By the time the pines are about 5,000 years old, they will stand 60 feet tall with a trunk that is nearly five feet around. If we were to cut into the trunk, we could look at its growth rings. Each ring would signify a year of its life. We would have a lot of counting to do.

On my hike, I noticed some of the trees' young pinecones were purplish-pink. Eventually they would turn brown and fall to the ground. I spotted a few old cones by the tree. They had that fresh pine scent.

I looked up at the branches that twisted and stretched like arms up to the sky. I wondered how on earth these trees were able to live such long lives.

Zobrist explained that bristlecone pine trees are tough and have adapted to their environment. They are equipped to deal with drought, extreme climates, and insects that might cause serious damage if they attack.

For example, the tree can actually shut down or go dormant for a while, if conditions are too harsh. This helps the tree survive for thousands of years.

"They teach us that nature is resilient," Zobrist said. "They teach us that nature can carry on."

Of course, not all trees live quite as long as these pines. But many live longer than humans and us cats.

The redwood trees of California are about six times taller than the bristlecone pines. Some of them have been around for nearly 2,000 years.

Even when a tree dies, it finds a new life. Creatures and plants on the forest floor are counting on the trees to get old, die, and fall. They can use the fallen trees as their home or for food.

It's been said that trees are our planet's lungs. They help make the oxygen we breathe and keep life thriving on our planet. I took a deep breath of the mountain air and said a quick thank you to the trees before heading down the trail, on to the next adventure.

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