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Cover: The Aurora Borealis as seen from Kachess Lake at Snoqualmie Pass (Photo: Chuck Hilliard) Left: From second largest sawmill in Washington State to headquarters of the Great Northern Railroad, Leavenworth had to reinvent itself as times changed. (Photo: Brian Muniz)
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.”

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WASHINGTON STATE UNIVERSITY MAGAZINE WINTER 2016

Built in 1895, Stevens Hall is Washington State University’s oldest residence hall.

'Tis The Season

Family. Festivities. Friends. The holidays are a time to reflect on life’s gifts, express gratitude for those around us, and create opportunities for many seasons to come.

Open doors at Washington State University throughout the year with a gift today.

foundation.wsu.edu/give
It's likely that the following year Dad may have relaxed that rule to the newly pledged Kappa Sigma fraternity roommate, Edward B. Morrow. Our father was honored to serve as president of the VTC's Alumnae Association during the term that brother Chick 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.

I am a 64-year-old, retired man who was involved in the Vietnam War. As the story points out, heroin can grab ahold of anyone, regardless of things such as family, life, affluence, etc.

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Your story does an excellent job detailing how it was in America, under the Harrison Narcotic Tax Act, 1924. Doctors were losing addicts alive (jail), stabilized, and active in their life pursuits, being normal, productive lives. That’s true for every addict lucky enough to be alive.

That’s true for every addict lucky enough to be alive.

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

Pullman, Washington

Main Street, USA

BY BRIAN CHARLES CLARK

Standing on the beach at Smokiain 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.

Local credit Washington State University’s Rural Communities Design Initiative for assisting their town of 1,500 in the eastern Washington sandblasts with improvement efforts. Soap Lake declined from fame and modest prosperity to a near ghost town but has recently redosed its pulse. “Smokiain” is a Tsinaye 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 law of the land.

The Glassblowers

I enjoyed the piece by Brian Charles Clark in the Fall 2016 issue of Washington State Magazine. “The glassblowers.”

It should be noted that scientific glassblowing has a long history at WSU. In the 1970s and 80s the glassblower was Bill Ryan. Dating back to 1972, George Harris was glassblowing many fuses and bulbs and tubes on the WSU campus. Many of Mr. Harris’ pieces were sent by WSU to Harvard 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

Soap Lake’s revitalized Main Street.

SOAP LAKE’S REVITALIZED MAIN STREET (ST AFF 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 1985, 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, after the pool where Jesus restored the sight of Jesus restored the sight of a blind man) thrived for 15 years. Then, according to local historian Bennye Rushton, after the pool where Jesus restored the sight of a blind man died, the sanitarium and hotel went up in a blaze accidently started by a 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.

“Nous 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 mouse 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.

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

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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 Kathleen and Sadie Dolge

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

More Soap Lake photos: Pinterest.com/wsmagsnowbook/soap-lake-photopourri

Photo Garret Veley
**GREENpages**

**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 materials keep 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 and for snow and ice control.

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

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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 grandchildren could be drinking salty water.”

Shi says to their credit, “state and county governments are taking it seriously.”

Fruit and vegetable-based deicers that degrade more slowly than usual, helping to extend the life of roads and sidewalks.

**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 block 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 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 a few years ago, “We’ll end up paying $5 an orange and it’ll have to be imported from somewhere else.”

That is a crisis he bought 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. “It’s like orange juice too much to let it die without a fight.”

Figuining 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 Andris Osmolans, an international expert on culturing the otherwise unculturable.

Attempts to culture Liberibacter to date have involved all the usual—and few unusual—techniques. The basic approach is to 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.

Osmolans, though, is undaunted. He has cultivated 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 preventing researchers with a tough challenge.

It took Osmolans four years to cultivate 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 rain (or, in California, irrigation) returns, the bacteria break 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 the young. So one way to beat Liberibacter might be to develop a “supplylaid”—a new variety of Asian citrus psyllid—that doesn’t transmit the bacteria. Such a psyllid would be healthier and would not 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 decimation; citrus greening disease literally strangles the tree from the roots out.**
When Jermiha White 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 back again and say, ‘Oh, God, it’s due tomorrow!’ It’s something I think many vets face.”

Providing, for instance, WDV A internships like the one White completed last July, which offered alternative “eco therapies” 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.”

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.

“Military challenge coins date back 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 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 can also be found in the new challenge coin. The official WSU and 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.”

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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 filled 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 milliseconds 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 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 earliest 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 “nucleons.”

Gupta was interested in the Advanced Photon Source synchrotron, a two-thirds-mile diameter ring that produces brilliant x-ray beams by hurling electrons at nearly the speed of light and deflecting them with magnets. The beams are then coerced into laboratories, called "sectors," that work out 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 broken bones and dental caries. Tuned to the right frequency, they can transform materials in a field called shock physics, the study 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 a 3D object, hit it, and look after the fact at what happened. Yes, you can take a 3D structure, hit it, and look after the fact at what happened. We've been assuming some things but we had never measured it. The critical, revelatory moment took less than half a millisecond of a second.

"If you can't look at the atomic structure, you can never be certain as to what the structure of that new phase is," Gupta says. 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. 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.

"For the first time, we can pinpoint what it is," 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 instantaneous transition from solid to solid. It belies the violence that has just taken place. The impact could turn eight feet of rags into a six-inch wad of felt.

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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 a way that patients would find meaningful.

“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 the patients and caregivers generally consider their doctors among the most important people in their lives, effective communication is lacking—not purposely but 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 play out.

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 VandeVusse, 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 VandeVusse. “The idea was to listen but the problem was the patient wasn’t always at the center of the project.”

The Spokane study placed the patient focus in 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, taking it, what it does. That’s just part of what we should be doing. We also need to be asking the patient what they want.”

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.

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 tissues.

Skin is a layered 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 1999, 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 wells to pinpoint an exact method of action. The work promised to explain how skin cells move both during wound healing and to form tumors, such as the invasive skin cancer.

The breakthrough came recently when Jones, postdoctoral research associate Shi Haryous, and graduate student Zachary 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 diabetes 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 on our skin cells go mad. And, if you inhibit them too much, it prevents normal wound healing.”

While Jones’ 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

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 fifth at the Olympics in Rio.

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 at 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.

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SEATTLE CHEF THOMAS DODD’S CUSTOMERS DEMAND THE BEST. So the only steak on the menu is smoked, tender, and flavorful American wagyu.

He was odor-limbed each week for his 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 freaked out over how flavorful it is,” says Dodd, talking things like the best steak they’d ever had,” says Dodd, executive chef at Liam. “Now we’re starting to see that 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 shorthorn 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 selecting the genetic traits that breeders in Japan were working with.

Until a bull named Alvin was found in rural Texas.

“Alvin is quite famous in our circles,” says Oregon rancher Jake Barnes, who serves on the governing board of the American Wagyu Association and raises wagyu cattle along with his 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 cow 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 him and several generations of his offspring to quickly develop cattle that were “wagyu,” which in genetic terms can be considered pure blood. Additional wagyu specimens were added to the mix in 1992 and the project was able to start building its own specialty herd, paying $10,000 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 Hokkaido, 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 the end of the world,” Reeves recalls. “The mood was terrible. You had all these ranchers 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.

“So tough as things were, it turned out better for the industry overall,” says Reeves, who raises wagyu breeding stock along the Snake River and farther east 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 really takes care of all of your levels —what they’ve led, 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.”

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 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 filet mignon, you’ll probably be disappointed,” says Fred Reeves, who serves American wagyu at his San Francisco restaurant, the Brickhouse Café. “Wagyu is delicious but needs to be cooked fast that’s because 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 steaming each side of the meat first, then cooking it over high heat for about four or five minutes: “You want to go within the highest heat you can 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 rich taste. Experts suggest cooking ground wagyu meat much 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 out 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 Michel, 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/WSUpremiumbeef
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 antibiotics (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, chancers are its backbone is composed of carbon, a
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 dis- tide, 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 ef- fact is the ancient carbon we’ve 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 sug- ars to a horded 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 direc- tor 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. Recombinates 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’re always on roads for our 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 out- comes of NARA has been huge support within the region for a more bio-based economy.” It’s resulting in actions like Sea-Tac Airport and Boeing and Alaska Airlines going forth and saying, “We are going to develop infra- structure to handle biofuels at Sea-Tac. We’re making this invest- ment now because this has to be part of our future.”

Wolcott could get off the ground. Now, the proof is in the 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 “bioproduts that enable the fuels development.” Wolcott says.

The sugar in cellulose make 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. Wolcott could get off the ground. Now, the proof is in the 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 “bioproduts that enable the fuels development.” Wolcott says.

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I’d heard her talk at a NARA-sponsored biofuels and coproducts conference a couple months before we met and was fascinated by the concept of “byproduct synergy” the presented. It turns out that not all waste is trash. Like the logging residuals the NARA partnership turns into fuel and coproduts, Corrion wants Conoco’s residual outputs to be another company’s raw materials.

For Conoco, moving into the biochemicals market is smart. 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 walk 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. 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 fresh 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 students’ work that I never thought of.

Not that the IDX students’ work is just playing around. But, every time, something comes from the students’ work that I never thought of.

Their work is just playing around. But, every time, something comes from the students’ work that I never thought of.

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-scale.

NARA’s commercial-scale production partners had to get creative by tweaking machines and processes. Critically, too, the production partners had to get certified by 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. 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 brain-power, along with private and public money, have gone into investigating plants’ abilities to supply us with fuel and the starters 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 and water, which is a huge market for alternative biofuels. The market for alternative fuels is growing. The U.S. military has been moving toward using a lot more biofuel.

That’s a familiar refrain among members of the NARA project. Doug Rivers, director of research and development for Kamaus-based biorefinery ICM, a NARA partner, recently said that when he worked for Gulf Oil in the 1970s, they built a prototype bio refinery because they were not going to be held hostage by any nature. Wolcott, too, talks about the oil embargo of the 1970s as a motivator of the core of his own and others’ careers.

All over the United States, NARA and similar USDA-funded projects explore the use of available biomass for energy production: pines killed by beetles in the Rockies, energy cane’s variety of sugarcane bred for high fibre 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 think about this stuff from an early age, and to think 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, tree-houses for our children, and tall timber buildings for our businesses, as well as the chemicals we need to maintain our energy-intensive civilization.

They’ve got valuable sugars in their waste stream. Finding ways to produce biofuels and coproducts market is smart. Wolcott says, rapping the wooden top of his desk.

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 walk 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. 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 fresh 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 students’ work that I never thought of.

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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.

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

At the time, one of the greatest challenges facing 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.

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Call it the Urban Extension

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.
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 services already is beginning to grow.

“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.

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 agricultural rural kinds of things,” says O’Connor. “But what they were able to do here in our 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.”

The simulations are led by Martha Aitken, the Metro Center’s awareness efforts. “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.

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-writing committee with the Association of Public and Land-grant Universities.

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“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 Prioti Shahidkar, who oversees Renton’s inclusion efforts. “Whether it’s affordable housing or homelessness, these are all things that cities are dealing with.”
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 combating 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 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, forcing state and local governments to cut spending to help balance their budgets. One target of those cuts were 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 development as it was about metropolitan programming itself.

“There was a feeling that Extension services no longer were as relevant to metropolitan lifestyles,” Gaolach says. “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.

“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.”

Money from the Molson (brewing) family founded Molson in 1890. A lively mining town until the boom busted, it was poised for a railroad-driven comeback until a resident filed a homestead claim and ordered everyone out of town. It is now an open air museum to a bygone era.

Glittering deposits in 1888 led to a frenzy of claim staking that became Monte Cristo—named to the late mining camp on the eastern slope of the Cascade Range. When the boom peaked in 1904, the town numbered 3,000. By 1930, most of the miners had left for the Klondike.
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.

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.”
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.


Meister recently became an aircraft commander. She plans to grow her business, and eventually work as an instructor pilot.
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 his 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 camera. Eyes on the park ranger who enchants them with tales of the wild. As if on cue, a great gray owl drops from the trees at the ranger naturalist in the Many Glacier area of Glacier National Park. As you listen, the quietness of the mountains...

Such were the poetic thoughts of a hiker 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 it also serves as a learning tool. 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**

**OAKIE 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 inexcusable foolishness and ineptitude.

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.

“Take 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

**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 hunting to sheep-dipped self-portraits and a coming of age in rural Washington and the place.

—Rebecca Phillips
We love our volunteers—they are the best. But we need more! If you love WSU, and are dedicated, passionate, and a die-hard Coug, we need you.

Contact the WSU Alumni Association at 1-800-ALUM-WSU or wsuaa.volunteers@wsu.edu to speak with a member of the Alumni Engagement team about ways you can help us help WSU.

Go Cougs!

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 $409,000 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 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, 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.

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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 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.

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Hollingbery retired to the San Diego area in 2013 with his wife Cindy, 76, also a comedian. He 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 the Brooklyn teen, but also wrote and produced it as 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. “I had 30 million people in California, the guy who inspired me ended up being my neighbor.”

BY CLARK CLARK

GEORGE HOLLINGBERY ’76 spent education at an interesting time, as the profession underwent significant changes in the 1970s. Teachers began asking where the classrooms began and ended, and how could they better reach and help students who learned in different ways.

Doing 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 glimmer into how “difficult” students could defy expectations.

Hollingbery, a fourth-generation Cong 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 documentation that Hollingbery stopped—bore him in the class, and said, “You were like Kotter in those with kids.”

KENDRICK SCHMUCKER ’54 Ag., ’78 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.

Ophidiologist, artist, and emeritus professor at the University of Nebraska, John Nolting ’53 M&M Wildlife (B.S. M.M. Wildlife Rec.) received the WSU Alumni Achievement Award in recognition of writing and teaching that has expanded public understanding of natural history, conservation, and prepress environmental issues.

The American Veterinary Medical Association presented Mr. Nolting the Humanitarian Service Award to ROGER MCELLENNAN ’60 DVM, for his distinguished career in inhalation toxicology, science, and public policy. He started the inhalation toxicology lab at the Lovelace Biomedical and Environmental Research Institute in Albuquerque, New Mexico in 1966. McCullen was the WSU Regent’s Distinguished Alumnus in 2008.

PeopleAdmin awarded the Inspired2Educate award to ROBERT JAMES (’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 (Com.) retired June 30 after nearly 45-year career in journalism. His most recent post was editor of the Tulelake Register for the last five years. Radford is editor of The Daily Evergreen for a year at WSU, before moving west to Port Angeles for the last five years. Radford’s recent post 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 Register reporters.

The Prentice, Prestressed Concrete Institute elected CHUCK PRUSACK ’76 (Civil Eng.) as chair for the technical institute for the U.S. prestressed concrete structures industry. Prusack, manager of sales, engineering, and quality control for Orleans/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 the University of California, Davis has advanced the field with work on musculoskeletal injury in performance horses. She was the first resident 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 (WSADA) honored GARY GLICKMANN ’77 (Gen. St.), Tacomac Glöckner Auto Center, the “Robert M. Tolkien Dealer of the Year” award. Glöckner is a third generation auto dealer and Tacoma-area native. He and his wife Grace are also involved with children’s health charities.

WSU track phenom HENRY BONO ’81 Gen. St., ’81 Psych, was selected in May as the Pac-12 Men’s & Field Athlete of the Century. Bono’s steeplechase and 5,000-meter 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 BRIN KUDOLL ’83 Forest & Range Mgt. as vice president of human resources. Prior to this he previously served as Boise Cascade’s vice president of human resources from 2003 to 2005 before leaving to join Stanley Tools Company. RICHARD BAUSCHER ’81 EdD was selected as one of the three 2016 Idaho High School Hall of Fame inductees. He served 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 2012. GREG COPELAND ’84 (Gen. St.) announced his resignation as Lehigh’s men’s golf coach after 15 seasons. He guided the Oregon teams to college and construction engineering firm based in San Francisco.

Johnson has worked at Bechtel since 1994 and held engineering positions of increasing responsibility at the Yucca Mountain project in Nevada, a chemical weapons destruction project in Kentucky, and the waste treatment and immobilization plant in Richland.

Cardiac Science, Los Angeles-based manufacturer of automated external defibrillators, appointed DEVADATT KURDIKAR ’83 MS Chem. Eng., as chief executive officer. Prior to joining Cardiac Science, Kurdiak was general manager of the Boston Scientific men’s heart business.

The Walla Walla Community College board of trustees chose DEREK BRANDS ’92, ’94 MA Comm., ’33 EdD, to succeed longtime President STEVEN VAN AUSDALL ’66, ’68 MA Ed., at the college. Brands, 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

also check out class notes online
A te ngoài MARVIN MACKIE. MACKIE., 63 DVM, was working all summer on the family farm at the end of the season 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 in veterinary medicine.

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

“If you run 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 overpopulation.”

In 1978, Mackie opened a spay clinic in a submarket 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 procedures 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

LAGAT (’01 MS) 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 championship track events and five gold medals.

JESSICA HAGAN (’13 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 KORID (’94 Ed.) as athletic director. He was a sixth-grade teacher at the Cosmopolis School District since 2004, and a coach for basketball and golf.

Lynne Bank (’00, ’02) was named 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 PEACODY (’05 Comm.) took the helm as editor of the Colby Pepperwey, Washington. She was promoted to the presidency 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 England, published by Oxford University Press this year. He credits his WSU Honors College, Fulbright, and German exchange experience with his success. The University of Oxford that led to the book. He now teaches at Scotland’s University of Edinburgh. IMPEY (’99 Math.) has been named BLOOMFIELD Junior High School. She then spent four years as assistant principal at Mountlake Terrace High School.

By Kelly Roppel

DEAN at Columbia Basin College in Pasco, and in various positions at WSU Tri-Cities in Richland.

The Oregon Super Lawyer magazine named VICTORIA BLANCH (’96 Busi.) among the outstanding attorneys for 2016. She works for Portland’s Samuel’s YourKantor law firm in estate and trust litigation. Kyla SAWYER (’99, ’03, WSU Comm.) stepped in as head of the Mini-Cassia Chamber of Commerce in southern Idaho. She will be the spokesperson for two counties, 12 cities, and thousands of businesses. Sawyer previously worked as a radio and television broadcaster, as its new vice president of education

Scott Walker/DFB

Bates was the dean of trades and technology at Green River College, where he led workforce development, and supervisory and provided leadership to 85 employees for two academic divisions and two programs. The Bainbridge Island School District hired KEVIN MURPHY (’99 Ag., ‘02 MS Ag.) in his new assistant superintendent of administrative services. Murphy was the principal of Abandoned Aldermaston School in the Edmonds School District. After graduating, she worked for her first eight years in education as a science and leadership teacher at Puyallup Junior High School. She then spent four years as assistant principal at Mountlake Terrace High School.

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IN memoriam

LOIS ELEANOR HENKINS (’35 Office Admin.), 103, July 28, 2016, Spokane.


PAUL BERGOQUIST (’42 Sci. Eng.), 96, August 22, 2016, Upper Cedar River, New Jersey. JACk P. ARNOLD (’42 Agro.), 46 (PhD Plant Path.), 96, April 24, 2016, Silver Spring, Maryland.


RAEG NARDINO (’47 Home Econ.), 89, May 13, 2016, Kirkland.

JOYCE MARJORIE LEE (’48 Socio.), 96, August 4, 2016, Seattle.


H. VIRGINIA DONALDSON (’49 Home Econ.), 89, June 23, 2016, Lake Oswego, Oregon.

ALBERT K. SOLOMON JR (’49 BM), 94, May 21, 2016, Seattle.

JEAN KLOPFER (’50 MA Home Econ.), 87, January 15, 2016, Poulsbo.


DOROTHY FAY SCHOLL (’50 Home Econ.), 87, June 19, 2016, Redmond. SIDONIE LOIS K. WARNE (’50 Fine Arts), 87, June 8, 2015, Poulsbo.

DONALD S. BARTLEY (’51 BS Hort.), 98, May 27, 2016, Montreal, Canada.


DOROTHY E. STREET (’55 Tech.), 93, August 30, 2016, Yakima.

DAVID LEE SCHOLZ (’55 Tech.), 93, August 30, 2016, Yakima.

JOHN W. McLAUGHLIN (’55 Tech.), 88, August 21, 2016, Spokane Valley.

DEAN MILLER ('57 HBM), 84, July 13, 2016, Glendora, California. DONALD JAMES MCKAY ('60 DVM), 86, May 25, 2016, Rathdrum, Idaho.


GARY LEE BENNETT ('70 Acc.), 56, July 21, 2016, Seattle. RICHARD ARTHUR RICKARDS ('72 Acc.), 52, August 4, 2016, Moscow, Idaho.

STEVEN CLAUDE MOORE ('77 DVM), 80, August 23, 2016, Rathdrum, Idaho. STEPHEN G. EDWIN KENNY ('78 Accounting), 61, August 23, 2016, San Diego, California.


BRANDON JAMES MESERVEY ('11 Busi.), 28, February 28, 2016, San Bernardino, California.

FACTOR AND STAFF


INSPIRING TEAMWORK

Every year, infected needles cause 1.3 million deaths. Two 2016 Washington State University bioengineering graduates have a solution.

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Are you 70½?
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Call the WSU Foundation Gift Planning Office at 800-448-2978 or visit foundation.wsu.edu/giftplanning to create your legacy today.

ASK DR UNIVERSE

HOW LONG CAN TREES LIVE?

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.

Sincerely,

DR. UNIVERSE
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Winter 1 6
vol16no1