Features
When a hacker attacks the electric power grid, scientists and industry partners are prepared. They’ve done it already.

Ion mobility spectrometry has become one of society’s most powerful tools in detecting deadly chemical agents and other dangerous substances.

Upfront
WSU researchers seek to prove that an untamed tangle of nature can ensure long-term salmon survival.

Taking tea in historic Stevens Hall.

Devotion to answering one of ecology’s central theoretical and practical questions.

How to clean up irradiated soil from the Fukushima disaster.
The birth of a medical school in Spokane.

Cover Photo by Robert Hubner

Correction: The summer 2015 story on the WSU Bread Lab, “Billions to Be Served,” mischaracterized a request for Stephen Jones to breed a certain kind of wheat. He was asked to use traditional breeding methods to give wheat private genetic traits resulting from conventional chemical mutagenesis. He was never assigned by CAHNRS, nor asked by the Washington Grain Commission, to breed GMO wheat.
“The universe is transformation; our life is what our thoughts make it.”
—Marcus Aurelius

WE LOST AN EXCEPTIONAL LEADER THIS SUMMER IN OUR TENTH PRESIDENT, ELSON S. FLOYD. His vision in just eight years transformed the University, and elevated WSU in research, student achievement, and land-grant service. This short space can’t begin to list his accomplishments, so I encourage you to read his story in the special tribute supplement at the center of this issue. President Floyd will surely be missed, but it’s imperative for us to continue his legacy. In the spirit of transformation, we began a redesign of this magazine over a year ago. While the devotion to telling WSU’s stories remains, we worked to create a new look and feel that both innovates and honors our 125-year-old land-grant mission. The most obvious change you’ll notice is the size and paper. In the land of Bigfoot, we decided to have a smaller footprint. The magazine production will waste less paper in printing because of its slightly slimmer form. Even the paper itself is an innovation. We are among the first university magazines in the nation to use 100 percent recycled paper, which uses less water and chemicals in manufacturing, in line with WSU’s commitment to sustainability. We also improved the digital side of the magazine. When you visit magazine.wsu.edu, you will find a mobile- and story-friendly look that better serves our readers. We will have more video and other online content to enhance the stories. The web’s great for another thing: having a conversation. I want to hear your stories, opinions, ideas, and updates, whether it’s through an email, letter, or a connection on social media.
Restoring chaos

WSU researchers seek to prove that an untangled tangle of nature is a prerequisite for long-term salmon survival

"Look at all these fish!" says wildlife officer David Karl. My eyes adjust to the dappled magazine.

The darting, hatch-sided fry are welcome evidence that salmon habitat restoration efforts are beginning to pay off in the Pacific Northwest. It is especially encouraging in the Tucannon River, one of the last breeding grounds for southeast Washington’s wild steelhead and spring Chinook salmon. After ten years of intensive stream channel reconstruction, the river has emerged as a role model for the recovery of fish populations in the Columbia River Basin watershed and beyond.

Washington State University associate professor Alex Fremier and former graduate student Joe Parzych ‘15 MS are preparing to validate these reports. Board as they pull on waders and prepare to navigate on foot, but it is pure paradise to Chinook salmon. Technically called “large pieces of wood,” the logs create eddies and side channels where fish can safely hide and feed.

In the river, Parzych demonstrates the use of a device called a piezometer, first pounding a stake into the streambed and then threading a long white PVC tube down into the hole. This simple apparatus is a tool for measuring water level as well as the interaction between stream water and groundwater, called hyporheic exchange. In the hyporheic zone, the water sources constantly intermingle, regulating oxygen levels in the streambed gravel where salmon make their nests.

Parzych’s research provides compelling evidence that the hyporheic zone is indeed making an impact. Where water levels were once uniform, the Tucannon is now a composite of deep pools and shallow reaches. The pressure differences lead to enhanced hyporheic exchange, he says. "Intuition says the large wood is behaviorally, but we need Joe Parzych’s data to prove it,” says Martin. "Precipitation and snow pack are part of the variables involved, but all the other streams in the Blue Mountains are flat or have base flows that are dropping. If we document that large wood doubles water flows, it will have huge implications for rivers throughout the Pacific Northwest."

WSU officer Karl wades over to an eddy behind a large tree trunk and points out two round steelhead nests along the bank. By all appearances, the restoration efforts have significantly boosted fish populations in the Tucannon, but Fremier says they’ll know for sure in a few years. The spent young salmon return from the ocean as adults ready to spawn in the river’s cold, clean waters.
Recycling Passion

Engineers at Washington State University take upcycling to a whole new level

BY EMILY SMUDDE ’12

At the Composite Material and Engineering Center, they turn waste—from wood to carpet fiber to wind turbine blades—into composite materials strong enough for new buildings and bridges.

“My passion is the recycling aspect,” says Karl Englund, an associate research professor and Extension specialist with CMEC. “I enjoy figuring out how to deal with trash and turn it into something good.”

A composite material combines two or more materials for an added benefit, such as flexibility, strength, waterproofing, or durability.

“A cake is a composite material,” Englund explains. “You mix things together, like eggs, sugar, and flour, to create something new.”

However, more goes into a composite building material than into a birthday cake, Englund says. The engineer has to consider the science of making the composite, the economics, potential end uses, and the public benefit of the new composite.

Often Englund and other CMEC researchers are approached by industry or government to make something better. Vik Yadama, also an associate professor and Extension specialist with CMEC, is studying how the United States Forest Service could make new building material from the small trees it removes from forests.

Researchers have to be methodical and understand every step that goes into adding benefits. “You have to look at the big picture. You can’t just jump in the middle of the process,” says Yadama.

After identifying the material, the researcher figures out how to process it, says Englund. “How are you going to break down the material and how will you form it into a final composite? And how does this affect the properties?”

In the case of wood, grinding it up gives the engineer more freedom to reshape it, but it could potentially lose its strength. For Yadama’s timber, the best option is to break the wood down into flakes called “strands” and fuse the strands together. This process converts up to 90 percent of the timber into lumber and keeps its structural strength.

A composite also needs to be easy to use, affordable, and marketable. “A lot of people have had really great ideas, but the economics just weren’t there,” Englund says.

Although Englund admits this mentality can be stifling, it’s realistic. When creating new composites, Englund and Yadama have to consider where this composite will be manufactured, how much energy goes into manufacturing it, transportation and work costs, and of course what the material will look like.

“If the material doesn’t look right, it won’t sell,” Englund explains. “Nobody wants to buy off-white toilet paper, for example.”

Once the engineers create the composite, it’s time to figure out if the material works. That’s where CMEC director Don Bender comes in. Bender analyzes the architectural and end-use properties of the composite to ensure that when it goes to market, it’s safe for public use.

“Building codes require products to undergo extensive testing at accredited laboratories such as ours,” Bender says. “If a product hasn’t gone through this rigorous process, then the local building official or inspector can reject its use in buildings for their jurisdictions.”

Once testing has confirmed that the composite product is safe, the client has the green light to take the product to market.

“We generally wouldn’t bring the product to market,” Englund says. “We would definitely patent the material or the process, but we would need a commercial entity or a faculty member would have to start their own company to market the material.”
Tea traditions

Whether it’s the tail end of the nineteenth century or the middle of the twenty-first, the women of Stevens Hall will sip tea on any given Sunday afternoon. For the past 120 years, thousands of women have called Stevens home at Washington State University and embraced its unique traditions.

“It’s an interesting feeling knowing you’re living in a place where so many people have lived before,” says second-year Stevens resident and senior wildlife ecology student Margaret Kreder. “You have a sense of community with people you haven’t even met.”

In the foyer, it’s impossible to overlook the myriad of tea cups placed in glass cases. The impressive collection is one of the greatest treasures of Stevens Hall.

Traditionally, women contribute a tea cup after big events in their lives such as marriage and graduation. Visitors may also offer a cup. Helen Keller and her teacher Anne Sullivan allegedly stopped by for a cup of tea during their 1916 visit. Jacqueline Kennedy may have visited when John F. Kennedy came to WSU as a presidential candidate in 1960.

The tea parties were once a formal affair, but have now adapted to the laidback lifestyle of today’s residents. “I love the old photos of the ladies at tea in their puffy-sleeved gowns,” says junior biochemistry major Michelle Minton. “And then there’s us today in jeans and t-shirts,” adds Kreder.

Stevens Hall was built in the heart of the small Pullman campus in 1895. The college’s first hall for women was named in honor of Isaac I. Stevens, Washington’s first territorial governor. Only the original Ferry Hall, which burned down in 1897, preceded it as a residence. To ensure that Stevens Hall won’t be demolished, it entered the National Register of Historic Places on March 12, 1979.

“We can look around and see the tubing where the wiring was added later on. Or be reminded that the fireplace was once used for heat, rather than just being a nice touch,” says Minton. “We’ve even found pictures of when Stevens first got running water.”

The brick portion of the exterior was molded in a clay pit behind the building, and has endured the Palouse winters for well over a century. Despite obligatory procedures to keep the building up to code and a few modern touches such as TVs and a kitchen, the picturesque building with the columned entrance maintains its original elegance.

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the face of climate change. Important consideration for forest management in control, nutrient recycling, shade, clean air and ests, as are shiitake mushrooms, which are often grown in U.S. for up to $600 per pound. Shade-loving ginseng root is grown in U.S. for — some of their culture. “It gave me the science foundation to work in this field, and it helped me understand the complexity of ecosystems,” says Tidwell. After WSU, he began his Forest Service career in Boise National Forest, and has since worked in eight different national forests. In Tidwell’s 37 years in the Forest Service, he worked as firefighter, district ranger, forest supervisor, and legislative affairs specialist. “The idea of a job outdoors was attractive. Little did I know it would lead to a job that you spend most of the time in an office setting,” he jokes.

Tidwell was named Forest Service chief in 2009 and has led efforts to balance uses and sustain national forests, particularly with the overarching challenge of climate change. He says a collaborative effort between local, state, and federal governments works best. He and his wife Kim have one daughter, MacKenzie. Tidwell received the WSU Alumni Achievement Award in 2011.

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Help Zobrist find two elusive tree species growing naturally in western Washington. Check out the Tree Watch page at washingtonstate.edu/WSU/treewatch and start hunting. If you spot one of these most-wanted trees, simply upload photos and GPS coordinates tagged #WSU/treewatch.

In the USFS hot seat

Native Trees of Western Washington

From Douglas fir and western red cedar in the lowlands, to Noble fir and Deodar cypress at higher elevations, forests grow across much of the Pacific Northwest. State and provide this nurture. A new photographic guide for enthusiasts and explorers examines the native species of western Washington. In author, Kevin Zobrist, is a Washington State University associate professor and regional forestry expert for WSU Extension in the north Puyallup River counties. The guide covers far more than evergreens. Native Trees of Western Washington also includes broad-leaved deciduous trees such as Pacific madrone and slippery elder. Each entry includes key features of the trees, range and habitat, modern and traditional uses, and beautiful photographs of full trees and their details. Zobrist, a native of western Washington himself, brings to bear his considerable knowledge of indigenous species as well as tree physiology, ecology, and the dynamics of forest stands.

The book, published by WSU Press, is available now.

FOREST O’PLENTY

BY REBECCA PHILLIPS

From above, forests unroll like thick carpets of maple or pine. Beneath the leafy canopy, however, one might find ginseng root, mushrooms, blueberries, hazelnuts, floral greenery, or even ducks. For millennia, indigenous cultures thrived on sustainable tree-based agriculture, and today, mainstream Americans are embracing the tradition through forest farming.

In their book Farming the Woods, Ken Mudge and Steve Gabriels offer a detailed look at multilayered, multipurpose forest production. A Cornell University professor specializing in agroforestry, Mudge says that healthy forests can produce a valuable range of food, medicinal, and other non-timber products. Coffee and chocolate, for example, are grown under the protective cover of tropical rainforests. Shade-loving ginseng root—selling for up to $600 per pound—is grown in U.S. forests, and mushroom crops, which are often cultivated on logs. Forest farming is also a form of protective conservation, says Mudge, providing erosion control, nutrient recycling, shade, clean air and water, and wildlife habitat. Additionally, trees help buffer extreme temperatures and weather events, an important consideration for forest management in the face of climate change.

Although Farming the Woods focuses on harvesting edibles like native pawpaw fruit and maple syrup from deciduous forests in upstate New York, the principles easily reach across the nation to the evergreens of the Pacific Northwest. In Olympia, Washington State University Extension agent Jim Fred uses agroforestry principles with indigenous people around the world. He originally came to Washington to work with Christmas trees. “I got lots of questions about what people could do with their land besides watch the trees grow,” he says.

Today, Fred uses horticultural techniques to help landowners manage forest plants like huckleberry, bear grass, and salal, as part of Washington’s $60 million floral greenery industry. Organic Christmas trees and evergreens for holiday wreaths and centerpieces are also big business. “Over six million wreaths are made in Washington just from forest greenery,” he says. “We prune the trees to produce a sustainable crop.”

Native fruits and nuts are also in demand. “With wild blackberries, raspberries, and blueberries, we don’t need sprays, we just mow the overstory,” says Fred. He is currently developing local markets for pine nuts.

“Families are excited about this,” Fred says. “Cultivating nuts, berries, oyster mushrooms, and medicinal herbs like yarrow give people another reason for owning property in the country. Beyond producing food and preserving the environment, forest farming can be a type of mental health therapy. And for native populations, it’s about recapturing some of their culture.”

I know that Carlton Complex makes the news, but 98 percent of fires on the national forests are suppressed in the initial attack. There’s a lot of great work that goes on, not just on the large fires but on those smaller fires.

What’s the long term plan for forest management, considering climate change, insect depredation, and other problems? Our strategy is first based on the science we have, and here to apply that science. We’re fortunate that our research scientists have worked for decades to understand the effects of a changing climate on vegetation throughout the country. We then can apply that science to restore the resiliency of our forest ecosystems. When we do get that wildfire, the forest is able to recover faster.

We’re also not restoring back to pre-settlement conditions. We recognize fire is part of the ecosystem. There’s a need for us to allow fire to carry out natural resiliency efforts, but that in a way to keep our communities safe. Around our communities, we’re thinning our forests. However, as our summers get hotter, longer, and dryer, the windows we have to do prescribed fires or manage natural fire get shorter and shorter.

Times have changed. Climate change has contributed to our fire seasons being 60 to 80 days longer than what they were even about 15 years ago.

What do Pacific Northwest residents need to know about wildfire risk in our forests? We still want folks to get outdoors and enjoy the national forests, but we need to be more careful and reduce human-caused fires, which are the majority of ignitions. Everything we can do to keep those fires from getting started makes the job of firefighters a lot easier.

If there’s a fire and the sheriff’s department asks you to evacuate, please do it. Know how hard it is to leave your belongings and your home. Most people want to stay and defend it. But the best thing you can do to help firefighters is to follow those directions and let the firefighters deal with the fire rather than a rescue operation.

Even though he didn’t realize it at the time, scientific education from Washington State University might help U.S. Forest Service Chief Tom Tidwell tackle the challenge of managing 183 million acres of forest and grasslands during a time of increasing wildfires and climate change.

Tidwell was born in Yakima and grew up mostly in Boise, where his family would spend their vacations in the national forests. His love of the woods and the outdoors drew him to WSU’s forestry program. Under the tutelage of plant ecologist Rexford Daubenmire and other professors, Tidwell learned principles and scientific rigor that would help him for many years.

“The idea of a job outdoors was attractive. Little did I know it would lead to a job that you spend most of the time in an office setting,” he jokes.

Tidwell was named Forest Service chief in 2009 and has led efforts to balance uses and sustain national forests, particularly with the overarching challenge of climate change. He says a collaborative effort between local, state, and federal governments works best. He and his wife Kim have one daughter, MacKenzie. Tidwell received the WSU Alumni Achievement Award in 2011.

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We tapped into Tidwell’s expertise and talked with him about managing forests with the higher risk of wildfires in hotter, dryer summers.

With the drought in the Northwest and major fires like last year’s Carlton Complex, what is the Forest Service strategy for dealing with the risk of major wildfires? There’s no easy answer.

When we have these predictions of above-average fire years, we spend time coordinating with state, county, and local fire departments so they’re aware of what we’re thinking. We’re doing everything we can to be ready to deal with whatever fire comes.

It takes all of us working together. There’s no way the Forest Service can accomplish our responsibilities without state, county, and local working together.
WSU reinforced a sense of hard work and humility that carried him through graduation, his NFL career, and medical school.

BY JACOB JONES ’07

IN AN EXAM ROOM AT HIS YAKIMA MEDICAL PRACTICE, FORMER SEATTLE SEAHAWKS RUNNING BACK DAN DOORNINK ’78 HUNCHES HIS SHOULDERS AND HARDENS HIS BROW AS HE RE-ENACTS A KEY 1979 PLAY AGAINST THE THEN-REIGNING WORLD CHAMPION PITTSBURGH STEELERS. EXPECTING A BLITZ, DOORNINK SAYS, HE LOCKED EYES WITH AN OPPOSING DEFENDER AND THEN GLANCED TO THE SIDELINE.

“Smart guys like him learn how to read the eyes of the receivers,” Doornink explains.

With the snap, the Pittsburgh defender bolted for the sideline, but Doornink broke toward midfield, caught the ball and ran about 50 yards for a touchdown. Doornink says that his hours of studying film, subtle strategizing, and hard practice paid off at that crucial moment.

“This whole play was made by me going like that,” he says, flicking his eyes to one side. “It was all done before it even got started.”

A black-and-white photo from the play now hangs on the exam room wall. Doornink, 59, grew up in nearby Wapato, where the high school football field bears his name, before playing with WSU and the Seahawks. He returned to central Washington 25 years ago to join his brother’s practice at Memorial Cornerstone Medicine.

Broad-shouldered and square-jawed, Doornink still moves with the heavy grace of the gridiron. He cruises the bright corridors of the clinic, noting the practice had moved into the new facility in December. Doornink says most of his patients rely on Medicare. He manages their treatment to keep them out of the hospital as much as possible.

“In a day, I might see eight patients who have 80 birthdays or more,” he says. “They were a population that worked hard, didn’t look for a handout. There was no safety net. You just did what you had to do. So they’re sort of a fun group to work with.”

Doornink says early work in the nearby orchards and playing sports against other regional farm boys helped toughen him up for his football career. He received a scholarship to WSU where he soon started at tailback while also balancing his demanding pre-med studies.

He says his time at WSU reinforced a sense of hard work and humility that helped carry him through graduation, his eight-season career with the NFL, and medical school at the University of Washington. He notes that he thinks a WSU medical school would certainly benefit rural communities.

“I used the same philosophy in medical school that I used in football,” he says. “I’m not the smartest kid on the block, but if you’re not a brilliant person, what do you do? You study more than everybody else.”

Doornink credits his steady work ethic and strong faith for his successes. He has a comfortable patient load. He and his wife live just minutes from the clinic. He now spends most of his free time visiting his children and grandchildren.

But he says he will never forget those small, glorious moments on the field. The fake-out against the Steelers in ’79, his first WSU start on national TV against Stanford, and maybe his greatest—rushing 126 yards against the defending champion Los Angeles Raiders in 1984.

Doornink tilts back his head and closes his eyes. A grin spreads across his face as he sees the empty air, like he can almost feel the ball and hear the cheering fans again.

“I can see it in my vision,” he says, “where the guy was and the moves I had to make. It’s still sort of exciting to think about those times.”

Opposite: Nicknamed “Mr. 3rd Down” for his knack of gaining first downs as a running back, Dan Doornink ’78 played one season for the New York Giants and seven seasons for the Seattle Seahawks. (Al Messerschmidt/AP) Below: Doornink, now a doctor of internal medicine, runs a clinic in Yakima with his brother. (Courtesy Yakima Valley Memorial Hospital)
WASHINGTON STATE had all escaped the limits of their previous lives in Latin America by Nobel Prize for Literature. Márquez published the bestselling screen of most Americans. That began to change in 1970, when García than Borges, Latin American literature was not really on the radar English translation, of his landmark book Borges, already known among American literati from the appearance of Julio Cortázar. Their forefather was the Argentine master Jorge Luis Márquez, Mexican writer Carlos Fuentes, and the Argentine writer group of writers that included 1982 Nobel Laureate Gabriel García Peruvian writer to have spent time teaching and writing. Right was the almost secret presence in the fall of 1968, when I was a fresh-and early 1970s. For me, one of the most precious of these anomalies of how anomalous the campus was when I was there in the late 1960s and early 1970s. For me, one of the most precious of these anomalies was the almost secret presence in the fall of 1968, when I was a fresh- man, of the 2010 Nobel Laureate of Literature Mario Vargas Llosa. There was hardly a more unlikely place for the young and radical Peruvian writer to have spent time teaching and writing. Right before arriving in Pullman, he had been a member of a jet-setting group of writers that included 1982 Nobel Laureate Gabriel García Márquez, Mexican writer Carlos Fuentes, and the Argentine writer Julio Cortázar. Their forefather was the Argentine master Jorge Luis Borges, already known among American literati from the appearance of his stories in The New Yorker in the 1960s, and the publication, in English translation, of his landmark book Ficciones in 1982. Other than Borges, Latin American literature was not really on the radar screen of most Americans. That began to change in 1970, when Garcia Márquez published the bestselling One Hundred Years of Solitude in English translation, and in 1971, when poet Pablo Neruda won the Nobel Prize for Literature. These were writers who highly valued being cosmopolitan. They had all escaped the limits of their previous lives in Latin America by finding refuge in the city that they considered the cultural capital of the West—Paris. When they were not in Paris, they lived and worked in large and vibrant European cities such as Barcelona and London. Today, Vargas Llosa lives most of the time in Madrid. In this context, then, his presence in Pullman was an anomaly in his otherwise lifelong commitment to urban life. Why was this upstart Peruvian writer in Pullman? It had everything to do with something of an anomaly on the WSU faculty: Wolfgang A. Luchting, a professor of German nationality who had completed a degree in American studies in Germany, learned Spanish in Peru, and taught an unlikely combination of German and Peruvian literature in the Department of Foreign Languages. Luchting was also Vargas Llosa’s translator into German. Vargas Llosa was considering the possibility of an academic career, so he accepted the invitation to WSU. When the author was in Pullman, he worked on two very lengthy books: the novel that eventually was published under the title Conversación en la Catedral and a book-length critical study of the work of Gabriel García Márquez. Most students and faculty who were reading Vargas Llosa’s novel The Green House, attending his four public lectures, or hosting him in Pullman for his semester-long stay in 1968 are no longer living near WSU. To a large degree, the fact that a future Nobel Laureate taught a literature class in Spanish on campus has been forgotten. Nevertheless, even though the Nobel Prize is awarded on the basis of each writer’s total work, one could reasonably argue that the centerpiece for his Nobel recognition was actually written in Pullman. That argument, which I personally would defend, is that his most complex and ambitious novel, Conversaciones en La Catedral, was the key piece of his Nobel Prize. As a freshman, I was not among the rarefied American literati who had read Vargas Llosa’s two extant books in English translation—The Time of the Hero and The Green House. I just happened to be in a Spanish advanced grammar class and attended the writer’s four public lectures upon the recommendation of my Spanish professor Billy Weaver. The truth is, I was an anomaly myself; a first-generation college student of a working-class Scandinavian family from Tacoma, I was fascinated with the work of Vargas Llosa, then Chilean culture, and then Latin American literature. Since completing my doctorate in Latin American literature, I have published several books on this literature as part of an academic career that has as much to do with Vargas Llosa, Luchting, and the WSU Honors Program as has my graduate training. It was really the special anomalies of the place that made all the difference for me. Only recently have I realized just how important those formative years were for me at WSU. Today, I am proud to be associated with the Vargas Llosas, as well as the unorthodox Gary Larson and Mike Leaches of this unique institution. A 1972 WSU graduate, Raymond L. Williams is the author of fifteen books and currently holds the title of Distinguished Professor at the University of Texas at Austin. His book Mario Vargas Llosa: A Life in Writing was published by the University of Texas Press in December 2014.
Did a story inspire you or stir a memory? What’s your own story? Do you have a photo to share?

We’d love to hear about your life, your thoughts about the magazine, and your WSU experiences.

**DEAR reader**

**Traveling ecologist Rexford F. Daubenmire**

In a spiral-bound notebook, now yellowed after nearly seven decades, blue ink in a neat hand sprawls across page after page listing plant after plant from grasses to trees. Buried within Washington State University’s Manuscripts, Archives, and Special Collections lie this and myriad artifacts of WSU botanist Rexford F. Daubenmire’s scientific life. Daubenmire devoted his life’s work to answering one of ecology’s central questions: Did plant communities exist as discrete, predictable entities, or were they more or less random configurations of plants?

A field trip guided by Daubenmire reveals the practice of ecology and the region’s community of science in the middle of the twentieth century. In 1948, shortly after coming to Pullman from the University of Idaho, Daubenmire developed a six-week summer field course that surveyed the northern Rockies. He opened the course to students in botany or forest and range management, as well as inviting professionals from other regions who wanted an intensive ecological introduction to “the finest scenery in North America,” as a course advertisement put it. For $25 tuition and $0.97 per day for food, students received six credits in field ecology in the northern Rockies.

Seven students with various experience from universities in Idaho, Michigan, Montana, and Tennessee joined Daubenmire. His wife, Jean, assisted him as an instructor, part of a lifelong professional partnership that included co-authoring a seminal work in regional ecology published in 1968 through WSU Extension, *Forest Vegetation of Eastern Washington and Northern Idaho*.

From July 11 to August 12, the party drove more than 3,000 miles. They first headed west through the Palouse to the rugged seashells of Palouse Falls before venturing north toward Spokane. They then crossed Lookout Pass to Montana where they circled clockwise from Missoula toward Billings, to Great Falls, and on to Glacier National Park before returning to Pullman. They often camped in the woods and plowed on the beaten path. Most of the six weeks and 3,000 miles passed uneventfully. Rain delayed them on occasion. They forgot supplies once and retraced their path. Another time, a landowner at a dude ranch in Big Timber Canyon, Montana, refused the party passage. And there were casual days, such as August 1, when Dauby recorded: “Sunday—went fishing—successful.”

Throughout their travels, these peripatetic ecologists met other researchers at nurseries and experimental research stations. Part of the larger scientific community, these experts knew the local areas intimately and directed the party toward particular sites to see specific ecological processes. In these often remote locales, Daubenmire and his colleagues worked in the field, and they wrote that work is what contributed to Daubenmire’s lifelong project.

In the best tradition of the land-grant system, the WSU botanist consistently sought practical applications. Ecologists like Daubenmire believed that if plants existed in communities, experts could predict their behavior better and thus manage forest and range more effectively. So, he and students sought out relatively undisturbed landscapes—climates in ecology’s jargon—to study plant associations in natural settings. They gathered and plotted data, hypothesized along the way, and built toward conclusions Daubenmire used in subsequent publications. Daubenmire’s time in the Palouse corresponded to transformations in ecology and WSU. He arrived during the Great Depression when ecology was but a nascent discipline and led during the post-Earth Day Age of Ecology when Americans hoped university scientists might guide them out of multiplying environmental dilemmas. Daubenmire’s work demonstrates one man’s place in communities—natural and scientific—and shows an abiding concern about the fate of the Northwest’s forest and rangelands, an interest in the practical and theoretical rooted in this place where he traveled wide and deep.

Adam M. Sowards is an environmental historian and professor at the University of Idaho.
Birth of a medical school

BY DOUG NADVORNICK

Like the best athletes, sometimes a university has to run full speed then shift directions. For months beginning last summer, WSU representatives pushed hard for a new medical school. The legislature approved the authority for the University to create a WSU College of Medicine this spring. Now the work begins to build the medical school.

After the governor’s signature, College of Medical Sciences Acting Dean Ken Roberts and his team pushed into action. They began the search for the new school’s founding dean. Teams of WSU faculty and local physicians are writing the curriculum, and staff members are developing the school’s student support infrastructure.

If preliminary accreditation is granted, the university could begin recruiting students in the fall of 2016 and the first class of students could begin in the fall of 2017.

Those students will spend their first two years of academic studies on the Spokane campus. For their third and fourth years, students will work in community settings at clinical campuses in Spokane, the Tri-Cities, Vancouver, and Everett, with an emphasis on primary care.

“We believe that by sending students to one of those places for two years, they will develop relationships with health care providers, patients, and the community, all factors that increase the likelihood that these students will return to practice in these communities,” Roberts says.

The school will go through three accreditation rounds before full accreditation, perhaps by 2020. By 2021, the University hopes to increase the size of its class to 120 students.

Follow the medical school progress: medicalsciences.wsu.edu

What to do with toxic soil?

Fukushima soil remediation proves promising

BY LARRY CLARK

Japanese farmer Kenichi Okubo didn’t lose his family farm immediately when the massive TOHOKU EARTHQUAKE hit in March 2011. Even the ensuing tsunami spared his crops from sea water. But the meltdown of the Fukushima Daiichi nuclear reactor, 30 miles away, spewed RADIOACTIVE CESIUM over the fields, and forced the 72-year-old rice farmer and his nonagenarian mother to evacuate.

“The cloud stopped at some hills east of the reactor,” says soil physicist and WSU instructor Colin Campbell ’95. “Then radioactive cesium-137 dropped in snow on this little village called Iitate and surrounding areas.”

Campbell is vice president of Decagon Devices, a family-owned scientific instrument company in Pullman founded by his father, former WSU professor Gaylon Campbell ’68 PhD. Since 1983, the company has made products to measure energy states of water, important for soil quality, food safety, and other uses. In 2007, one of their devices tested soil for water on Mars.

Campbell learned about Okubo and the soil contamination in Fukushima from his colleague and friend Masaru Minaguchi, a soil scientist at the University of Tokyo.

The Japanese government response was to scrape the top ten centimeters of soil from the area and cart it away, leaving the fields a barren wasteland. However, Minaguchi knew that cesium will bind onto certain soil particles, like clay, which is prevalent around Iitate. He had a plan to mix the soil and filter it so the heavier clay bound to cesium goes into a containment hole. Okubo and other farmers who returned could then start farming with little to no soil radioactivity.

Minaguchi turned to Campbell and Decagon Devices for help. They donated sensors and expertise to the project.

Campbell visited Iitate in 2013 to see the progress. “They were just beautiful rice farms carved out in the valleys,” he says. Campbell had studied rice cultivation as a doctoral student at Texas A&M, so he borrowed some boots and joined dozens of retired scientists and university professors to help remediate Okubo’s farm.

Through the course of Minaguchi’s project, radiation levels dropped significantly and rice grown there was safe to eat. A few factors confounded the operation: cesium washes down from the unremediated hills; the public still suspects crops from Iitate might have radiation; and wild boars dig up the soil and return some cesium.

Still, the process shows promise. Campbell knows it’s not a solution for every incident, but “Okubo is making rice in the land he loves,” he says.
Tomatoes
A fruit of myths and legends
BY LARRY CLARK

For a staple found in backyard gardens and farmer’s markets everywhere, the tomato certainly carries its share of myths. The rich, acidic fruit that we often call a vegetable has been considered a potion and an aphrodisiac. Even in late Renaissance Italy, a botanist connected the tomato to the golden apples of Greek mythology. Despite its rep, gardeners grow tomatoes by the bucketful all over the state, often with help from Washington State University researchers and Master Gardener volunteers. Tomatoes were no mystery to the South Americans who first ate them. The first great wave hit the coastal highlands of Peru, Ecuador, and northern Chile. It was later cultivated in Central America, where it looked similar to a plant the Aztecs called “tamatl,” Spanish explorers took the plant to Europe, and Bay PD, calling it “tomato,” and farmers grew the plant there since the 1540s. Italian herbalist Pietro Andrea Matthioli in 1544 included it in his plant guide a reference to a yellow tomato, which he called mela amoris, the “golden apple.” In 1553, Swiss naturalist Conrad Gesner painted a watercolor of a red pomum amoris, a “love apple,” named for the tomato’s alleged aphrodisiac qualities.

The misconception of belief in poisonous tomatoes spread with the tomato’s pests earned mythic notoriety. The fat, three-inch-long worms that attack the stems are a problem, especially in dry summers. By the middle of the nineteenth century, tomatoes were cultivated all over the continent, including the Pacific Northwest, where they were introduced by missionaries. In 1839, a visitor reported tomatoes growing on the banks of the Walla Walla River. Historian Edwin Warren claimed that Oregon and Washington pioneers boiled them with sugar until thick, and stews.

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Hackers had a banner year in 2014. They stole hundreds of millions of passwords and other pieces of confidential information from banks, retailers, credit card companies, even film company Sony Pictures. A record number of computer breaches affected more than half of all American adults, costing businesses up to $500 billion, and fueling increased attention to the security of Internet interactions. But the financial consequences of those attacks pale in comparison to the possibility of intrusion and disruption of the electric power system.

From hospitals’ life support machines to nuclear reactors to home heating during bitter cold winters, keeping the power flowing can be a matter of survival. Increasingly the power grid is a smart one, an interconnected system of electric power generation, distribution, advanced home meters and appliances, and computer control centers. The system can increase efficiency, reduce outages, and possibly lower costs. But with more and faster communication across the system comes greater vulnerability.

At Washington State University, a combination of power engineers, computer scientists, and their industry partners simulate holes and weaknesses in the smart grid, then work out ways to manage the risk of hackers interrupting and subverting the electric power system. Their key to successfully securing the grid is understanding that the threats are both cyber and physical.

“What is the nightmare scenario of an attack on the power grid? If you’re an IT manager alone, you can’t imagine that,” says Chen-Ching Liu, electrical engineering professor and director of WSU’s Energy Systems Innovation Center (ESIC). “We have to bring the two sides together, much like our group of computer scientists and engineers. You have to know enough about the power grid to see what kind of cyberattack would take control and do enough damage to the grid to create that nightmare scenario.”

Liu says a successful attack could cause not just a power outage, but create a tremendous expense for utilities as they replace blown transformers worth millions of dollars each. The threat is not just theoretical; in 2007, Idaho National Laboratory ran an experiment where a cyber attack physically destroyed its Aurora Generator, causing it to explode after rapidly opening and closing circuits.

Even President Barack Obama and Congress agree that cybersecurity is a national priority. “No foreign nation, no hacker, should be able to shut down our networks, steal our trade secrets, or invade the privacy of American families,” said Obama in his 2015 State of the Union, to rare bipartisan applause.

“If you think of the big threat, it’s not just the cyber part. The power grid is always a target, whether it’s terrorists or others,” says Anjan Bose, an electrical engineering professor and former dean of the Voiland College of Engineering and Architecture, with more than 35 years of experience in the field. “What has been added is that now you might be able to get to the power grid through the cyber systems. That is what worries people.”
DETECT AND CONTAIN

In the test setting, the control room center at WSU’s engineering building, a hacker attacks the power grid. It’s a smart grid, shown on large computer monitors as yellow squares and lines representing elec-

tric substations and generators, and at first everything is cooperating

moving graph shows a steady flow of data every four seconds. Now you’re looking at a more detailed view of the grid with fast sensors,” he says. That immediacy means more control ability to isolate problems and maneuverability to bring back the power system in case of trouble.

Seivastava says the test bed can help analyze responses to both hackers and damage from storms, accidents, or direct physical at-
tacks by humans.

“A big concern is how to survive big storms like Hurricane Sandy. Turns out some of the techniques you need to survive cyber attacks are the same kinds of technology and processes,” says Bose.

BAKE IN THE SECURITY

On the other side of Pullman, Dave Whitehead ’89, vice president of research for the electric power equipment manufacturer Schweitzer Engineering Laboratories, or SEL, takes an engineer’s perspective on cybersecurity.

“We build systems to take into account temperature and other environmental factors. Cybersecurity is just another thing we need to do so we can make sure the system is robust and reliable,” he says.

Not that the sky is falling. It’s really preventive medicine. “Is Pullman a dangerous place? No, but I’m still locking the door on my house. It’s just prudent behavior.”

After he graduated from WSU, Whitehead worked on submarines in Connecticut, and then returned to Pullman and the expanding company in 1994.

Whitehead says security has always been built right into the com-

pany’s electric relays and other equipment. Edmund O. Schweitzer III ’50 PhD created the company in his basement in 1982, with an industry-

changing digital protective relay—a device that monitors power lines and systems for problems. Since Schweitzer, also a former WSU faculty member, had introduced the world’s first microprocessor-based relay, he recognized the potential for misuse through the increase in electronic communications. The relay was now passing more information than ever to an electric utility’s control centers through dialup modems. Even so in the early 1980s, Schweitzer reserved two passwords to use the relay, one for technicians to evaluate problems and another for engineers to actually change settings.

It’s essentially the same as the two-part access at SEL’s offices, where a person might need both an electronic badge and a password.

“We take data security we have in our headquarters and apply it to substations out in the middle of nowhere,” says Whitehead. “It’s a layered approach.”

He says there are advantages to securing the grid, as opposed to guarding strictly on-land transactions. When it comes to cybersecurity, the challenge for Target or banks is abstract; it is money, but it’s a handful of bytes in a computer, says Whitehead. “When you take the money from my account or give me a whole lunch, there’s no connection to the physical universe. I don’t tell a million dollars sitting in my wallet.” For the electric power system, the cyber part really does connect back to some physical thing, whether it’s electrical current or an open circuit breaker.

Another advantage is that power systems are overmeasured, “so if somebody was able to spoof one location, we have another location that essentially measures the same thing,” he says. If something is wrong or values don’t match, the attack can be identified and isolated.

When they complete their new projects, Whitehead’s research team at SEL works in a similar way to the WSU scientists, and sometimes with them. “Our cybersecurity team has a test bed where they put in equipment, and then start poking holes in it or attacking it.”

PUT ON THE HACKER HAT

Adam Hahn, a computer scientist at WSU, says researchers must consider the worst ways to break the power system if they want to mitigate against attacks.

“How can you defend against something you don’t know? You have to know what an attack is going to do before you can defend against it,” says Hahn. “In other engineering fields you try to design a system that meets some functional requirements. Here we try to figure out how we can violate whatever assumptions they made.”

“Instead of making a system work, we’re trying to make a system fail.”

Hahn came to WSU in 2014 after working in the private sec-

tor on cybersecurity, primarily for the federal government. He says cybersecurity really came to the forefront after the 2010 revelation of Stuxnet, the powerful computer “worm” that could propagate and infect computers to control machinery and industrial processes. Stuxnet was a magnitude of order worse than anyone imagined, says Hahn. It pushed into high gear the research into cybersecurity of physical systems like the power grid.

Hahn and WSU computer scientist Carl Hauser work with stu-

dents to infuse the security mindset—an effect, to think like a hacker. Hauser says students will often come up with good security ideas, but don’t necessarily think about how their ideas might be circumvented.

“Having built this thing, it’s hard for someone to ask, ‘Where are the holes?’ You don’t want to admit there are holes,” says Hauser. “When you teach the students partly through attack and defense games on the operational systems, called red team-blue team competitions. Hahn isn’t worried that they’re teaching students to be hackers. ‘You protect you’re an adversary and attack the system. As a security person that’s what you really need to focus on,’ says Hahn.”

To Hauser, invasion is inevitable. Experience shows us that computer security will be breached, just not very often, he says. When there’s only one line of defense, it reduces planning for the attack that makes it through.

MICROGRIDS

To keep the smart grid operating, it must be resilient when things go wrong, says EIC Director Chen-Ching Liu. One tool to help recover from electric power system failure is a microgrid.

A microgrid connects onsite electric power generation—such as WSU’s backup generator—to the local power grid. The smart grid can then use excess power from the backup source in case of disruptions or power outages.

“When the utility is not available, how do you survive?” says Liu. “If you rely on a microgrid, you can keep critical services like hospitaI-generating.”

Hancock County Sandusky focused attention on the resilience problem when many New York and New Jersey coastal towns lost power for days. Since EIC is an integral part of the $174 million Department of Energy-funded Pacific Northwest Smart Grid Demonstration Project, WSU has been working with Hancock and the other teams to work out better ways to increase resiliency, such as microgrids.

A military base, shopping mall, or industrial park can be a microgrid. In the case of Pullman, power utility Pacific Power installed a state-of-the-art battery storage system, the largest of its kind in North America and Europe that is connected to the grid.

Washington Gov. Jay Inslee, U.S. Sen. Maria Cantwell, and U.S. Rep. Cathy McMorris Rodgers opened WSU’s inaugural energy summit this spring to introduce the new battery, which is housed at SEL. The 6 megawatt battery can supply most of the power to the campus for three hours. A 5-megawatt battery on the other side of Pullman can be deployed around the United States by 2019.

Smart meters, which send usage information to the Avista utility company in 1994.

Ther e’s a strong interest in cybersecurity, and systems for problems. Since Schweitzer, also a former WSU faculty member, had introduced the world’s first microprocessor-based relay, he recognized the potential for misuse through the increase in electronic communications. The relay was now passing more information than ever to an electric utility’s control centers through dialup modems. Even so in the early 1980s, Schweitzer reserved two passwords to use the relay, one for technicians to evaluate problems and another for engineers to actually change settings.

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New challenges continue to push engineers. One of the challenges is it becomes an arms race over the security of computer systems, and focusing 100 percent of their research on the power grid. "I think this is the only place where we have three computer scientists in the country where power engineers work with computer scientists," says Bose. "There are other parts of the country where power engineers don’t get involved with computer scientists."

"That’s not helpful. It doesn’t lead you to doing the things you should be doing to make the system resilient," says Hauser. Instead he recommends that people look at computer security as risk management. That makes it easier to talk about how to contain damage in the power grid and understanding the risks associated with different types of cybersecurity failures.

"In turn he and the other computer experts learn from engineers about how to build control systems that fail gracefully and rebrand the challenges, just like the power grid itself. Their collaboration doesn’t end with research. WSU’s graduate students take courses taught by the two disciplines, a unique combination that benefits both fields. "This is a very interesting group of our combination of power engineers and computer scientists," says Bose. "There are other parts of the country where power engineers work with computer scientists but I think this is the only place where we have three computer scientists focusing attention 100 percent of their research on the power grid."

"In MANY WAYS, the struggle between good guys and bad never ends. It becomes an arms race over the security of computer systems, and now challenges continue to push engineers. One of the challenges is the growing amount of data and computer traffic. The smart grid, with its numerous advanced meters on homes and businesses and complex control systems, will create a flood of new information. It has become a scale problem, says Whitehead. "How do we secure all that data, as the data rates get faster and faster and the volumes get larger and larger?"

Hahn also points out that, unlike smartphones, home computers and other short-lived products, power equipment lasts up to 30 years. That makes it tough to build computer security systems that can block out hackers of the future, perhaps even armed with the capabilities of ultrafast quantum computers.

Moreover, he says, the "Internet of Things," with its interconnected devices from refrigerators to light bulbs to smart meters, can exacerbate security concerns when they get picked up quickly by consumers. "We don’t think about the risk before we do the adoption. From a security perspective, we’re always chasing the problem," says Hahn.

Despite these challenges, the WSU engineers and industry researchers realize most people just want the electricity to work. "My expectation when I go home is that I hit that light switch and the lights come on. I think it’s the same for all consumers," says Whitehead.

Protecting power transmission and distribution from hackers or storms keeps the TV on and businesses running. This is something the smart grid can do well, as long as it’s secure.

When deciding where to attend graduate school, Chyenece Temple of Tacoma, Washington, looked for a quality graduate program that would also be a good fit for her daughter. Assuring that her 4-year-old daughter, Conneece, would be in a safe environment that values quality childcare and public school education was important to her. When she visited WSU, she knew it was a good fit. Chyenece is now in the second year of the counseling psychology doctoral program at WSU. Her daughter is learning the alphabet at a local community childcare center.

"My daughter feels completely at home here," said Chyenece. "It’s the same time, as a single parent I am determined to be a good role model for her, which includes pursuing an education and a meaningful career for myself."

In addition to a family-friendly environment, WSU had the program in counseling psychology that fit Chyenece’s career goal. "When I found out that WSU had the program I wanted, I came to visit and had such a positive experience," she said. "I felt all of the people in the department and the faculty were so nice. I knew this was where I wanted to study. I’ve really grown here. I’ve learned to become more independent and motivated, and my daughter has also grown exponentially."

Chyenece was awarded an assistantship and he was taken from her department to help pay costs, as do many graduate students at WSU. Including students who receive scholarships, the majority of graduate students at WSU receive some form of financial assistance—and many finish their degree programs with no student loan debt. That’s a good place to start for young families embarking on new career paths. Balancing family and education isn’t so hard at Washington State University, where residents make family safety and support a priority, and where finances are less of a burden. WSU Pullman offers the unique combination of a leading research institution with a safe, wholesome community that many are proud to call home.

28 WASHINGTON STATE MAGAZINE FALL 2015
On a cool evening last April, at exactly 8:01 p.m., the International Space Station traced a bright silver arc over Pullman. Inside, astronauts went about their routine while a small sensor scanned the air for hazardous vapors and relayed the data to flight controllers in Houston.

Meanwhile, 200 miles below in the rocky Syrian desert, soldiers searched through rubble carrying a handheld device that sounds an alarm in the presence of chemical warfare agents. At airport security gates and customs stations all over the world, similar devices sniff out explosives and narcotics.
The technology behind those detectors is finding its way into the medical field as a rapid, ultra-sensitive method to diagnose disease. It is also helping scientists probe the obscure workings of metabolism and complex conditions involving cancer and diabetes.

That technology is called ion mobility spectrometry or IMS. While it may be unfamiliar, IMS is emerging as one of society’s most powerful workhorses, able to detect and identify an extensive range of potentially harmful materials.

For Herbert Hill, the Washington State University chemistry professor who led the development of ion mobility over the last 40 years, the journey has been nothing short of a grand adventure.

I navigate a labyrinth of hallways, elevators, and staircases one afternoon to meet with Hill at a laboratory on the fifth floor of Pulfer Hall, the WSU chemistry building. The genial professor waves me in.

Seated behind a large computer monitor and dressed in jeans, boots, and a puffy brown vest, Hill takes a sip from a can of Pepsi and points to a chair. Papers and books are stacked everywhere. The wall behind him holds a dusty green chalkboard covered with equations. On the opposite wall, a long row of red-framed, faded photographs displays the smiling graduate students who have worked their way through Hill’s classrooms.

Hill is an analytical chemist and Regents Professor. A modest man with a soft Southern drawl, he tends to downplay his role in the success and commercialization of ion mobility spectrometry.

Simply put, IMS is a fast, highly sensitive method to identify the chemical makeup of a substance based on the speed of its molecules as they shoot through a cylinder. Tiny samples are first vaporized, and then turned into charged ions. Some ions zip through the cylinder quickly while others move more slowly, providing each a signature mobility rate.

On its own, IMS can be made into a small, simple, and reliable handheld device. When coupled with other analytical tools, IMS reveals the details of a chemical compound in three-dimensional ways never before possible.

The door opens behind me and Hill Siems ’74 PhD comes in with a cup of coffee. Research professor and master of the mandolin, Siems has played a pivotal role in many of the Hill lab breakthroughs.

Dr. Brian Hauck and Jessica Tufariello follow behind. I listen as they chat with Hill about the progress of their dissertation projects. Hauck is refining IMS for national-security measures and Tufariello is building what could be the first marijuana breathalyzer. Within a year or so, their faces will be featured in the row of red frames—both small, simple, and reliable handheld devices.

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“Those were looking for traces of life on the moon—searching for amino acids,” says Hill who was thrilled by the research. In the end, the scientists found no evidence of lunar life forms but the experience sparked Hill’s interest in the field of trace organic analysis. He soon found himself immersed in the lab for hours on end, turning out tiny concentrations of pesticides and heavy metals contaminating the environment. As often happens when living through historic times, Hill and his fellow graduate students were only vaguely aware of the revolution unfolding around them. The early 1970s had just ushered in the first Earth Day along with acclaim for Rachel Carson’s book. “We thought it was just a rapid method of separating and analyzing volatile organic compounds,” Hill says. “It was a happening time for science,” he says.

In 1976, Hill joined Washington State University as an assistant professor. Though eager to continue his work with ion mobility, he had to put it on the back burner. “There were problems with the technique and people had decided it wasn’t going to be a useful analytical tool after all,” he says.

Hill hid his time with other projects until 1982 when he received tenure and felt free to gamble a little. “I understood why ion mobility didn’t work well,” he says. “I wanted to try building an instrument the way I knew it should have been done.”

He recruited graduate student Mike Raim ’84 PhD and the two of them built...
the first computer-controlled ion mobility spectrometer. The design was Hill’s first big break-through and it enabled IM technology to go mainstream where it was widely copied and commercialized.

“The key to making ion mobility work was to sweep ‘all the neutrals’ out of the system,” says Hill. Using a counter-current gas flow, they were able to push the non-ionized molecules away from the detector while the charged ions continued forward. They initially tested the system with gasoline from a friend’s motorcycle. “We injected a tiny sample into the IMS and were amazed to see peak after peak of compounds being identified. It was so impressive that the first book written about IMS used the image on its cover,” he says.

Buried by their success, Hill took Baim to his backyard to test soil near dandelions that had been sprayed with the herbicide 2,4-D. “The sample about blew the instrument apart,” Hill says. They followed with dirt from Hill’s garden that had not been sprayed, but still detected a strong signal for 2,4-D. Intrigued, they collected samples from all over Pullman and found traces of the herbicide in each one. “We never could find a clean dirt. They all had 2,4-D in them,” he says.

Hill was about to accuse poor Baim of being a crummy chemist but instead took a horseback trip into Idaho’s pristine Gospel Hump Wilderness to search for uncontaminated soil samples. “When I came back and tortured them, every one of the samples still had traces of 2,4-D,” he says. Baim was vindicated but Hill was mystified.

One day, Hill heard about the campus soil bank where samples from the Palouse have been warehoused over the decades. He gave it a try.

“We had to go back to the 1940s before the advent of 2,4-D—and until we could find clean soil,” he says. “This is an example of how widespread environmental contamination is at the trace level, and how well ion mobility can detect it.”

Hill left for sabbatical in 1983, and fellow Southerner Siems was hired to oversee the IM research group during his absence. Siems liked the laboratory’s pioneering atmosphere and ended up joining the team. “Hill has always been a fountain of knowledge and invention,” he says. “He had a million ideas. As a physical chemist, my role has always been to take the ideas back to him or whack them down as the case may be.”

During this interval, Siems helped incorporate the idea of multiplexing which gave IMS the capability to run multiple experiments simultaneously. Their work quickly drew the interest of the Federal Aviation Administration. “There had been a number of boonshairs around that time and they were interested in detecting explosives on planes,” he says.

“It was the beginning of our involvement with explosives, drugs, and chemical warfare agents, which continues on today through Homeland Security and our development of the marijuana breathalyzer,” says Siems.

He explains that most people have had an experience with ion mobility at the airport when a TSA agent swabs their laptop or carry-on luggage during security screenings. “The swab goes into an IM device set to look at a specific window of compounds and an alarm sounds if they detect molecules that fall within that range,” he says.

When Hill returned to WSU in 1984, he was ready for a new challenge. At that time, IMS could only identify volatile organic compounds, yet a world of non-VOC molecules remained. “How can we get compounds like large proteins into IMS detectors to measure them?” asked Hill. They tried a number of new laboratory techniques, but it wasn’t coming together.

The answer arrived through another of Hill’s grad students, Chris Shumate ‘89 PhD, who heard about electrospray technology at a conference in 1985. Electrospray uses high voltage electricity to turn liquids into an aerosol of ions. It is especially useful for ionizing proteins and other large molecules. Setting another milestone for the lab, Hill and Shumate built their first electrospray ion mobility spectrometry unit in 1986.

The discovery broadened the use of ion mobility spectrometry and set the stage for future work in the field of medicine. In 1995, Hill, Siems, and graduate student Ching Wu ‘97 PhD, advanced it yet further when they successfully coupled an IMS to a mass spectrometer, which can be likened to a tiny scale for weighing molecules. “The combination gave us a complex array of mass and mobility information never before possible,” Hill says. “It allowed us to identify molecules in a much more comprehensive way.”

With ion mobility-mass spectrometry, or IMMS, Hill finally had the vehicle to study the chemical processes involved in health and aging. In 2005, he introduced the idea of using IMMS as a tool to map the human biomarker—entire set of physiological byproducts called metabolites. IMMS can measure hundreds of metabolites simultaneously. Within 30 minutes, it can detect thousands of compounds in a single drop of blood.

Each metabolite produces a specific IMMS pattern, or signature, that can be altered by disease. IMMS can monitor these patterns to diagnose or track conditions such as cancer, heart disease, diabetes, depression, Parkinson’s disease, and others. Hill has also shown that IMMS can detect colorectal cancer in the feces of mice, and most likely in humans as well.

Similar technology is being adapted for use on the International Space Station. NASA engineers Tom Limero has known Hill for 20 years and invited him to Houston in 2011 to help the agency develop electrospray ion mobility for space. “NASAs is just moving forward on this,” says Limero. “We want to monitor physiological changes using saliva or breath instead of drawing blood, which is problematic in space.” He says. Several versions of IM have also been used for monitoring air quality on the space station since 2001.

Hill’s cell phone rings playing Muddy Waters “Bad to the Bone.” While he tends to the call, Hauck and Tufariello invite me to the lab to see the ion mobility instruments. Hauck is polite and articulate. “This instrument is currently the most accurate IMS in the world,” he says, introducing me to a large machine brimming with wires and projections. Hauck explains that his doctoral project involves fine-tuning the accuracy of IM Instruments for national security purposes. His goal is to eliminate the number of false positives that occur while searching for drugs, explosives, or chemical weapons agents, yet not err on the side of false negatives, which could result in disaster. “The government wants to set a standard for 1 percent false negatives,” he says.

Tufariello is a freckled former art student from New Jersey who came to WSU on a whim. I watch as she tinkers with several small instruments, one of which will become a marijuana breathalyzer for detecting THC in human breath.

The idea for a marijuana breathalyzer grew out of a longtime friendship between Hill and Nick Lovrich, WSU Regents Professor Emeritus in political science. The two have neighborhood cabins in North Idaho’s Selkirk Mountains where they’ve spent vacations since 1977. One night in 2009, the two were seated at the same table at a WSU fundraiser. Their usual conversation revolved around fishing, barbeques, and the like, but that night Lovrich finally asked Hill, “Just what kind of work do you do?”

Hill replied that he was an analytical chemist and explained the concept of ion mobility. “What do you do?” Hill asked in
Return. Lovrich said he worked with law enforcement and was trying to help control impaired driving due to illegal or prescription drugs. “Why don’t you use a breathalyzer to detect drugs in the breath?” asked Hill. “No such thing exists,” said Lovrich. “Interesting,” said Hill, “I think it’s possible.”

The two obtained funding, and Tufariello volunteered to tackle the project with the intention of studying an array of drugs. Soon after in 2012, Washington state voters approved Initiative 502, which allowed the legal use of recreational marijuana. Hill and Tufariello changed their focus to the detection of the cannabinoid THC in human breath. “I believe it will work,” says Hill, “but we have only just begun the study in breath and how it correlates to blood levels of THC.”

Though the marijuana breathalyzer is still under development, the initial prototype is so encouraging that the National Highway Traffic Safety Administration and the United Nations Office on Drugs and Crime are interested in the technology.

When Tufariello’s project is completed, Hill and Siems will slowly begin to close up shop. Brian Clowers ’05 PhD, who not long ago took notes in Hill’s classes, will carry on the ion mobility work in his own laboratory across the hall.

“There is still a lot of research to be done in the realm of IMS,” says Clowers, particularly in glycomics, the study of the body’s sugar molecules. The work promises to shed new light on immune system function as well as how cells recognize bacteria and viruses and whether or not a cancer develops.

In mid-April, Hill took a preliminary step away from the chemistry lab and planted 600 young fir trees near his daughter’s house outside of Pullman. “I’m going to have a U-Cut Christmas tree farm,” he says—no doubt, where wandering customers will hear holiday blues drifting through the grove.

Hill will eventually transition to the role of consultant for academic and industrial research. He’s happy with the way things have turned out. “I feel great,” he says. “To be one of the earliest people in ion mobility ... and to have said that it could be used for everything, and seeing it turn out to be true. It’s been a lot of fun.”

CHEMICAL WARFARE AGENTS

The military uses ion mobility spectrometry (IMS) for detecting chemical warfare agents like mustard gas or the nerve agents VX and sarin. More than 150,000 handheld units are currently deployed worldwide to help soldiers monitor the disposal of chemical weapons as well as warn of their accidental release. IMS is also used in a forensic manner to determine if chemical agents—banned for war by the Chemical Weapons Convention of 1993—have been used for combat or to attack civilians, such as those documented in the ongoing Syrian civil war.

FOOD SAFETY

The safety of our national food supply relies on the use of accurate screening methods to detect chemicals, bacteria, or other contaminants as food travels from farm and processing plant to local markets. Ideally, detection methods should be fast, sensitive, and portable—all characteristics of IMS, which is gaining ground as an analytical tool of choice for the food industry. IMS can detect traces of pesticide residue on food as well as identify mold and bacteria. IMS is also used to monitor quality during the production of cheese, beer, wine, and pharmaceuticals.

GLYCOMICS

Glycomics is the study of the body’s sugar molecules, or carbohydrates. Assistant Professor Brian Clowers is developing innovative IMS techniques to identify the various forms of carbohydrates, which can be turned into novel therapeutic drugs like Herceptin®, an FDA-approved treatment for breast cancer. “There are a range of carbohydrates in a biological system which appear in different states for healthy and diseased tissue,” says Clowers. “We don’t have fast, sensitive tools to differentiate them right now, but we are developing them.” Clowers expects many more drugs like Herceptin® to be developed in the future.
Cuba, adiós

A secretive telegram—wired to Santiago, Cuba, in April of 1962—forever reset the course of Lorenzo Pablo Martínez’s life, stripping away his teenage hopes for a prestigious musical scholarship in Europe and exiling him to an unfamiliar culture as a political refugee in eastern Washington.

Martínez ’67 recalls a surge of outrage and confusion as he watched his mother pack bags for him and his 14-year-old brother. Both would depart for America in less than three days, leaving behind their parents and sisters, their home and dreams, everything they had ever known.

“I’m not going anywhere!” he remembers defiantly telling his mother.

Neatly folding another outfit, she ignored his outburst and continued packing their suitcases for the trip to Havana and then Miami. The family had traded many favors and risked imprisonment for his freedom. He should be thankful.

“You’ll have a rainbow of opportunities,” she said.

Despite his protests, Martínez and his brother would join more than 14,000 unaccompanied Cuban children ex patriated from Castro’s communist regime under the “Operation Pedro Pan” relocation effort between 1960 and 1962. Children went to temporary shelters or foster families in 30 states around the country—settling into asylum and paving a way for other family members.

As Martínez made his way in a new society, the universal language of music would continue to define his future. In a recent memoir, Cuba, adiós: A Young Man’s Journey to Freedom, Martínez recounts his first days in a Florida boys’ camp, his musical studies at WSU, finding his artistic self in New York, and eventually returning to Cuba 40 years later.

“I gained a lot by coming here,” he says now, “but it was not an easy journey.”

Martínez grew up studying and emulating many classic composers such as Beethoven, Chopin, and Mozart. He spent hours practicing complicated piano arrangements, studying full-time at a music conservatory in Santiago. When the Catholic-run Operation Pedro Pan program placed him with a family in Pasco, his adept playing earned him a scholarship to WSU.

“Adjusting to American culture took patience, but Martínez says he found an artistic and welcoming community in Pullman. While he struggled with the distance from family, he says he grew into a stronger and more independent musician. He played piano accompaniment for many singers and musicals, collaborating with faculty and mentoring younger students.

“I was very fortunate that I had a lot of people helping me along the way,” he notes. “I think my artistic sensibility helped me through that time.”

Pullman residents Bonnie and Ramon Fausti embraced Martínez as their own, inviting him and other students over to play music and sang at their home in the mid-1960s. The Faustis’ daughter, Jannis Peterson ’70, says she first met Martínez as a young teen.

“He was wonderfully exotic,” Peterson says. “That impressed me. He helped me develop as a pianist.”

Peterson says she would sit in on Martínez’s rehearsals or watch him perform in summer musicals. His guidance helped strengthen her passion for music, which she would go on to teach for 32 years at the State University of New York at Fredonia School of Music. As he pursued his master’s degree in piano performance, Martínez also found a place in the city’s thriving gay scene. Moving to New York, he says, felt like immigrating to a foreign country all over again.

“I am so glad that I went to New York,” he says, “but that was very traumatic.”

Nearby, other young exiles hoped for similar reunions, including 63 Pedro Pan children placed with families in Colfax. Martínez notes many of these children were much younger than him.

After graduation, Martínez set his sights on New York and the Manhattan School of Music. As he pursued his master’s degree in piano performance, Martínez also found a place in the city’s thriving gay scene. Moving to New York, he says, felt like immigrating to a foreign country all over again.

“I am so glad that I went to New York,” he says, “but that was very traumatic.”
Ultimately, the city would prove an inspiring fit. Martínez spent several years teaching piano, composing arrangements, writing music for the TV show Captain Kangaroo, and publishing children’s songs. He says he later devoted his career to working with international nonprofits.

Cuba has haunted Martínez ever since he left. Throughout the embargo, he had watched the people and places he once loved wither under Fidel Castro’s rule. He says he still longed to return though, despite what he might find.

“Thad always been afraid of going back,” he says, “but at some point the urge to go back was stronger than my fear.”

In 2002, Martínez again walked the streets of Santiago. He saw his childhood home stripped and broken. Oppression continued.

But Martínez says he also found inspiration and an intense musical rhythm he had forgotten existed in the streets and shops of Cuba. He channeled that energy into his writing, collecting scenes and moments for his 11th book of poetry, 9

In addition to writing poetry, Russo teaches creative writing and literature at Washington State University. Her forthcoming collection of lyrical essays, To Think Of Her Writing About Light, was selected as the winner of the Subito Press inaugural creative nonfiction prize. She also has another volume of poetry, The Enhanced Immediacy of the Everyday, coming out this year.

—Anjali Torok

Meaning to Go to the Origin in Some Way
LINDA RUSSO
SHEARSBOOKS: 2015

Linda Russo translates the environmental characteristics of the Palouse from scenery towards in this slender volume of her poetry. The cohabitation between humans and nature is explored here from a garden home to the vast wheat fields. Her poems delve into post-pastoral themes of consumer development on farmland: shopping centers and cheap food production the song of ariole, or dams, of more native, consigned to the production of more arable land.

—from “Going to Survey Walmart Construction from the Crest of Pioneer Hill”

Russo addresses the friction between people and their surrounding environment. In this, her second full-length collection of poems, she brings the Palouse alive and makes the rolling wheat fields feel like home: I do not live here because I want to, but because being here is a kind of sympathy.

—from “City and Country Life”

Russo writes with distinct fluidity while creating strong visuals out of small details. Even a simple wild rabbit can seem familiar to the reader.

Barnyards and Birkenstocks: Why Farmers and Environmentalists Need Each Other
DON STUART
WSU PRESS: 2014

Rural America faces the challenge of saving farmland to feed a growing population while sustaining the planet’s ecosystems. Stuart tackles these issues confronting both the agriculture industry and environmental activists. He explores pros and cons of regulation, climate change, land zoning, conservation, water rights, economic impacts, local food systems, and Farm Bill policy, among other debates. As he looks at each situation objectively, Stuart also gives voice to both agricultural and environmental perspectives.

Using multiple case studies, he delves into the interrelatedness of agriculture and environmental policy—how they’ve proven successful and beneficial to all those involved when people and policies were aligned. Stuart’s experience lends unique insight to the relationship between farmers and environmentalists. He has worked with both sides as an attorney in Washington state and as a consultant. His work in public policy helps different groups find common ground and solutions to what he refers to as political deadlocks.

Stuart leaves readers with two very different visions for the future of agriculture—one where the groups are divisive and the other where collaboration sees a fruitful future. With discussions geared primarily to farmers, environmentalists, academics, and policymakers, it will inform and educate any readers curious about the policy and practices shaping farming and our natural world.

—Rachel Weibler

The Pacific War and Contingent Victory: Why Japanese Defeat Was Not Inevitable
MICHAEL W. MYERS
UNIVERSITY PRESS OF KANSAS: 2015

Conventional wisdom among scholars of World War II claims that Japan would inevitably lose the Pacific War to the United States and the Allies. They base that belief on greater American military and economic power and a U.S. strategy that forced the war against Japan on a path to unstoppable Allied victory. Myers, a professor at Washington State University’s School of Politics, Philosophy, and Public Affairs, counters the historical paradigm and says Japan did have a chance to win the war.

Impressively, Japan launched the Pacific War on December 8, 1941—in one of the windiest days of the war—yet despite U.S. superiority in military strength, Myers says the Japanese did have a chance to win the conflict. Moreover, he writes, “inevitable” can’t describe a war that ranged over half the world for the better part of a decade. One might expect caution in assigning such a word to history. Instead, Myers says the term is a kind of sympathy. The fact that Japan depended on a strategic concept that Japan couldn’t win, yet they continued to fight, says he doesn’t place positive moral judgment on Japan or the Japanese military for their actions. However, by moving beyond a “no single person formulated the strategy” paradigm and says Japan did have a chance to win the war. Thus, the war raised the technology, production, leadership, and morale. As an example, Germany had industrial and military advantages in Europe, but failed to win World War II. The United States, had events and battles not worked in their favor, could have lost the war.

Just because Japan could have won, Myers says he doesn’t place positive moral judgment on the Japanese (or American) military for their actions. However, by moving beyond a suspect belief in “inevitable defeat,” Myers provides more fruitful ways of understanding the strategies of the combatants in the war, the way it was prosecuted, and the meaning of the Pacific War.

—Larry Clark

New Media

Meaning to Go to the Origin in Some Way
LINDA RUSSO
SHEARSBOOKS: 2015

Russo addresses the friction between people and their surrounding environment. In this, her second full-length collection of poems, she brings the Palouse alive and makes the rolling wheat fields feel like home: I do not live here because I want to, but because being here is a kind of sympathy.

—from “City and Country Life”

Russo writes with distinct fluidity while creating strong visuals out of small details. Even a simple wild rabbit can seem familiar to the reader.
The Yakima Chamber of Commerce gave their community service award to radio broadcaster RON KING (’67 Comms.) for his work in Yakima. In addition to more than 58 years of broadcast and sales work, Ron has served with the Jaycees, school boards, Boy Scouts, Chamber of Commerce, and numerous other organizations. The Benton City Council named former Hufnagle Times editor ERIC MATTHISON (’69 Comms., Pol. Sci.) as citizen of the year, in recognition of his journalism and volunteer activities.

BUD WITHERS (’70 Comms.) retired from The Seattle Times. TONY BAKER (’72 Comms.) stepped back from day-to-day oversight as editor and publisher of The Register-Guard in Eugene, Oregon. He will remain on the board of directors. The University of Idaho Board of Trustees voted to extend the term of President JUDITH BENSE (’72 PhD Anth.). She has been president of 1,000 since 2009.

ARTHUR BOLGAN (’72 Arts.) received the fresh water Muilliak Conservation Society Lifetime Achievement Award. The Bureau of Land Management appointed JULIE WEIRIK (’72 DMV) to the National Wildlife Home and Home Advisory Board.

TED BAEXLER (’78 Comms.), president and CEO of Six Michelle Wine Estates and a WSU Regents, received the 2015 Lifetime Achievement Award from the wine industry for his many contributions.

RANDY FRNK (’76 Music) retired as Spokan’s Mt. St. Helens High School choir director after 32 years. SRBC Wealth Management awarded Tri-Cities branch manager RAD FISHER (’78 Bus. Admin.) with its Dick McFarland Volunteer of the Year Award. He focuses on children’s literacy projects.

MIKE CHURCHILL (’82 Soc. Sci.) worked as a sales and marketing executive with Aspen Antiques, where he led Aspen’s manufacturing, supply chain, and quality departments. Penn State University awarded AMY FREEMAN (’82 Const. Mgmt.), assistant dean of engineering diversity, with the 2015 Council of College Multicultural leadership Way Power Award.

MIKE CHURCHILL (’82 Bus. Admin.) is the new president of finance and administration. After 30 years in the Air Force, KEVIN MARTIN (’86 Bus. Admin.) joins Ascend Ohtsford & Associates in Florida as director of new business development. ALLISON REEVES-HELPHN (’84 Hotel and Restaurant Admin.) is celebrating the tenth anniversary of her and her husband’s wine shop, The Wine Alley in Renton.

The U.S. Forest Service named LEANNE MARTIN (’97 PhD Sci.) as forest supervisor for the northern region, which spans five states. ANTHONY LAROSE (’82 MA Crim. L., ’97 PhD Pol. Sci.) published a mystery novel, Catedral of Gold, inspired by a research trip to study police in Colombia.

Randy Frank, a retired music teacher at Spokan’s Mt. St. Helens High School, received the Dick McFarland Volunteer of the Year Award from SRBC Wealth Management.

30,000 COUGS

Want You to Join Them (and Us).

Last spring, the WSU Alumni Association exceeded 30,000 members for the first time. With members joined because of the amazing events, exclusive programs, special services, and fantastic discounts. Where Cougs get together, the more the better. Become a member and help us reach 40,000—because WSU Cougs are who we make the difference. Find us online at alumni.wsu.edu or call 1-800-ALUM-WSU.
He was director of Six Sigma process improvement at the Sheraton Seattle. Arizona hotels, the Westin St. Francis Hotel in San Francisco, and the resort. He got promoted accomplishing incremental. For Battersby, however, inspiration is seismic but had taken root. For Battersby, however, inspiration is seismic but had taken root. For Battersby, however, inspiration is seismic but had taken root. For Battersby, however, inspiration is seismic but had taken root. For Battersby, however, inspiration is seismic but had taken root. For Battersby, however, inspiration is seismic but had taken root.

The Sheraton added a tower and became Seattle’s largest hotel in 2007, with 1,236 rooms, 44 meeting spaces, and 2 pools.

He will donate all royalties to wounded veterans, with a goal to raise a total of $10,000. The Sheraton Seattle’s new chef for Callam County Fire District 8. At the Grand Hyatt Martin named ROY STEVENS (’88 MFA) as vice president of global solutions. MARGARET GROGAN (’94 PhD Higher Ed. Adm.) will be the new dean of the College of Educational Studies at Chapman University. Clockman Water Environment Services in Oregon appointed GREGORY GIEST (’94 Physical Sci., ’95 MS Env. Sci.) as their new director. SUSAN YOUGHT (’76 VMD, PhD, Vet Med.) was named dean of the College of Veterinary Medicine at Oregon State University. MELVIN BOSTIC (’75, ’79 MS Civil Eng.) was selected as Spokane County engineer by the Spokane County Commission. His department will have 40 fewer employees than it did in 2009.

The Washington State Department of Transportation appointed KRIS STRICKLER (’98 Civil Eng.) as southwest regional administrator. JOSHUA MEIK (’95 EdSc, and Eng) was selected as the new assistant superintendent of the Moses Lake School District. JEFF YRAZABAL (’99 Arch.) received the AGC 2014 Young Architects Award. He is a principal at SRG Partnership in Portland, Oregon.

After 14 years as Park Middle School’s assistant principal, SHANAE ESSE’ (TRIMED) was named principal of the Kennewick school. He will begin his post next fall.

MIKE SULLIVAN (’92 MS, Econ.) is the new director of IT at the University of Washington.

SUSAN HAYASHI, president of the Seattle chapter of the Japan Society, is the new president of the Seattle chapter of the Japan Society. HAYASHI (’76 English-Lit.), was appointed to the position after a national search.

Three thoughts went through his mind: 1) Wow, it was a great day and a half. He was 18, an exchange student from Japan, and he had been in Japan a week. Someone handed him a book and asked him to read it in English pronunciation.

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The text contains a list of names and dates, possibly indicating a memorial or obituary section. Without further context or the ability to interpret the specific content of the list, it's difficult to provide a coherent summary. The text seems to be formatted in a way that each name is followed by a date, which could indicate a list of deceased individuals. If this is indeed a memorial section, it would typically include information such as names, dates of birth and death, and sometimes brief biographical notes or achievements. Without specific information about the context or the nature of the list, it's challenging to provide a detailed account of the content. If you need further assistance or have specific questions about the text, please let me know!
IN Memoriam

MA-Mat., 72, March 1, 2015, Modesto, California. LOYD THOMAS SWAIN (71 Curns), 66, March 30, 2015, Richland.


MA-Mat., 72, March 1, 2015, Modesto, California. LOYD THOMAS SWAIN (71 Curns), 66, March 30, 2015, Richland.


“For a warrior, to be harmonious is to flow, not to stop in the middle of the current and try to make a space of artificial and impossible peace. He knows that he can only give the very best of himself under conditions of maximum tension... Ask yourselves these questions: What am I doing with my life? Does it have a purpose? Is it right enough? A warrior accepts his destiny, whatever it may be. However, he fights to change things, and he makes something exquisite of his passage on Earth.”
—Carlos Castaneda

This quote by Carlos Castaneda, a 1960s shaman and spiritual writer, was included in the program of Erich Joseph Lear’s memorial service, held on March 29, 2015, in Bryan Hall Theatre. Castaneda’s books had a profound effect on how Lear approached both life and death. Erich stated his career approach was “to help people reach their goals.” This was evident in his work as an administrator, educator, mentor, and friend.

Erich earned his college degrees in violin performance and was an accomplished musician, playing in a variety of orchestras and chamber ensembles. He began his academic career as a teacher but soon realized that his true calling was as an administrator. While he was a philosophical thinker, Erich was also pragmatic and the combination made for a strong leader. First as the director of the School of Music at WSU and later as the dean of the College of Liberal Arts, he impressed people with his brilliant mind and ability to see both the big picture and the details within. Colleagues were often amazed at how his mind worked, similar to a giant spreadsheet, whether discussing budgets, architectural drafts, or long-range planning for a program. And yet through it all he was humble and respectful of other ideas and viewpoints.

For me, Erich was my mentor, colleague, and dear friend. In honor of his retirement in 2011, I performed a voice recital entitled “Words of Wisdom” with pianist and WSU professor Gerald Berthiaume. Lear loved Mahler’s music, and the songs included this lyric:

I have died to the world’s turmoil and rest in a silent domain.
Surrounded by those he dearly loved—his wife, Jane, and his daughters, Sarah and Rachel—Erich lost his battle with cancer on February 18, 2015, leaving this world much too soon. What he left behind was a wonderful legacy of dedication to his profession, students, family, and friends.

BY JULIE ANNE WIECK

Julie Anne Wieck is an associate professor of music at WSU.
HOW DO YOU MAKE THE BEST CHOCOLATE CHIP COOKIES IN THE UNIVERSE?

You've got to know your dough. Whether you want chewy cookies or crispy dunkers, it's all about chemistry. Especially when it comes to the flour.

At the wheat lab on the Washington State University campus where my friend Doug Engle works, scientists test out different kinds of flours to find out which kind works best. They've got baking down to a science.

Different types of wheat grown in the west come into the lab for testing. Their first stop is the flourmill.

The machinery at the mill grinds up wheat kernels and makes them explode. When the kernels explode, they turn into tiny flour particles that will impact how the cookies look and taste.

While an explosion might sound like it damages the wheat kernel, it actually happens fast enough to keep the storage compartments for the long, sugary chains of molecules—the starches—from blowing apart. You need starch in your flour to help soak up the liquids in the dough and help give the cookies their form. If the storage compartment, or starch granule, breaks then liquids will flood the cookie.

Cookie structure also depends on proteins. Cookies have protein, but not a whole lot. So, unfortunately we can't just make cookies for dinner.

At the lab, scientists test out flour that comes from either hard or soft wheat kernels. Hard wheat is great for baking bread, but doesn't work as well in cookies.

"What makes the best cookie is soft wheat," Engle explained. "If you bite into a wheat kernel and it's softer, it will make a better cookie." All wheat started out soft, but over centuries, hard wheat developed. Scientists aren't totally sure why there are two kinds, but they can tell them apart when they look closely at their structures.

Some of my mice friends helped with wheat research here at WSU. They tried both kinds and preferred soft wheat to hard wheat. We don't know exactly why or how they can tell them apart, but soft wheat is easier for them to chew. Scientists, on the other hand, can use lab equipment to measure the differences.

In the wheat lab, they measure the quality of a cookie by how it spreads in the oven. Most cookie recipes call for all-purpose flour. Usually it contains mostly hard wheat flour so to balance out the dough they call for more water and butter.

With hard wheat, the starches suck up too much of the water in the dough and the cookie shrinks when it bakes. Soft wheat makes a cookie softer and bigger.

After talking to Engle about cookies, I was getting thirsty. Thankfully, the lab of cookies was just a short walk away from a place where you can find milk courtesy of the university dairy cows.

Sincerely,

DR. UNIVERSE
A celebration of
the life and legacy
of Elson S. Floyd

_In the service of education_

August 26, 3 p.m.

Beasley Coliseum

Washington State University

Pullman
The tenth president of Washington State University, Elson S. Floyd, arrived in Pullman with aspirations to lead the University into a new era of prestige and growth. Even though Floyd faced an unprecedented budget crisis that drastically cut state funding, an uphill effort to establish a medical school, and a closely-held personal struggle with illness, he worked tirelessly toward WSU’s land-grant mission of service and access to education—and achieved his goals.

Charismatic and intuitive, decisive and visionary, Floyd as a leader inspired the Cougar nation. In just eight years, he elevated the University in student access and diversity, research and private funding, academic and campus expansion, and service to the state.

Floyd died June 20, 2015, in Pullman, after a battle with colon cancer. He was 59. In the wake of his passing, condolences and appreciation flooded into the campus and social media from students, alumni, dignitaries, and state and national leaders. He was remembered not just as an exceptional leader, but as a kind and loyal man who cared deeply about students, family, friends, and colleagues.

“I have a hard time thinking of when one Washingtonian’s loss has been this noted and appreciated. It was very profound all over the state,” says Washington Gov. Jay Inslee. When he met Floyd in 2007, says Inslee, “I remember thinking, this is a real comet that’s going to light up the state. And he did.”

Inslee and others recall Floyd’s warm smile, emotional intelligence, work ethic, and his unselfish and sincere desire to promote education.

“He was somebody who was driven to succeed and change the world. He had a drive and a will that was incomparable. But he was driven for the greater good. It wasn’t about Elson Floyd. It wasn’t about WSU. It was what WSU and Elson Floyd could do for you,” says WSU Interim President Daniel Bernardo ‘85 PhD.
Floyd's commitment to education began in Henderson, North Carolina, where he was born on February 29, 1956. The oldest of four boys, he was raised by his mother Dorothy and father Elson, neither of whom graduated from high school but desired an education for their sons. Dorothy said that, as a child, Floyd would do math problems in the sand because they couldn't afford paper.

"Dr. Floyd was a rags to riches guy. He was afforded a higher education because of scholarships and financial aid. He was all about providing that chance to others," says Bernardo.

Because of a scholarship opportunity, Floyd was the first African American to graduate from Darlington School, a prestigious private institution in Rome, Georgia. He excelled at school, both academically and socially as president of the student council, vice president of the honor council, and a three-sport athlete.

He went on to college at the University of North Carolina, where he received his undergraduate and graduate degrees. Floyd began his career in higher education there as an assistant dean for student life. He also met and married the love of his life, Carmento.

At UNC, he was afforded a higher education opportunity, Floyd was the first African American to graduate from Darlington School, a prestigious private institution in Rome, Georgia. He excelled at school, both academically and socially as president of the student council, vice president of the honor council, and a three-sport athlete.

When Floyd applied to be president as WSU, he immediately impressed the leaders of the University. Bernardo was dean of the College of Agriculture, Human and Natural Resource Sciences (CAHNRS) and a member of the presidential search committee when he met Floyd at the first interview.

"I was a little bit cautious because he didn't come up through the academic ranks. Then he spoke and two minutes into it, I knew who would be the next president of Washington State," says Bernardo.

WSU Regent Michael Worthy also recalls how Floyd's magnetic presence and confidence, without arrogance or self-aggrandizement, won over the Board of Regents.

"There was no dissension; it was unanimous. He was the one," says Worthy.

Leading the state's university

Floyd became WSU's first black president in 2007, and he soon articulated a strategy of growth for the University, by connecting to its roots.

"We will not fulfill our potential as an institution, we will not keep faith with the vision of those who came before us, by taking half-steps and half-measures," said Floyd in 2008. "We are building the intellectual capacity and scientific acumen to become one of the leading land-grant universities in the country."

Bernardo, who was later appointed as provost, felt heartened by Floyd's plans to return WSU to its origins. "As someone who was educated and worked at only land-grant institutions, it really rang true for me," he says. "Not land-grant institutions, but land-grant in terms of agriculture, but land-grant in terms of access to higher education for the population of the state, the outreach and engagement of the University to all communities in Washington, and the application of our research to solve problems in the state."

John Gardner met Floyd at Missouri, where he was dean of the College of Agriculture and then vice president of research under Floyd's leadership. Gardner joined Floyd at WSU in 2007. Now WSU vice president for development, Gardner says, "He saw in WSU a public research land-grant university that had tremendous potential, an institution well-poised to have a much bigger voice, a much bigger presence, a much bigger impact."

One area that needed cultivating was WSU's relationship with the agriculture industry.

"We had sort of lost touch with the farmers in Washington state. Even though CAHNRS did good work with them, they didn't get the sense that it was a priority for the University. That was one of the first things Dr. Floyd did, to reestablish that connection with the ag community," says Worthy.

Another of Floyd's earliest endeavors was an ambitious tour to each of the state's 39 counties to spread the word about WSU and its academic and service mission.

"That entire tour set the course for his presidency because he was articulating the vision that we were in every county to serve the people of the state," says Bernardo.

Back on campus, Floyd quickly became a very visible and welcomed presence for the students. They affectionately called him "L El" when he sat with them at sports events and greeted them on campus. As a student, Rafael Pruneda remembers when he first saw the Floyds at the all-campus picnic in 2007.

"He stood out because of his presence, and Mrs. Floyd had on this big, beautiful hat. I remember them walking from Beasley Coliseum to Mooberry Track and saying hello to everyone," says Pruneda.

Soon after Floyd became president, the worst fiscal crisis in University history struck in 2008, during the recession. Over the next several years, state funding was cut by 52 percent. Undaunted, Floyd was forced to make tough budget decisions, but never lost sight of his goals.

Floyd was known for his transparency and honesty, and it was never more apparent than during the budget problems. He made it clear that he would safeguard WSU students, faculty, and staff as much as possible.

"From a faculty perspective, his leadership through the economic crisis, his extraordinary commitment to students and faculty during that time and trying to protect us, was impressive," says Laura Griner Hill, professor and chair of the human development department.

"He made wise decisions that were both financially prudent and compassionate that brought us out of that crisis in amazingly good shape."

Although tuition went up and some programs were cut, Floyd saw the tight budget times as an opportunity to focus the University on areas with demonstrated strength, such as veterinary medicine, agriculture, communication, and engineering.

"It made us a very different university—a lot more nimble and entrepreneurial and one that is..."
President Floyd built on the traditions and the promise of WSU to make it the place it is today.
marble or granite on an edifice. It’s built on people’s lives because he opened doors to them.”

Many people who worked at WSU also saw that Floyd was invested in their success. “Elson was chief among my great mentors,” says Netzhammer. “He wanted to give you confidence in the decisions you were making, yet bring you along in his vision. He was truly one of the rarest of people.”

Gardner says a major part of people’s commitment and connection to Floyd came from Floyd’s belief in unqualified loyalty. “I used to believe loyalty should be questioned. He taught me that loyalty stands on its own merits.”

Regent Worthy often witnessed Floyd’s honesty and loyalty. “He was absolutely a man of his word. If you heard it from Elson Floyd, there was never a retreat,” he says. “In the very public role as president of Washington State University, he realized there was a lot of potential for misinterpretation of his intention. He always sought to be as clear and deliberately spoken as he could be.”

Floyd was admired for his diligence, even beyond his position at WSU. “He had a work ethic like I’ve never seen,” says Worthy. Worthy points to Floyd’s role as one of the most prominent African American educators in the country, chairman of the Pac-12 Conference, a member of the Knight Commission, a trustee at Oregon State University appointed by Oregon Gov. John Kitzhaber, and an active member of the Black fraternity Alpha Phi Alpha.

On a personal level, Floyd was known to welcome students and others into his home, and even cook for them at times.

“He had a really good Southern hospitality about him, both he and his wife. They were really proud of where they were from. They made sure any guests that came into their home were welcome. Whether it was a student or the governor, they were always treated well,” says Pruneda.

He also remembers lighter moments, such as when Floyd was walking across campus during homecoming week and saw students dancing the “Electric Slide” on the mall. “He was watching us and then he stopped and started electric sliding with us. He had a big smile on his face. Not a lot of people can say they saw a university president electric slide on the Terrell Mall,” says Pruneda.

Anecdotes of Floyd’s compassion abound at WSU and beyond. “As a person, there was a tender side to Elson that some people didn’t know,” says Bernardo.

A Pullman grocery store clerk tells of helping Floyd at the checkout line. A teenaged boy behind him had some flowers, and Floyd asked who they were for. “My mother,” the boy replied. Floyd smiled, said, “That’s a fine thing,” and paid for the boy’s flowers.

In simple acts of kindness and his belief in people, Floyd showed that he was a man of faith, says Worthy. “I didn’t see it as clearly until I had an opportunity to go to North Carolina for the memorial service with his family and his colleagues in his hometown.”

The memorial service in the Henderson church was attended by hundreds of Floyd’s family and friends as they laid him to rest and remembered the man they admired and loved.

Floyd is survived by his beloved wife, Carmento; his mother, Dorothy; his daughter, Jessica Floyd Middlebrooks, (her husband Shawn) and granddaughter Victoria; his son, Kenneth Edwards and granddaughters, Kenae’ and Kennedy, all of North Carolina; and brothers, Michael and Dennis Floyd of North Carolina, and Garrett Floyd of Tyler, Texas.

In lieu of flowers, the family suggests memorial gifts to honor President Floyd be made to the Elson S. Floyd Founders Fund for the WSU College of Medicine.