Features
Eradicating a worldwide deadly disease by using an old remedy. 24

Long viewed as the stuff of science fiction, artificial intelligence has now stormed into the mainstream. 30

Upfront
Painstakingly transforming farmland into an arboretum may be rewarded with an iconic insect’s survival. 8

Need a new computer? Just hit “Print.” 11

After beating the odds, they’ll soon be number one. 16

The healthy innovations of student entrepreneurs 19

Cover: Curving road in the Olympic Peninsula (Photo Mason Vranish)
Left: Diverging path on Dog Mountain in Skamania County (Photo Ben Chase)
real-world experience and hands-on learning in every degree. it’s that approach that helped victor charoonsophonsak secure a job before his graduation from washington state university. as a mechanical engineering student, he worked with a faculty mentor on research to improve food safety. victor’s exceptional student experience is one of the many reasons why wsu is ranked the #1 public university that adds the most value to students’ careers. (money magazine, 2016)
Real-world experience and hands-on learning in every degree.

It’s that approach that helped Victor Charoonsophonsak secure a job before his graduation from Washington State University. As a mechanical engineering student, he worked with a faculty mentor on research to improve food safety.

Victor’s exceptional student experience is one of the many reasons why WSU is ranked the #1 public university that adds the most value to students’ careers. (Money Magazine, 2016)
Retiring?

Marriage, children, career move, grandchildren, retirement.

Our lives are full of life-changing moments that make us stop and reflect on taking care of the people and causes that mean the most to us. Wherever life leads you, consider being a part of creating a bright future for Washington State University through your estate plans.

Call the WSU Foundation Gift Planning Office at 800-448-2978 or visit foundation.wsu.edu/giftplanning to create your legacy today.
Left turns. I recently learned that drivers for UPS make 90 percent of their turns to the right. Since 2004, the package delivery company has had a policy to avoid left turns. They save millions of gallons of fuel and dollars each year because there’s less idling.

While I applaud the UPS effort to save gas and reduce emissions, there’s still something adventurous about the left turn, the unexpected veer in a new direction. We often refer to a left turn as a complete shift in our lives. Some of us even change our entire careers, such as Washington State University alumni Berenice Burdet, Richard Larsen, and Robb Zimmel, who all shifted from other work into winemaking. The allure of the grape, its cultivation, and its fermented result drew them from such disparate occupations as neuroscientist, plant pathologist, and an Army field medic. They couldn’t be happier.

Another happy group around Pullman are the butterfly fans. Monarch butterflies took their own left turn last summer and visited the campus’s arboretum for the first time in 25 years. Wildlife ecologist and WSU professor Rod Sayler, who planted milkweed to attract the iconic orange-winged insects, hopes the monarchs return again this summer. Visitors are invited to look for themselves, since the pollinator gardens are open to the public in the expanded arboretum.

Whether one takes a left or a right turn, a decision must be made. That’s the crux of programming computers, and specifically artificial intelligence, for computer scientist Matt Taylor, director of WSU’s Intelligent Robot Learning Laboratory. He’s researching how computers can teach each other, learn, and adapt to make complex decisions. A more capable AI could help the elderly remain in their own homes longer or protect apple orchards from crafty birds.

Another example is UPS, which benefits from the AI in their custom GPS called Orion. It’s used to calculate the most efficient route for drivers. Even though the computer favors right turns when planning, UPS manager Jack Levis told CNN that, “The hardest part was making it think more like a driver and less like a computer.”

Of course, every computer decision has consequences, and this issue’s story on AI takes a dive into the possibilities and risks of smarter computers.

Humans, too, make choices in their lives that can have a profound effect. First-generation students face an uphill battle to get into college, even more so to graduate, but the rewards can be significant when they succeed. So when those 30 percent of WSU students, first in their family to go to college, take a left (or right) turn onto a WSU campus, they’re choosing a path that fits exactly with our mission of access.
**Waste not**

I enjoyed reading “Waste Not” in the Spring ’17 issue of Washington State Magazine. I learned a lot and was especially intrigued by the part about microwave sterilization and preservation.

I thought I would clarify to readers that, while composting food waste still releases greenhouse gasses, if treated properly with balanced carbon-to-nitrogen ratios, aeration, and moisture, decaying food waste favors carbon dioxide and releases less methane than that same material would in a landfill, where moisture, aeration, and the rot recipe are far from optimal. Methane is a much more potent greenhouse gas than carbon dioxide.

Animal husbandry is the missing link (in your excellent article) between rescuing leftovers and composting. That fermenting fruit salad at the back of the fridge, though no longer fit for human consumption, would just suit the taste of the five hens in my front yard. Though we might not all have the space or expertise—or zoning privileges—to raise goats or hogs, laying hens are some of the easiest and most rewarding animals to keep. Many urban codes have been updated in recent years to allow backyard chickens in the city, and instructional resources for beginners abound.

Washington State University Extension’s online resources are a great place for my fellow readers to start learning about backyard animal husbandry and proper composting methods if they haven’t already.

---

**Olympic connections**

In “Coug at the Olympics” in the Talkback section of the Fall ’16 issue of Washington State Magazine, Don Brust asked the question regarding what other Cougs had the opportunity to go to the Olympic Games. I was a biathlon judge for the ’80 Winter Olympics in Lake Placid, an official for the ’84 Summer games in L.A. (where I wrote the official procedure manual for all 13 summer Olympic shooting events), and was a biathlon coach for the 1988 Winter games in Calgary. Additionally, I coached rifle shooting at the Colorado Springs Olympic Training Center throughout the 1980s and into the 1990s. My neighbor, Richard Zollars, also worked the winter Olympic downhill ski events in the Salt Lake games and maybe other games.

**Noteworthy class note**

I thoroughly enjoyed the wonderful Class Notes section article on Dan Maher. In the ’70s, a “guitar every 30 feet” was indeed the case. In that era my friends (and WSU alumni) Mary Brelsford, Bonnie Channing, Drew Zimmerman, Kurt Bergeron, Carl Eckhardt, and my brother Jim wore our fingers raw jamming at the K-House (Koinonia House). The skills I learned and the friends I made continue in my life today. I still play my 1970 Martin and jam with brother Jim. Those memorable days of Vietnam War campus unrest, Palouse River floods, the stadium fire, student strikes, and others were balanced with the laughter, camaraderie, and easy flow of music created by fellow musicians in the intimate surroundings of the K-House. Go Cougs!

**Correction**

Per WSU media guides, Jeanne Eggart Helfer (1,967) is the leading career scorer for women. Isaac Fontaine (2,003) scored more points in his career. The article in our Spring ’17 issue mistakenly stated she was WSU’s all-time leading scorer in WSU basketball.

---

**In his memory**

I was saddened to read in your Winter 2016 issue of the passing of Henry Zimet ’45 DVM. Dr. Zimet maintained a veterinary practice in nearby Moscow, which conveniently served as a means for pre-vets to gain “practical” experience required by the admissions committee at the vet school. He also would provide helpful advice to anyone who asked, and always as a devoted alumnus. Dozens, if not hundreds, of WSU students benefited in this way from Dr. Zimet’s generosity and assistance over the years; in addition to me, I recall at least four others in my class who were helped by his kindness and support 40 years ago. I invite those with a similar experience to join me in returning the favor by making a donation to the vet school in his memory.

---

**STEVE NIEMI, ’82 DVM**

Cambridge, Massachusetts

**Olympic downhill ski events in the Salt Lake games and maybe other games.**

**RICHARD DOMEY, ’80 PHD**

---

**In his memory**

I was saddened to read in your Winter 2016 issue of the passing of Henry Zimet ’45 DVM. Dr. Zimet maintained a veterinary practice in nearby Moscow, which conveniently served as a means for pre-vets to gain “practical” experience required by the admissions committee at the vet school. He also would provide helpful advice to anyone who asked, and always as a devoted alumnus. Dozens, if not hundreds, of WSU students benefited in this way from Dr. Zimet’s generosity and assistance over the years; in addition to me, I recall at least four others in my class who were helped by his kindness and support 40 years ago. I invite those with a similar experience to join me in returning the favor by making a donation to the vet school in his memory.

---

**STEVE NIEMI, ’82 DVM**

Cambridge, Massachusetts

**Olympic downhill ski events in the Salt Lake games and maybe other games.**

**RICHARD DOMEY, ’80 PHD**

---

**In his memory**

I was saddened to read in your Winter 2016 issue of the passing of Henry Zimet ’45 DVM. Dr. Zimet maintained a veterinary practice in nearby Moscow, which conveniently served as a means for pre-vets to gain “practical” experience required by the admissions committee at the vet school. He also would provide helpful advice to anyone who asked, and always as a devoted alumnus. Dozens, if not hundreds, of WSU students benefited in this way from Dr. Zimet’s generosity and assistance over the years; in addition to me, I recall at least four others in my class who were helped by his kindness and support 40 years ago. I invite those with a similar experience to join me in returning the favor by making a donation to the vet school in his memory.

---

**STEVE NIEMI, ’82 DVM**

Cambridge, Massachusetts

**Olympic downhill ski events in the Salt Lake games and maybe other games.**

**RICHARD DOMEY, ’80 PHD**

---

**In his memory**

I was saddened to read in your Winter 2016 issue of the passing of Henry Zimet ’45 DVM. Dr. Zimet maintained a veterinary practice in nearby Moscow, which conveniently served as a means for pre-vets to gain “practical” experience required by the admissions committee at the vet school. He also would provide helpful advice to anyone who asked, and always as a devoted alumnus. Dozens, if not hundreds, of WSU students benefited in this way from Dr. Zimet’s generosity and assistance over the years; in addition to me, I recall at least four others in my class who were helped by his kindness and support 40 years ago. I invite those with a similar experience to join me in returning the favor by making a donation to the vet school in his memory.

---

**STEVE NIEMI, ’82 DVM**

Cambridge, Massachusetts

**Olympic downhill ski events in the Salt Lake games and maybe other games.**

**RICHARD DOMEY, ’80 PHD**

---

**In his memory**

I was saddened to read in your Winter 2016 issue of the passing of Henry Zimet ’45 DVM. Dr. Zimet maintained a veterinary practice in nearby Moscow, which conveniently served as a means for pre-vets to gain “practical” experience required by the admissions committee at the vet school. He also would provide helpful advice to anyone who asked, and always as a devoted alumnus. Dozens, if not hundreds, of WSU students benefited in this way from Dr. Zimet’s generosity and assistance over the years; in addition to me, I recall at least four others in my class who were helped by his kindness and support 40 years ago. I invite those with a similar experience to join me in returning the favor by making a donation to the vet school in his memory.

---

**STEVE NIEMI, ’82 DVM**

Cambridge, Massachusetts

**Olympic downhill ski events in the Salt Lake games and maybe other games.**

**RICHARD DOMEY, ’80 PHD**

---

**In his memory**

I was saddened to read in your Winter 2016 issue of the passing of Henry Zimet ’45 DVM. Dr. Zimet maintained a veterinary practice in nearby Moscow, which conveniently served as a means for pre-vets to gain “practical” experience required by the admissions committee at the vet school. He also would provide helpful advice to anyone who asked, and always as a devoted alumnus. Dozens, if not hundreds, of WSU students benefited in this way from Dr. Zimet’s generosity and assistance over the years; in addition to me, I recall at least four others in my class who were helped by his kindness and support 40 years ago. I invite those with a similar experience to join me in returning the favor by making a donation to the vet school in his memory.

---

**STEVE NIEMI, ’82 DVM**

Cambridge, Massachusetts

**Olympic downhill ski events in the Salt Lake games and maybe other games.**

**RICHARD DOMEY, ’80 PHD**

---

**In his memory**

I was saddened to read in your Winter 2016 issue of the passing of Henry Zimet ’45 DVM. Dr. Zimet maintained a veterinary practice in nearby Moscow, which conveniently served as a means for pre-vets to gain “practical” experience required by the admissions committee at the vet school. He also would provide helpful advice to anyone who asked, and always as a devoted alumnus. Dozens, if not hundreds, of WSU students benefited in this way from Dr. Zimet’s generosity and assistance over the years; in addition to me, I recall at least four others in my class who were helped by his kindness and support 40 years ago. I invite those with a similar experience to join me in returning the favor by making a donation to the vet school in his memory.

---

**STEVE NIEMI, ’82 DVM**

Cambridge, Massachusetts

**Olympic downhill ski events in the Salt Lake games and maybe other games.**

**RICHARD DOMEY, ’80 PHD**
This August, Washington State University’s Elson S. Floyd College of Medicine will welcome its charter class.

The MD program gives students a rich breadth and depth of clinical experience. Innovations in teaching and technology prepare tomorrow’s physicians to thrive in a rapidly evolving health care environment. Students emerge ready to deliver outstanding care to individual patients. In addition, they know how to lead change to improve the health of entire communities.
There he is!” I look up as tattered orange wings flutter above the sunflowers. A lone male monarch butterfly hovers near the milkweed patch, gallantly hoping, says wildlife ecologist Rod Sayler, for the arrival of a female.

The scene took place early last August at the Washington State University Arboretum and Wildlife Center, where for the first time in 25 years, Sayler documented the iconic butterflies living and breeding on campus. Weeks earlier, to his astonishment, he’d found a handful of monarch caterpillars devouring the leaves of recently restored showy milkweed plants.

“The monarchs were a big surprise for me,” he says. “It’s the first time I’ve seen them at WSU except for fly-bys. I thought, ‘Wow, it finally happened!’”

Sayler, an unabashed naturalist known for his signature straw hat, is project director for the arboretum and an associate professor in the School of the Environment. In an age of climate specialists and policy wonks, Sayler revels in the down-to-earth study of nature in all its intricate bounty.

For the last nine years, he and his colleagues have painstakingly transformed a wedge of farmland into a botanical garden alive with wildflowers, native bees, meadowlarks, amphibians, rabbits, deer, and more. It’s a campus dream over a century in the making, says Sayler, one that finally came to fruition in 2008 when the 100-acre conservatory was approved by former WSU president Elson S. Floyd and the Board of Regents.

Today, the arboretum’s rolling hills are threaded with public walking paths that lead through a showcase of environmental exhibits: sagebrush rangeland, native Palouse prairie, a ponderosa pine forest, grassy savannas, wetlands, and blue camas meadows. Interspersed here and there are pockets of milkweed.

While some arises naturally in disturbed soil, most of the milkweed is carefully grown from seed and transplanted with the help of Sayler’s restoration ecology class. It’s a slow process—the plants take two years to mature to the flowering stage when seedpods can be harvested for further propagation.

The arbor etum is also dotted with small ponds, the largest of which is located in a hardwood forest affectionately known as the “Woodland.” Toward the north end of the reserve, Sayler has developed three smaller ponds near a series of flower-filled pollinator gardens.

It was on a lush milkweed plant in these gardens that Sayler first spotted the striped monarch caterpillars last July. The parent butterflies, exhausted by their long migration, had been drawn by the pink and white blossoms.

The western monarch, which typically overwinters in eucalyptus trees along the California coast, travels north each spring in search of milkweed plants on which to lay eggs. Though adult butterflies eat nectar and fruit juice, the caterpillars must have milkweed for normal growth and development.

Sayler says breeding monarchs only live two to five weeks, so it takes several generations to reach Washington state. Once here, the monarchs populate the Palouse until mid-August when the last generation to hatch returns south.

The discovery of monarchs at WSU comes at a time when the insect’s survival is threatened by habitat loss in their overwintering grounds and the destruction of native milkweed by herbicides. Populations
of the once abundant eastern North American monarch have fallen by 80 percent since the mid-1990s.

The situation is so dire that the vermillion butterfly is getting assistance through former President Obama’s 2014 Pollinator Health Task Force aimed at promoting the wellbeing of honeybees and other pollinators like the monarch.

Sayler is also doing his part. On that hot afternoon last August, he invited me into his laboratory where five plastic jars sat on a workbench. Hanging from each lid was a small, emerald-green chrysalis containing a pupating monarch caterpillar. In about 10 days, they hatched into butterflies and Sayler released three males and one female into the wild.

“We’ll see if monarchs make it back here next year,” he said last fall. “Was this a unique event? Or will they be here on a regular basis? We’re not sure what we’ll find.”

This spring, visitors can take a look for themselves. The pollinator gardens are now open to the public and can be accessed from the arboretum parking lot via a meadow-like pathway complete with benches and the occasional bat box. Educational displays and demonstrations are in the works.

As a counterpoint to America’s increasingly urban lifestyle, Sayler says he wants to provide opportunities for school children to interact with and learn from nature. “We’re planning things like an ecological scavenger hunt and a sunflower forest with paths,” he says.

“It’s really important for our kids—and people of all ages—to be exposed to the outdoor world, not just to learn about problems with the environment and climate change, but to learn to love nature for what it is. To see a butterfly. To see frogs and tadpoles, you know. That’s the first step.”

It was a step that brought lifelong adventure for Sayler himself.

“I used to do this when I was a kid,” he says, looking out over the gardens. “I grew up in the Midwest where monarchs were common in the summer ... I studied them as a budding scientist. And we played in the grassy fields and ponds. Now, I’m an old man and back to where I started.”
Organic electronics on a roll

BY REBECCA PHILLIPS

In the near future, your local hardware store could include a “green electronics” counter where friendly clerks unspool sheets of plastic film and print devices while you wait.

Need a few more solar panels? No problem.

How about a flexible LED lighting strip? This roll over here.

Computer? Loudspeaker? Or maybe transparent, energy-producing panels for your greenhouse? On sale today!

Though the scene is hypothetical, the emerging technology for organic, thin-film polymer plastics is up and running in laboratories around the world, including those of the Collins Research Group at Washington State University.

Led by assistant professor of physics Brian Collins, the enthusiastic young team is part of an international effort to develop electronics composed of earth-abundant elements such as carbon, nitrogen, and oxygen. In contrast, today’s electronics are usually powered by silicon in combination with rare or toxic metals like silver, lead, mercury, and cadmium.

Collins says carbon-based polymer electronics offer clear advantages. For one, they are biodegradable and environmentally friendly. They are also compatible with human tissue and could potentially be used as brain implants for restoring movement to paralyzed limbs and vision for the blind.

Like plastic wrap, the polymers are flexible. And their properties are easily “tuned” or adjusted to meet the needs of various applications. They can also be made into inks for printing with inkjet or 3D printers. In fact, Collins foresees a day when an entire device could be printed at home—complete with battery, solar panel, and LED screen.

“It’s the technology of the future,” he says with a grin.

Indeed, the possibilities are limitless and all stem from the discovery of semiconducting polymers by a trio of Nobel-winning chemists in 2000. These plastic-like materials contain optical and electronic properties that are especially suited for transistors.

Collins describes transistors as small switches that are used to turn electrical signals off and on.

“Transistors allow you to use a tiny signal to control a huge machine,” he says. “They make computers possible. When you put in a request, billions of transistors coalesce to open logic gates, and then trigger memory, operations, and instructions. We need transistors to be able to control almost anything.”

In a recent study, Collins and research partners in France, Spain, and California created a bioelectronic “transistor” that mimics nerve function. The device could eventually be developed into a nerve bypass system, say for spinal injuries where brain impulses are blocked from reaching target muscles.

Through a brain implant, the device would allow a computer to “read” a patient’s desire to move, and send electrical signals directly to his hand or foot, bypassing the damaged nerves.

The technology could eventually lead to thought-controlled prostheses, as recently demonstrated in an Ohio man. Scientists at the Feinstein Institute for Medical Research in New York used an inorganic brain implant and bulky equipment to enable him to move his fingers after five years of paralysis.

Collins says organic polymers provide a more sensitive and biocompatible option—and could be made into small, permanent implants complete with computer and components.

Though organic electronics offer extraordinary potential, their commercial success will depend in part on the efforts of Collins’s research team. While chemists design and fabricate the polymers, it’s the physicists who help ensure they function well on the molecular level.

It turns out that polymers which seem so promising in the liquid form often perform poorly once printed and dried. For years, the enigma puzzled scientists.

It was Collins’s team who recently spotlighted the problem. Using a billion-dollar X-ray machine called a synchrotron, located at Berkeley National Laboratory, they found that polymer nanoparticles change configuration as they go from a liquid to solid state. It’s similar to the way water molecules change their arrangement to form ice.

The discovery came through Collins’s innovative development of X-ray techniques that can isolate and identify individual molecules. He is now able to view polymer nanostructure in a way never before possible. Once problems are identified, he tweaks or “tunes” the nanostructure to work more effectively.

The discovery came through Collins’s innovative development of X-ray techniques that can isolate and identify individual molecules. He is now able to view polymer nanostructure in a way never before possible. Once problems are identified, he tweaks or “tunes” the nanostructure to work more effectively.

So far, he has used the procedure to improve solar cells, organic LEDs, and a variety of transistors, including the new bioelectronic device. ✨
Space farming

Surviving the challenges of deep space exploration could rely as much on botany as astrophysics.

NASA sees plants not only as potential food sources aboard future spacecraft but as natural oxygen producers. The space agency is preparing for its first in-depth study of how growth and development of plants is affected by gravity, or more specifically the lack of it.

“The overall significance is what it could mean for space exploration,” says Norman G. Lewis, a Regents professor at Washington State University’s Institute of Biological Chemistry and principal investigator for the NASA-funded study. “Whether it’s colonizing planets, establishing a station, or for long-range space travel, it’s going to require maintaining air and food for artificially supported environments.”

The idea of growing food aboard spacecraft is nothing new. Several earlier experiments, in fact, already have demonstrated plants will grow in low Earth orbit. But the WSU-led effort goes beyond simply proof of concept.

The multidisciplinary project brings together scientists from Pullman, New Mexico, and the Los Alamos and Pacific Northwest National Laboratories for a study of how plants change in microgravity environments. Everything from their metabolism and genetics to protein and photosynthesis will be measured aboard the International Space Station. A control group of identical plants will be grown at the same time at Kennedy Space Center in Cape Canaveral, Florida.

The study will serve as a baseline or reference point for future NASA research, with the collection and analysis of big data sets showing changes in genes, proteins, and metabolites.

Among other things, the $2.3 million research grant will help determine whether plants develop the same characteristics, such as nutritional value and rates of oxygenic photosynthesis, in weightless environments as they do on Earth. The test facility at Cape Canaveral will duplicate the space station’s atmosphere so that gravity will be the only major variable.

Of particular interest will be the effect on carbon-absorbing compounds known as lignins, which plants use to form rigid outer cell walls to counteract Earth’s gravity and grow upright.

“In a microgravity environment, rigidity isn’t as important,” Lewis explains. “We know that astronauts and cosmonauts see bone and muscle loss. The body compensates by unloading what it thinks it doesn’t need anymore.

“So, with less lignin requirements, what will the plant think it should be doing? And what effect would those changes have?”

The connections between WSU and NASA’s space biology program run deep. Thora Halstead ’50 pioneered the research field for NASA and managed the space agency’s Life and Biomedical Sciences and Applications Division. Much of the awareness of how cells respond to low-gravity environments can be traced to Halstead’s early research.

Lewis worked with Halstead on research projects as early as the 1980s. Later, when Lewis was considering an offer to join WSU’s faculty in 1990 he happened to mention it to Halstead, unaware at the time that she was an alumna. She enthusiastically endorsed the idea, he recalls.

For the latest project, Lewis, coprincipal investigator Laurence Davin, and researcher Mike Costa have converted a portion of a Pullman lab to the same dimensions of the plant habitat that soon will be on its way to the space station. They designed the experiments with equipment and supplies that can fit into the available square footage, and using procedures that can be conducted without gravity.

“We’re trying to replicate what they’ll be doing there,” Costa explains.

One of the major challenges, for example, is watering plants. You can’t simply sprinkle water over soil because, like anything else in space, it floats away. The experiments will rely on absorbent fabric and materials that trap the moisture so seeds can germinate and roots can draw nourishment.

NASA wants the experiments ready to go for potential launch this fall.

“We’re developing a reference point for space biology going forward,” Lewis explains. “This is a new frontier.”

OUTERspaces

BY DAVID WASSON

WASHINGTON STATE MAGAZINE SUMMER 2017
Space Cougs

Since the 1960s, engineers, biologists, astronauts, and even historians who graduated from Washington State University have contributed to the exploration of the solar system. Here are just a few of the many Cougs involved in space research. If you know more, please visit magazine.wsu.edu/contact and send a message; we’ll add them to the list online.

THORA WATERS HALSTEAD ’50 pioneered the field of space biology and her research now is a critical piece of NASA’s plans to send astronauts to Mars. The microbiologist was a trailblazer at NASA both as a female scientist during the space agency’s early years and in recognizing the importance of researching the effects of low gravity on cellular biology. She retired from NASA in 1994 as manager of the Space Biology Program in the Life and Biomedical Sciences and Applications Division. She also served as the program scientist for a 1992 space shuttle mission.

Halstead was a founding member and past president of the American Society for Gravitational and Space Biology. She died March 9, 2016, at her home in Falls Church, Virginia, at the age of 87.

JOHN FABIAN ’62 was the first Cougar astronaut as mission specialist on the space shuttle Challenger II in July 1983. He received the WSU Regents’ Distinguished Alumnus Award that year. He flew aboard shuttle Discovery in 1985 and was the first space scientist to release a satellite from a spaceship and retrieve it after an orbit. In 2010, Fabian was named a Distinguished Member of the Association of Space Explorers, a nonprofit organization of over 375 individuals from 35 nations who have flown in space. Fabian was only the third astronaut or cosmonaut to be so honored.

DAVID LOZIER ’66 spent 40 years working at the NASA Ames Research Center at Moffett Field, California, including on the Pioneer Project that sent the first spacecraft to the outer planets. Pioneer 10 flew beyond the orbit of Mars through the asteroid belt and encountered Jupiter in 1973. After the flyby of Jupiter, Pioneer 10 headed on an escape trajectory out of the solar system.

More Cougs in space research:

NASA
ROB ROBERSON ’66—Leader with NASA programs for 19 years, including at the Jet Propulsion Laboratory and at NASA headquarters in Washington, D.C., until 1982. He worked on lunar science, sun-earth physics, earth observation science and applications, and technology transfer.

DAVID ATKINSON ’80, ’89 PhD Elec. Eng.—Former systems engineer at the Ames Research Center

FRANK PICHA ’90, ’92 MBA—Propulsion engineer at the Jet Propulsion Laboratory, including Mars projects

MHIHAIL PETKOV ’98 PhD Physics—Failure analysis at the Jet Propulsion Laboratory

JENNIFER ROSS-NAZZAL ’04 PhD History—NASA historian

AMY FELT ’16 Mech. Eng.—Fluid systems engineer

BOEING
ALLEN STORAASLI ’72 MS Mech. Eng.—Communication satellites

U.S. AIR FORCE AND LOCKHEED MARTIN
IRIS FUJURA BOMBELYN ’83 Eng.—Engineer, payload operations, and communications

BLUE ORIGIN
ERIC SORENSON ’85 Mat. Sci.—Manufacturing and process engineering

RONDALD BLEJNER ’11, ’13 MS Elec. Eng.—Fluid systems design engineer

ANDREW LINTON ’13 Elec. Eng.—Avionics engineer

FRANCO SPADONI ’15 Mech. Eng.—Aerospace engineer

SPACEX
AUSTIN SKYLES ’02 Comp. Sci.—Software engineer

THONG TRAN ’06 MIS—Programmer

MOHAMED NUUR ’07 Comp. Sci.—Software architect

ERIC BROWN-DYMKOSKI ’08 Mech. Eng.—Computational physicist

PETER KITZMILLER ’12 Mech. Eng.—Manufacturing engineer
The allure of winemaking has attracted a menagerie of professionals to the business. Washington State University’s viticulture and enology programs have lured aerospace engineers, Army medics, apparel designers, scientists, and many others to the field. Here, we bring you a few of the stories of those who have changed careers by hanging a left at wine.

**After years of dissecting rat brains, Berenice Burdet had had enough.**

The Argentinian neuroscientist was untangling stress’s web of physiological effects on the hippocampus. The stress we feel in a crammed subway train, Burdet says, affects our behavior by dampening affect. We become depressed, and activity levels decline. The same thing happens to overcrowded rats, and the effects can be traced in the brain.

But you have to kill the rat to see those changes in its brain, she says, “and a point came where I didn’t want to kill any more animals.”

“So I started looking on the internet to see what I could do in the wine industry.” Through a series of fortunate events, she connected with Markus Keller, Washington State University Chateau Ste. Michelle Distinguished Professor of Viticulture. “In Argentina, my family was always intrigued by the wine industry in Mendoza, and I had studied a little enology.”

Keller, for his part, jumped at the chance to hire an experienced biologist to study the molecular process of sugar transport in grape berries. How water and sugar move through grape vines and berries is key to helping vineyard managers produce great fruit—and to prepare for the effects of climate change.

As if shifting from neuroscience to the molecular biology of grapes wasn’t a big enough jump, Burdet recently headed back to Argentina’s world-class wine country... to open a brewery.

She laughs, saying, “I know it’s a bit odd, but I want to help open Argentina to craft brewing.” Argentinians are used to fairly light beers. “When my mom came to visit me at the WSU research station in Prosser, she couldn’t handle some of the beers we tried. But by the time she left, she loved IPA!”
Get married, have kids, move to a different part of the world—these are a few of the ways people initiate major changes in their lives. Not Richard Larsen. He walked across the parking lot.

Larsen worked for 21 years with the U.S. Department of Agriculture, studying the viral pathogens of important food crops, including beans, peas, chickpeas, and lentils.

Before he turned to science, though, “I majored in music performance,” he says. He was a professional clarinetist and vocalist before earning a doctorate in plant pathology.

“But I’ve always been fascinated by wine,” Larsen says. Soon after Larsen took the virology position with the USDA in Prosser, he met WSU’s wine science team, which was then based at the research center there. Larsen signed up for a palate training and discovered that he had a rare gift: He could detect not just small but truly minute differences in wines that most of us would say were from the same bottle.

When enologist Jim Harbertson joined the wine science team, “We hit it off right away,” Larsen says. “Jim has an amazing palate, so we formed an enological friendship.”

Harbertson and his colleagues embarked on an ambitious project, installing in Prosser the largest research winery in the Pacific Northwest. A winemaker was needed to manage the multitude of experiments the team wanted to conduct. Larsen got the job.

Now that the research winery has moved and expanded to the Tri-Cities campus, Larsen spends his days happily conducting experiments among a myriad of fermentation vats, teasing out the data that help inform decisions made by grape growers and winemakers in one of the world’s great wine regions.

It was a rainy evening in 2010 in a swampy region of southern Iraq, and Robb Zimmel was slogging through mud so thick it nearly swallowed his combat boots. A sergeant first class in the U.S. Army Reserves and leader of a 10-member forward surgical team, Zimmel was getting chores done in the medical tent after a busy day.

Wind whipped its way through the tent, causing the new soldiers to worriedly glance around. It almost sounded like gunfire.

A team of Navy SEALs burst in with several severely injured sailors. A medic with more than two decades of experience in the military and as a civilian, Zimmel jumped into action. He and his surgical team fought through the night finding emergency transport and performing blood transfusions. All of the sailors made it, though one nearly died.

As the Iraqi sunrise capped another sleepless night of nonstop, adrenaline-fueled battle to save his fellow Americans, Zimmel knew one thing with certainty. He needed a change.

“I can’t do this anymore,” he told his wife over the phone. Within a year, Zimmel was at WSU as a wine science student. Four years later in 2014, he graduated with a bachelor’s degree in viticulture and enology. By late 2016, Zimmel had released seven wines under his own label.

“What I like about the winemaking process is it’s a completely different contrast of what my past life was. Being in the medical field, there’s not a lot of joy involved. You’re always called to the worst of the worst. People are hurt. They’re injured. They’re sick. You learn a lot about what humans can do to one another in a bad way,” Zimmel says. “With winemaking, you come to an event, and there are smiles. People are happy. I get to be a part of a celebration.”

read Robb’s full story at: wsu.edu/125/perseverance

From left: Berenice Burdet in a Prosser WSU research vineyard (photo Robert Hubner). Richard Larsen (from video courtesy The Seattle Times) and Robb Zimmel (photo Robert Hubner) at the WSU Wine Science Center in Richland.
My name is Krystle Lyric Arnold and I am a first-generation college student.

To nearly 70 percent of the college population nationwide, those words mean little, but to those of us who are the first in our immediate families to pursue a college degree, the description carries weight, and for good reason.

Nearly 90 percent of first-gen students fail to obtain their college degrees. The majority of first-gen students are also low-income and the U.S. Department of Education says only 9 percent of students from the lowest income brackets graduate with a four-year degree, whether or not they are first-gen.

While everyone has their own background, many first-gen students share experiences similar to mine. Many of us grew up in poverty and several hours drive from the nearest college campus. Our families are often unable to help us financially in pursuit of a college education, or they don’t value such an education. So instead, we enter the workforce and we battle our socioeconomic status—quite often for a number of years—before we are able to consider a college education.

MARY JO GONZALES ’95 MA, ’01 PhD was a perfect example of a first-gen student at risk of failing to graduate.

Gonzales, the youngest of ten children, says she never expected to go to college—in part because she hit a trifecta of challenges. Gonzales was a low-income, minority, and first-gen student. She was also a single mother and a transfer student. Statistically, she had very little chance of obtaining a degree.

Fifteen years after receiving a doctorate and working for various universities throughout the United States, Gonzales has returned to WSU as the vice president of Student Affairs, which includes programs for first-gen students.

After high school, Gonzales intended to work rather than pursue college, but a favorite high school teacher decided she had greater potential. He encouraged Gonzales to apply to college and even helped her fill out the application that was due only a few days later. With the teacher’s encouragement, Gonzales realized she had a chance to pursue a higher education, not to mention even higher degrees. Before applying for graduate school at WSU, Gonzales says she had no idea what grad school was.

“It only takes one caring adult,” Gonzales says, for a student to realize their potential and to pursue it. With this in mind, Gonzales has dedicated her career to helping students like herself achieve academic and professional success. “I have to make a difference,” she says. “I have to give back.”

The Department of Education reports that first-gen students more often enter college several years after other students. In many
cases, this means the students are married or, like Gonzales, parents. These students are often closer in age and experience to their younger professors rather than their classmates. Transfer students often run into similar problems.

For example, Gonzales demonstrates the complications of being both a single mother and a graduate student. To balance her WSU coursework with being a mother, Gonzales would read textbooks to her daughter at bedtime. To make it fun, Gonzales would read each chapter in a sing-song voice.

Twenty years ago WSU did not systematically gather data on first-gen students, says Lucila Loera ’98 MED, WSU’s assistant vice president of Student Affairs. Since then, the University has made it a point to work with first-gen and other underrepresented students providing scholarship money, daycare, food pantries, and other services. It’s an important effort; WSU first-gen students comprise over 30 percent of students, and a similar percentage are minority students. Additionally, more than 40 percent of WSU’s transfer students are first-gen.

I met senior finance major Eliana Rodriguez rummaging through a plastic set of drawers in the food pantry run by the Student Affairs office. Like Gonzales, Rodriguez is a first-gen, transfer minority student. Rodriguez agrees that this can present more challenges.

There are numerous resources available to students but they can be hard to find, Rodriguez says. Finding programs that fit a student’s needs, or that the student fits into, “is half the battle. There’s no one who’s going to hold your hand.”

Eva Navarijo ’04, director of the First Scholars Program at WSU, says first-gen students often have trouble because, in many cases, they were not raised in a college-going culture.

Within some families, she explains, the idea of obtaining a college degree is established, and sometimes even expected, as early as grade school. The student works toward this goal throughout their K–12 education. Additionally, as incoming college students, family mentors can advise and encourage the students.

There are several “hidden tips and tricks” that first-gen, transfer, and minority students may not receive, Navarijo says, such as what classes to take in high school to better ensure acceptance to a university, how to first apply for financial aid once they’ve been accepted, or how to successfully transfer from a community college to a university. They may not know what programs are available to help, or how to find them.

For example, Navarijo tells the story of a first-gen student who failed her first semester at WSU. First-gen students often do poorly their first semester, but her parents felt that she must not be cut out for college. Despite programs designed to help students like this young woman, her parents packed her things and drove her home.

Gonzales says that although the number of first-gen students is increasing, universities often fail to acknowledge the differing experiences of each student and their needs.

She also believes these students are less likely to succeed because universities don’t teach them the professional skills they will need after graduation, such as negotiating salaries, money management, and loan repayment options.

According to the Department of Education, “Low-income students, first-generation college students, and minority students, in particular, are being underserved by the current system.”

“As universities we haven’t done our job,” Gonzales says.

But that’s changing. Gonzales, Loera, and others hope to improve support for WSU’s first-gen students. Loera would like to see a concerted effort to consolidate information and resources for all these students.

We have to let the students know that they are not alone, Gonzales says.

My name is Krystle Lyric Arnold and on May 6, 2017, I, along with Rodriguez and others, will have beaten the odds—we will be among the 10 percent of first-gen students who have succeeded. We will be university graduates.

Reading the benefits of tea leaves

Much of what is known, scientifically, about the arthritis-fighting benefits of green tea has in one way or another come from Salah-uddin Ahmed and his research group.

And it was Ahmed, after all, who helped establish that a phytochemical found in green tea essentially halts the progression of rheumatoid arthritis in lab rats.

It also was Ahmed who helped pinpoint where in the disease’s progression that the phytochemical, known as epigallocatechin-3-gallate or simply EGCG for short, is able to combat further degradation without blocking other cellular functions.

Now, with scientific evidence supporting green tea’s health benefits continuing to pile up, Ahmed hopes the research he and his group at WSU Spokane are conducting can move to the next level.

“What I would like to see is whether this could become an adjunct therapy in clinical settings,” says Ahmed, who began his scientific career as a toxicologist in New Delhi before transitioning to inflammation researcher at medical schools in the United States. He now serves as an associate professor at Washington State University’s College of Pharmacy. “This has really started moving in a lot of different directions.”

Although researchers still don’t know what causes rheumatoid arthritis, and EGCG testing has yet to move beyond lab animals, Ahmed believes green tea holds promise as a potential complementary therapy alongside traditional immunosuppressive treatments.

Rheumatoid arthritis is an aggressive disease that tricks the body’s own immune system into attacking itself, causing painful damage to joint cartilage, surrounding tissue, and bones. Currently, doctors treat the disease with drugs that suppress the body’s immune system to help slow the attack.

Those drugs, however, not only are expensive, but they leave patients vulnerable to other medical problems while their immune systems are compromised.

Ahmed wants to explore the possibility that EGCG, in combination with conventional medications, could improve patient outcomes if included as part of the first-line treatment plan developed by doctors. He theorizes that potential benefits could range from greater pain relief and slowed degradation to perhaps even reduced reliance on costly immunosuppressants at some point.

“This has not been tested in humans and would need to be thoroughly studied,” says Ahmed, who has spent 15 years researching inflammatory diseases. “But what we know so far indicates that there could be a benefit to a combination therapy like this and it should be looked at.”

The National Institutes of Health awarded Ahmed his first research grant to study green tea while he was with the University of Michigan Medical School. He moved his research into pharmacology in 2009 at the University of Toledo’s School of Pharmacy before accepting his faculty position at WSU Spokane in 2014.

Additionally, other autoimmune diseases such as type 1 diabetes and gout follow similar inflammatory pathways and green tea therapies might hold potential benefits in the fight against those conditions as well.

Meanwhile, the first steps toward documenting the ability of EGCG to improve patient lives already are getting started. One of Ahmed’s doctoral students, Sabrina Fechner, is studying whether pain perception is affected by consumption of green tea.

Ahmed, who has watched loved ones suffer with rheumatoid arthritis, is eager to evaluate the results.

But he’s mindful that these findings are from tests conducted only with lab animals and cautions against drawing premature conclusions.

“Since these findings are not tested in rheumatoid arthritis patients,” Ahmed explains, “patients must talk with their doctor before incorporating any dietary supplement to avoid any unwanted diet-drug interactions.”
Healthy innovators

A safe and sterile needle seems to be a basic idea when preventing infections. But how that needle is sterilized, especially in places where reuse is a common practice, spurred a good idea for a pair of Washington State University student entrepreneurs.

Emily Willard and Katherine Brandenstein came up with the idea of SafeShot, a lid that sterilizes a needle each time it enters the vial of medicine, as part of an entrepreneurship class. The two students started a company, won a health business contest last spring, and headed to Tanzania early this year to research how their product could be used in a real setting.

It’s a great example of what the entrepreneurship program wants to give students, says Marie Mayes ’87, ’04 MBA, director of the WSU Center for Entrepreneurial Studies in the Carson College of Business.

Mayes coteaches classes on entrepreneurship with Howard Davis in the Voiland College of Engineering and Architecture’s Harold Frank program. Started more than a decade ago, it’s one of the first such programs in the country.

“I might teach a business concept and Howard will interpret it into engineering speak. Likewise he’ll say something in engineering and I try to interpret in terms our business students understand,” says Mayes.

They combine students into interdisciplinary teams, and the instructors try to instill an entrepreneurial attitude on projects chosen by the students, so the teams can take calculated risks.

Students also learn about the entrepreneurial process. “Basically that’s business education for students who are not business majors,” says Mayes, noting that they learn customer assessment, costs, revenue models, and basic financial analysis.

Companies love that students have worked on such diverse teams. “Even if students don’t launch an actual venture out of this program, they’re very attractive to industry,” says Mayes.

In coordination with the Paul G. Allen School for Global Animal Health, Mayes took Willard and Brandenstein to Tanzania earlier this year, where they watched needle use practices on animals, visited clinics, and presented at the Nelson Mandela African Institute of Science and Technology.

They were joined by two other undergraduate entrepreneurs, Annalise Miller and Victor Charoonsohnsak, who developed a digital thermometer for milk pasteurization, which could be used by the Maasai.

A number of companies and ideas emerge from the entrepreneurship class. Here are a few in the health devices field:

**SAFESHOT**
Willard and Brandenstein started their company, Engage, with the SafeShot needle-sterilizing lid. SafeShot’s sterilizing liquid stops the spread of common contaminants such as Hepatitis B, Hepatitis C, and HIV.

The pair won first place and $10,000 in the inaugural, regional Health Innovation Challenge at the University of Washington in March 2016.

**VBCARDIO**
WSU students Brandon Graham, Carena Ramos, Joshua Tenzler, Vikram Chandra, and Katherine Keller founded VBCardio, with Cardio One, a device that attaches to a patient’s finger and monitors blood pressure. Similar to a pulse oximeter, the invention needs no cuff or stethoscope.

The team came up with the idea when they asked a first responder how long it takes to take blood pressure. He said, “Before or after I get the blood pressure cuff on?”

**CO-OPTICAL**
With diabetes on the rise, there’s a need for consistent and reliable blood glucose monitoring. WSU students Amber Graviet, Qassem Naviet, Samuel Byrd, and Zane Duke developed the first noninvasive blood glucose measurement device, which integrates sensors into a standard pair of glasses. The device collects signals correlated to blood glucose levels and then displays them on a smart phone or other device. Health care providers can also receive the information and offer diagnoses.

Their company, Co-Optical, won the University of Washington Business Plan Competition’s $5,000 AARP Award, and received two $2,500 merit prizes and second place in the WSU Business Plan Competition. ✪
THE WASHINGTON STATE UNIVERSITY WOMEN’S RUGBY PLAYERS returned from their historic March trip to London with some bumps and bruises, but it’s the memories of competing against some of the world’s best club teams, seeing famous landmarks, and building camaraderie that they’ll remember the most.

After months of planning, fundraising, and training, the team—ranked seventh nationally in the most recent Division I poll—became the first WSU sport club in over 30 years to compete internationally.

During spring break, WSU took on the Blackheath Football Club at Rectory Field in Charlton, South London. Founded in 1858, Blackheath is the oldest open (without restricted membership) rugby club in the world. The Cougars played tough in a 21–40 loss.

“Blackheath is a very big and physical team,” says Coach Christy O’Shea. “It was great to see how we matched up against older players who have more experience than us.”

Fatigue from the long trip and the physicality of the game against Blackheath took its toll on the Cougs, but they weren’t about to get soft after all it took for them to get to London. They notched an impressive 40–21 win against a professional team consisting of players from Middlesex University and the Saracens Football Club a couple of days later.

O’Shea says both teams were great hosts, providing meals following the competitions and time for the players from both sides to get to know each other and talk about their games.

“The Blackheath coaches and players told us we were the second most competitive team they’ve played this season and we would be strong competitors in their league,” says O’Shea. Blackheath won their conference championship the week after playing the Cougs.

Senior fullback Mikayla Holmes says it was a big test to play against women who have played rugby most of their lives.

“We loved being surrounded by a culture where the sport we play is known and recognized by so many individuals,” she says. “Representing WSU in London was a great experience!”

The team spent a day sightseeing in London at famous landmarks such as Tower Bridge, Big Ben, and Buckingham Palace. They also attended the women’s England vs. Scotland game at the Six Nations Tournament, getting a chance to meet many of the players from England afterwards.

One purpose of sport clubs is to foster leadership development, says Matt Shaw ’06 MED, assistant director of University Recreation, and the women’s rugby team, in particular, has demonstrated solid leadership in recent years.

“They have done a remarkable job handling their administrative duties and were ready to take on a larger task,” he says. “This not only challenged them against stiff competition, but also in the planning and decision-making that went into organizing such a big trip.”

The idea for the trip was hatched during an August meeting between O’Shea and team president Monae Hendrickson. They crunched numbers and pitched the idea to the team in September. Through a combination of jobs—including car parking during football games, selling concessions at basketball games, and performing work around the community—team members raised $25,000 to make the trip a reality.

O’Shea says his players will look back 20 years from now and remember what an action-packed, fun-filled trip it was—something very few college players ever get to experience. The impact of this trip will reach far beyond the rugby team itself.

“What these players have achieved is a good example for females in sports, sport clubs, and University Recreation in general,” he says. “It’s phenomenal and I hope it will inspire other sport clubs to think big.”
Photos from the game against Blackheath Football Club at Rectory Field, in Charlton, South London. By Felix Ursell
Cheering fans are as ubiquitous to competitive sports as coaches and clipboards.

And something about that had always puzzled Yong-chae Rhee, an assistant professor in Washington State University’s sports management program.

After all, far more teams fall short of the ultimate goal each season than achieve it. There’s just one Super Bowl champion, for example, and 31 franchises that end up promising a better season next year. Only one of the 30 Major League Baseball teams wins the World Series. Of the 351 NCAA Division I men’s basketball programs, just 68 advance to March Madness and only one claims the title.

“This was very curious to me because when I first started to look at this, all of the research about fan behavior had been associated with positive aspects such as winning,” says Rhee, who studies why fans remain loyal to losing sports teams. “If you look around, there’s all these teams but only one winner... and I wondered why can losing teams still have so many fans.”

It’s not that Rhee felt there was anything wrong with that. But since research shows a winning season can measurably boost overall support for a team, he wanted more than simply anecdotal explanations for the arguably irrational behavior of fans sticking with losing teams.

What he discovered reveals as much about human coping mechanisms as team loyalty or organizational excellence.

It begins with a concept known as relative deprivation, a theory social scientists use to evaluate the behavior of groups or individuals who feel they’re entitled to more than what they’ve received. It’s typically associated with the study of political movements or socioeconomic conditions such as poverty.

Rhee found that it also can be used to examine the behavior of sports fans. Like just about any group, members tend to most closely compare themselves to each other. So, while every sports fan wants their team to win, the feelings of deprivation that come with a losing season are made more tolerable by the realization that nearly every other member of their immediate group is struggling with similar disappointment.

“What happens is this in-group bias kicks in,” Rhee explains.

A particularly poignant example can be found among fans of the NBA’s Cleveland Cavaliers.

Back in 2010, they revolted after Cavaliers star LeBron James announced he was leaving for the Miami Heat. Fans defaced and destroyed copies of his jersey, burned posters and murals containing his image, and heavily criticized management of the team.

But the following season, ticket sales took only a slight dip.

“Relative deprivation explains this,” says Rhee, adding that the Cavaliers did see a brief but deep drop in ticket sales two years later during a 26-game losing streak that at the time was an NBA record but that, too, quickly rebounded.

“After the announcement, there were angry fans burning his jersey, blaming the team for letting him go... but they came back.”

As a footnote, so did James—four years later—and while fans cheered his return, along with Cleveland’s first NBA title in 2016, support for the team already had been back at pre-2010 levels for a while.

Rhee first noticed the seeming incongruity while growing up in South Korea.

A team from a struggling region of the country initially enjoyed tremendous success in South Korea’s fledgling professional baseball league during the early to mid-1980s but then went years without another championship as the other teams built stronger programs.

“The fans were still with them,” Rhee says of the initial team. “They were still proud of their team, and that got me to thinking, this is not just about winning.”

To study the connection, Rhee recently conducted in-depth interviews with a random sampling of Korean sports fans from diverse backgrounds. He found that relative deprivation combines with social identification to compensate for disappointment, which teams can also help manage by serving as strong representatives of the fans and the community that’s been built around them.

“This says that it’s not just about winning,” Rhee explains. “If you represent your people right, they’ll stick with you even when you’re losing.”

YONG-CHAE RHEE (COURTESY WSU COLLEGE OF EDUCATION)
IT’S FRIDAY NIGHT IN THE MIDDLE OF SUMMER, and Darren Wright and Janine Klingele have harvested everything they’ll take to the farmers market early Saturday morning—except peas. These they save for last—but not many peas are actually going to market. The pair of farmers are standing in the light of the full moon eating the irresistible fresh sugar snap peas as fast as they can pick them.

“Peas are best just eating them fresh!” says Klingele. “A quick stir fry is great but they are so sweet fresh.”

Longtime farmer Wright and former Master Gardener Klingele grow about 20 different row crops on their Gypsy Rows farm in Silvana, a tiny town situated between Everett and Mount Vernon within spitting distance of Camano Island.

“We grow a lot of different vegetables,” Klingele says. “We like to bring peas to market, but they take a lot of time to grow and harvest.”

WSU Extension’s Kate Ryan has a tried and true suggestion to get peas going early. Try taking a length of roofing gutter, filling it with potting mix, plant pea seeds about one inch deep and an inch apart. Once they are up two or three inches, you can slide everything into a pre-dug row in your garden.

“You can even keep them in the gutter all season, so you can grow them on your deck—but don’t overwater, as they are shallow-rooted,” Ryan says. “This is also a good way to keep peas going all season, because you can put one gutter’s worth in the ground and then immediately start the next batch.”

If started indoors, the gutter method gives gardeners a couple weeks jump on the season, Ryan adds, and also “protects them from critters.”

Wright and Klingele prefer sugar snaps over other varieties. “We end up taking home a lot of snow peas, but sugar snaps move pretty fast. That’s what everybody seems to want.”

Only developed in the early 1970s, sugar snaps don’t have to be split and shelled. They’re fun, tasty, and kids love them. Plus, there’s a self-twining variety that only gets 18-24 inches tall, meaning Wright doesn’t have to spend time staking them.

“Stringing those things up, that’s a hassle,” Wright says. “I try to keep maintenance as close to zero as possible. I like those self-supporting varieties. It gives you a concentrated fruit set.”

At farmers markets, Klingele says she is always talking recipes with customers. With peas, though, not so much, as they are simply so delicious fresh. Ryan agrees, as does her partner in the Snohomish County Extension Growing Groceries program, Diane Decker-Ihle ’76.

A Master Gardener since 1990, Decker-Ihle specializes in growing vegetables. She and Ryan started Growing Groceries in 2008, at the onset of the great recession when, at the same time, eating locally was growing in popularity. “People were having trouble growing food,” Decker-Ihle says, “because it’s very different than ornamental gardening.” The program offers classes throughout the spring on soils, starting seeds, and growing a wide variety of fruits and vegetables.

There are great pea varieties, she says, developed specifically for the Pacific Northwest. Cascadia, Oregon Giant, and others developed by Oregon State University are disease-resistant and, especially with sugar snaps, don’t get tough even when they get big.

“Last year I grew a 20-foot row of Cascadia,” Decker-Ihle says. “We ate on those from May through July. I even had enough to share with my in-laws!” ☆
It was the season for guavas. Their sweet musky fragrance drifted through the morning air and into the open window of seven-year-old Sharon Korir, beckoning her outside to play. The year was 2003, the day after Christmas. As was customary, Sharon had traveled with her parents to their home village in rural Kenya for the holiday. When it came time to return to Nairobi, the doting grandparents asked Sharon to spend an extra day.

The rains had passed and that day arrived with welcome blue skies. Sharon and her friends ran from yard to yard, climbing the guava trees and picking the succulent fruit. While crossing a neighboring compound, however, their laughter awakened a sleeping dog. Confused and snarling, the skinny cur gave chase as the children fled. Sharon, the smallest of the bunch, lagged behind and within moments was knocked down and bitten.

“We drove up country and met my in-laws half way,” says Sharon’s mother, Agnes Korir, during a phone call last December. “We had her to the medical clinic within two hours. Because of the threat of rabies, she was given a shot and we followed up with the required booster a couple weeks later in Nairobi.”

All seemed well as Sharon started back to school in January but soon Agnes received a call from the nurse saying Sharon was vomiting badly and falling asleep. They rushed her to the hospital.

“She kept asking to go to the washroom,” recalls Agnes. “When I took her in there, she was suddenly filled with huge strength; she grabbed me and bit my stomach.”

In shock, Agnes watched as her daughter crumpled to the floor. By now, the doctors suspected rabies and concluded improper procedures had been used when Sharon was first treated in the village clinic.

Medical staff struggled through the night to save the girl’s life. “The doctor said she was in critical condition and even if she lived, rabies had damaged her heart and brain,” says Agnes. “When she was awake, she seemed normal—would talk and smile—but then it would fall apart and she’d lose consciousness. The next thing we knew we were being called to see her body before it was taken to the morgue. It all happened so fast.”
Sharon had become one of the 2,000 Kenyans, mostly children under the age of 15, who die from rabies each year. One more case that adds up to the 60,000 human deaths reported annually worldwide. Ninety-nine percent of these cases result from dog bites, and once symptoms appear, rabies is nearly 100 percent fatal—the deadliest infectious disease known to man. Although an experimental treatment did save a Wisconsin girl in 2004, it has not proven successful for other victims.

Though it’s too late for Sharon, scientists now know there is an easy way to prevent such heartbreaking tragedy.

In the United States, the rabies virus survives in wildlife populations such as the fox, skunk, and raccoon and is therefore difficult to eliminate. But in Africa, research shows that domestic dogs are the primary reservoir—or infected group of animals—responsible for transmitting the disease. Vaccinating dogs shrinks that reservoir and stops the spread to humans and wildlife.

That discovery by epidemiologist Sarah Cleaveland at the University of Glasgow was a game changer, says Guy Palmer, Regents professor and founding director of the Washington State University Paul G. Allen School for Global Animal Health. Scientists had long considered the elimination of human rabies to be an impossible goal, but Cleaveland’s findings suddenly put it within reach.

In response, the World Health Organization formed an international alliance aimed at ending all human deaths from rabies by 2030. Palmer and the Allen School recently joined the effort through an ongoing pilot project in East Africa that has shown impressive results.

With key colleagues in Kenya, Tanzania, and Scotland, WSU oversees a region-wide rabies eradication program that has dramatically reduced the number of human and wildlife deaths in East Africa.

The program’s research, community intervention, and political networking are also providing role models for the control of other diseases such as malaria, schistosomiasis, and trypanosomiasis—also known as “sleeping sickness.”

With adequate funding and public support, Palmer believes rabies can one day join the ranks of smallpox and rinderpest—viral diseases that scientists have previously vanquished. And in so doing, abolish a scourge that has tormented humanity for over 4,000 years, its agony immortalized in Egyptian hieroglyphs.

I take a seat in a tiny room on the WSU Pullman campus and, through the wonder of a 360-degree camera and virtual reality goggles, am transported to rural Tanzania.

There, a chaotic scene unfolds as Palmer, WSU clinical assistant professor Felix Lankester, and Tanzanian veterinarian Imam Mzimbiri busily supervise a rabies vaccination clinic near the town of Bunda.

The air is stitched with piercing squeals and puppy yips. School boys of all ages, along with the occasional girl, pass by with dogs in tow, heading for a place in line. Most have walked several miles to bring their family pets to the clinic where they receive free rabies vaccinations and information about the disease.

As the children quietly chat, technicians scurry about recording information and veterinarians struggle to inject squirming canine patients. By the end of the day, hundreds of dogs and a handful of cats will have passed through the line, joining the more than one million animals vaccinated since the program’s inception.

WSU first became involved in 2007 when Palmer says the newly established Allen School began seeking ways to fight zoonotic diseases through intervention at the human-animal interface. Based on his previous laboratory experience with the virus, Palmer suggested they tackle rabies, an often ignored and poorly controlled infection that causes terrible suffering. It fit the bill perfectly.

In short order, he invited Cleaveland to Pullman for a brainstorming session. The renowned pioneer in East African rabies research says she and Palmer discovered a shared philosophy and scientific approach. It quickly developed into a strategic partnership.

Much of Cleaveland’s research is conducted through the Serengeti Health Initiative (SHI) in Tanzania which strives to preserve wildlife and ecosystems surrounding the Serengeti National Park, while also helping
local people like the semi-nomadic Maasai. The initiative includes a rabies vaccination program.

In 2012, his pilot project thriving, Palmer joined forces with SHI as a partner in the rabies control program. He also recruited SHI director Lankester to the WSU faculty.

I catch up with Lankester via Skype early one morning as he and his family prepare to fly from Nairobi to England for the Christmas holiday. After 13 years in Africa, he’s seen more than his share of rabies.

“In domestic dogs, it can present in a wide variety of ways,” he says. “There is the classic furious type where the animal is aggressive, out-of-control, and frantically trying to bite. But they can also be quiet, depressed, lying down, and having seizures.

“I’ve seen images of dogs literally attacking lions—they lose all their fear,” Lankester continues. “It shows how easily the virus can be transmitted to livestock, people, and seemingly rather frightening lions.”

Photographs of the encounter, taken in the Ngorogoro Crater, show the lioness apparently stunned with disbelief before clawing the small dog from her cheek. She holds him down with a paw, but he frees himself and eventually chases her off into the bush. Lankester alerted park veterinarians who were able to locate the lion and dart her with rabies vaccine.

“If you vaccinate within 24 hours, you have a pretty good chance to protect them,” he says. “One thing about rabies is that the virus takes several days to move from the wound into the nerve endings where it is then hidden from the immune system. So, early on, there is a window of opportunity to give post-exposure prophylaxis.”

Post-exposure prophylaxis or PEP is a vaccine or immune globulin treatment given after bites to help thwart an otherwise fatal rabies infection.

“The incident was a stark reminder of how important our work is,” says Lankester. “Rabies is a daily risk that greatly affects and traumatizes the families in these rural communities in Africa and Asia.”

Indeed, rural families face the anguish of a Sophie’s Choice if their children are bitten.

“They must decide that the dog might have been rabid and spend the approximately $150—or two months’ wages—on a post-exposure vaccination course, if they can find one,” says Lankester.

“Or, decide that the dog wasn’t rabid and save the money and take the risk. It’s a terrible choice and sometimes they get it wrong with tragic consequences. But living in such poverty, you need to be very sure that the dog was infected before spending the money, a cost which could prohibit another child from attending school.

“It’s a travesty given there are such effective canine vaccines out there.”

Lankester has channeled his passion into progress. Through program efforts, wild carnivores in the Serengeti National Park are now free of domestic dog rabies and the incidence of human rabies has dropped to almost zero. In the past, frequent outbreaks led to the extinction of the park’s African wild dog population and the deaths of many children each year.

Despite their success, areas beyond park borders still harbor pockets of rabies that can be easily transmitted by wandering dogs or dog-infected wildlife. To counter that possibility, Lankester is promoting a regional vaccination campaign aimed at creating large, rabies-free zones throughout Tanzania.

A similar story plays out in neighboring Kenya, where WSU clinical assistant professor Thumbi Mwangi helped organize Africa’s most progressive rabies control program.

I call the cheerful Kenyan on Skype, as he enjoys late afternoon sunshine by the shores of Lake Victoria. For the last two weeks, Mwangi has been holding rabies vaccination clinics near the town of Bondo. As is typical, each clinic is staged at a primary school within walking distance of everyone in the area. And just like in Tanzania, it’s a lively scene of kids and dogs.

So far, Mwangi’s team has vaccinated 15,000 dogs, or about 70 percent of the
local population, which is enough to stop the disease from propagating. In a few days, technicians will follow up with a household survey to verify they’ve reached that goal.

Mwangi, an epidemiologist with a love of statistics, was recruited by Palmer in 2012 to investigate the prevalence and impact of One Health diseases throughout Kenya.

According to the Centers for Disease Control and Prevention, six out of ten infectious diseases in people are contracted from animals. One Health programs focus on the links between human health, animal health, and the environment.

Traveling the country, Mwangi soon made a name for himself and caught the eye of government officials who entreated

He says it is all part of their proposal to make sure that by 2030 not a single child will needlessly die from the disease.

“What worries me most are the thousands of mothers and fathers who don’t have enough power—to lack of information, money, or access to health care—to make a choice to go to the hospital for post-exposure prophylaxis,” Mwangi says. “The cost of five doses of PEP is certainly way beyond the household income of many Kenyans who live in rural areas.”

He describes a 2014 case where a family of seven was attacked by a hyena. Mwangi read about it in the newspaper with his colleagues. “We discussed how strange it was that the hyena had found the family for over an hour,” he says. “We talked about it and said, ‘Let’s get the head.’” They did and it tested positive for rabies.

“Then the mother and the mother had severe deep cuts,” says Mwangi. “Using some of our own money, we managed to get them all PEP plus rabies immunoglobulin to infuse on the wounds. It worked and they all survived. If you recognize it in time, you can end up saving an entire family. We later heard the woman became pregnant and was blessed with twins.

“It’s why I dedicate my time to this work,” he says. “It’s cheaper to vaccinate and eliminate rabies in dogs, so people don’t have to make those very difficult choices concerning their loved ones.”

It’s also how he joined forces with Agnes Korir. After her daughter’s death, Korir, a professor of community development at DayStar University in Nairobi, and her husband Barnaba, established the Sharon Live On Foundation in memory of their “extremely humble and selfless girl.”

The organization advocates rabies awareness and provides vaccinations for dogs, cats, and donkeys, as well as PEP. They have funded over 100,000 doses to date and, through international contributions and partnerships, hope to see Kenya become the first African nation to successfully eliminate rabies.

Palmer says there’s still a long road ahead despite his collaboration with the Global Alliance for Rabies Control, the Pan-African Rabies Control Network, and smaller nonprofit organizations like Sharon Live On. He reports that only ten percent of bite victims are currently able to complete the full post-exposure prophylaxis treatment.

It’s one more reason to push for dog vaccination—which, thanks to Lankester, just became abundantly more accessible.

One of the biggest hurdles to achieving rabies eradication in Africa has long been the lack of electricity for vaccine refrigeration in rural areas. To compensate, veterinary teams would travel to the furthest refrigerated village, store the vaccine overnight, and the next day transport it in coolers to remote areas. It wasn’t enough.

Searching for ways to expand their outreach, Lankester turned to the vaccine itself. In a recent study gaining worldwide notice, he showed that commonly used canine rabies vaccines can be stored at elevated temperatures and still be effective; specifically, up to six months at 25 degrees Celsius (77 degrees Fahrenheit) or three months at 30 degrees Celsius (86 degrees Fahrenheit).

“It’s a quite remarkable result, as it showed the vaccine was thermostable at fairly high temperatures,” he says. “Having a vaccine they can safely store in the villages is an exciting development in our ability to control rabies.” And one that will allow coverage in isolated areas occupied by the Maasai herdsmen whose children are especially vulnerable.

Palmer says it’s another step forward. “This is a feasible goal that no person will die of rabies,” he says. “We don’t want to get into silly arguments about which disease kills the most people. We feel so strongly about rabies because it is so preventable.”

Palmer is also encouraged by the state-side success of their Eliminate Rabies Project, a fundraising partnership with veterinary clinics in the Pacific Northwest and beyond.

One of the partners is Kyle Frandle ’74, ’ 76, ’ 80 DVM, owner of Los Gatos Dog and Cat Hospital in Los Gatos, California. He is also an adjunct professor with the WSU College of Veterinary Medicine.

Frandle accompanied Palmer and Lankester on a 2013 trip to East Africa and says the experience opened his eyes to the need to become involved with the program.

“Veterinarians are the world’s experts in rabies,” he says. “We get so wrapped up in our exam rooms and surgery suites that we don’t get out and use the knowledge as we should. It’s unacceptable that 25,000 children die from rabies in Africa each year when there’s a readily available vaccine that’s been around for 135 years.

“At our clinic, we donate a dollar for every rabies vaccination we give, and I’d like to see that become a nationwide project,” says Frandle.

That little bit can go a very long way. It helped pay for one vaccination at last December’s videotaped clinic in Bunda, Tanzania. There a boy wearing a blue soccer jersey waits in line with his short-haired puppy. Turning to the camera, his eyes twinkle as he shouts with a boisterous grin, “Asante sana, Los Gatos!”

That’s Swahili … for thank you very much.
One of the most memorable moments of Matthew Taylor’s life so far would look to most people like just a jumble of numbers, brackets, and punctuation strung together with random words on a computer screen.

```
IF ((dist(K1,T1)<=4) AND 
    (Min(dist(K3,T1), dist(K3,T2))>=12.8) AND 
    (ang(K3,K1,T1)>=36))
THEN Pass to K3
```

And so on. Line after line of computer code flowing like a digital river of expanding possibilities.

Although sophisticated and wonderfully complex, it wasn’t so much the code itself that made this such a pivotal moment.

It was what came next.

Taylor, a graduate student in Texas at the time, used the custom coding along with an otherwise basic computer soccer game to prove what many previously had only theorized about the development of artificial intelligence.

Robots, when given a series of increasingly difficult challenges to solve, will learn new tasks faster.

It’s known as transfer learning and while Taylor’s doctoral thesis used simulated soccer scenarios as a virtual world test lab, the underlying algorithms behind those experiments have significantly broader potential and the scientific world quickly took notice.

“When we were putting it together, we kept thinking, of course this should work, because it’s so obvious,” Taylor, now an assistant professor of computer science and director of Washington State University’s Intelligent Robot Learning Laboratory, recalls of the conversations he had with his graduate adviser. “But then, when it did work, we were like, ‘Yes!’”

Nearly a decade later, Taylor is still pioneering breakthroughs in machine learning.

The mathematical algorithms he and his WSU students are developing enable robots to learn increasingly complex tasks by interacting with humans and with each other—whether it’s helping the elderly safely remain in their own homes longer or protecting Washington’s fruit orchards from hungry birds.

Taylor’s goal is to bring it full circle, creating environments where humans and machines can teach and learn together.

“In order for that to happen, we have to develop ways that people can interact with machines without needing to be computer scientists,” he explains. “This has to be something that nonexperts can do... so that you don’t need a programmer every time you want a machine to do something different.”
Long viewed as little more than a staple of science fiction, artificial intelligence has stormed into the mainstream.

Autonomous delivery drones and self-driving cars. Chatbots that can diagnose medical conditions or help motorists fight parking tickets. Machines that can interpret language, read paper documents, and instantly search massive databases for otherwise elusive patterns.

A technological revolution is underway that, depending on who you ask, is going to be either the pinnacle of human endeavor or the cause of societal collapse. Some of the biggest names in the world of science can be found on both sides of that debate.

Although WSU’s focus is largely on assistive AI, the ongoing development of robotic labor able to perform increasingly complex tasks faster and more efficiently than humans will test the fabric of society in the years ahead.

Advances in automated transportation, for example, mean most children born today may never learn to drive a car. And that’s just the start.

Back in the 1980s, Antonie Bodley was a youngster with a new friend.

Teddy Ruxpin was a robotic, storytelling teddy bear that never grew cranky or impatient. Its eyes blinked. Its mouth moved. And the bestselling toy of 1985 engaged kids with stories, songs, and comforting pronouncements about friendship and camaraderie.

It had a profound impact on Bodley, who quickly became more interested in how Teddy Ruxpin worked than in how all of those stories would end. She peeled back the layer of fur and peered inside to find the tangle of wires, tiny servo motors, and speakers that, along with a fresh set of batteries, could bring her animatronic friend to life.

Bodley, now 34, knows that’s where her fascination with robotics and artificial intelligence began to take root.

“Also, the character Data from Star Trek, which I discovered a little while later,” she says with a laugh. “I became really interested in how we, with science fiction, were able to better understand humanity through the experiences of an artificial robot.”

Bodley found herself being drawn beyond the technological side of artificial intelligence, instead pondering societal questions that are likely to emerge as machines continue to evolve. She spent several years exploring those issues, eventually turning them into the focus of an interdisciplinary doctoral degree, which she received from WSU in 2015.

“If we build machines that can learn and can react and can develop, then what have we really created?” she asks. “This, eventually, is going to become a very important question.”

Not just so we can better understand what AI represents but, as Bodley and others explain, the basic role and purpose of humanity itself could become more ambiguous as machines outperform humans in ever-expanding ways.

To help guide her graduate research, Bodley pored through the classic works of science fiction masters such as Isaac Asimov, Arthur C. Clarke, and Robert A. Heinlein—futurists whose novels relied heavily on hard science. Many of the concepts and principles outlined in those Golden Age novels, specifically Asimov’s “Three Laws of Robotics,” have since been embraced by the scientific community and adopted into current AI research.

She also examined what’s known as soft sci-fi—futuristic tales loosely inspired by science but focused more on fantastical depictions of advanced universes. Soft science tends to put greater emphasis on those what-if scenarios that can reshape entire societies, which is where Bodley’s interests have continued to migrate.

She sees a reckoning on the horizon: “We’re going to need continued discussion and active dialogue between futurists and the rest of society as AI continues to progress, because we do run the risk of irredeemably damaging the current structures of society.”

Bodley, however, is not among those pushing the panic button.

She acknowledges the transition could be economically disruptive, perhaps even painful, for many as unemployment grows. It likely will be emotionally difficult as well, because careers often are as much about personal identity or purpose as a means of providing necessary household income.
Bodley instead believes the pursuit of AI represents a logical progression of an important and distinctly human trait—innovation.

“We’re already seeing what’s known as weak AI in assistive roles in the workplace and throughout society, everything from how we can ask Siri for directions or let Netflix pick the next program based on our previous viewing choices,” she says. “Strong AI takes it to the next level—machines that, essentially, think.

“That’s where I believe AI will begin to challenge the framework of what constitutes humanity.”

Before leaving the White House, former President Barack Obama commissioned a study into how the nation should best prepare for what the rapid advances in AI will mean to our way of life.

The panel ended up issuing two separate reports, including one that focused exclusively on the potentially massive job losses ahead as computers and machines learn to perform increasingly sophisticated tasks.

“These transformations will open up new opportunities for individuals, the economy, and society, but they have the potential to disrupt the current livelihoods of millions of Americans,” the report warns. “Whether AI leads to unemployment and increases in inequality over the long-run depends not only on the technology itself but also on the institutions and policies that are in place.”

Historically, technological advances at various levels have contributed to job loss but, over time, the increased productivity and shifts in training to fill newly created needs have more than overcome those initially painful setbacks. The economy grew and lives improved.

The effects of rapidly developing AI already are being felt in the workplace but the major disruptions likely are still 50 to 65 years away, despite some studies suggesting it will come much quicker. Researchers at the London-based McKinsey Global Institute predict a massive but gradual loss of employment.

“Even when the technical potential exists, we estimate it will take years for automation’s effect on current work activities to play out fully,” the institute’s research team wrote in January 2017. “The pace of automation, and thus its impact on workers, will vary across different activities, occupations, and wage and skill levels.”

One of the primary obstacles to rapid transition is the high cost of acquiring AI-equipped machinery. For example, technology that would enable commercial hauling to be turned over to self-driving trucks already is being fine-tuned but few, if any, companies have the capital readily available to immediately replace their entire fleets with new high-tech trucks.

As those transitions occur, AI is more likely to be used at least initially to take over certain tasks or aspects of a given job rather than the entire job itself. It means human workers will still be needed but in smaller numbers.

Although low-skilled, repetitive jobs are widely considered the first to be replaced, advances in what’s known as natural language recognition—the ability of computers to interpret conversations...
At WSU, the decision to put greater emphasis on artificial intelligence was as much about practicality as pushing the boundaries of science.

“With the economic downturn (back around 2007 to 2010), and the strained budgets that followed, everyone was having to make careful choices about how best to use what we had available,” explains Behrooz Shirazi, who served as director of WSU’s School of Electrical Engineering and Computer Science at the time and now leads a new WSU initiative exploring AI applications for improving community health.

At the time, an advisory board consisting of tech industry leaders had identified machine learning, which is a crucial subset of artificial intelligence, as an emerging field. WSU already had two widely recognized experts on faculty, Diane Cook and Larry Holder, a husband-and-wife computer science team that Shirazi had brought to Pullman with him from the University of Texas at Arlington.

“Diane already was doing great things with smart technology,” Shirazi says, pointing specifically to her development of in-home AI that blends machine learning with pervasive computing to provide remote health monitoring and intervention. “Then we found Matt Taylor and that was like this big bonus.”

From her office across the hall from WSU’s Intelligent Robot Learning Laboratory, computer scientist and WSU doctoral student Bei Peng is experimenting with ways to simplify and improve interactions between humans and advanced machines.

“The goal is to combine AI systems with human intelligence,” says Peng, a Chinese scholar who worked as a programmer before enrolling at WSU to study with Taylor. “It helps machines learn quicker.”

That’s a key part of AI research at WSU. Another is developing systems that anyone—not just computer scientists—can use.

Peng is trying to do both and her experiments already are drawing notice.

She started with a time-tested animal training technique, essentially a “good dog, bad dog” approach to reinforcement learning that is intended to help speed up the pace.

Using a virtual floor plan, a machine—typically referred to as an agent by researchers and represented as an icon on the computer screen—is given a series of basic but increasingly complex tasks to

and read paper documents—are putting solidly middle-class careers at greater risk as well.

Many functions within the banking, legal, and accounting professions are seen as vulnerable, while certain medical and even journalism skills could be performed by machines as well.

“We estimate that about half of all the activities people are paid to do in the world’s workforce could potentially be automated by adapting currently demonstrated technologies,” according to McKinsey. “That amounts to almost $15 trillion in wages.”
complete. Human operators provide feedback, a +1 for each correct move or choice and a -1 for each blunder.

A typical task would be something like: Move the chair to the blue room.

The machine has to learn to navigate the floor plan, distinguish a chair from other objects, and differentiate colors. Those lessons, however, carry over from one scenario to the next so subsequent challenges are accomplished faster as everything from basic colors, object identification, and floor plan layouts are learned.

Think of it as a kind of digital, twenty-first-century version of Flowers for Algernon.

The research team, however, wasn’t done.

In order to make it interactive, the communication had to go both ways.

So, the machines were given the ability to adjust the speed of their movement through the floor plan based on the confidence level of the actions they take. Slow movement, for example, serves as a visual cue for uncertainty, telling humans the machine wants guidance.

“What we’re trying to understand better is how humans can teach robots,” Peng says.

Although much of the AI research being done now is in virtual settings, the underlying algorithms being developed can be used in hardware that operates in the physical world. One of the most visible examples is within the auto industry, where complex computer code is what enables the real-time data processing needed for driverless vehicles to operate autonomously.

The project is intriguing to Taylor because it involves developing ways for drones to communicate with each other to share information and coordinate an effective response. Simply designing a grid pattern atop an orchard for a drone to continuously follow would quickly become ineffective because birds can spot patterns and exploit them.

“This has to be something that’s done autonomously,” he says. “If you have to have someone out there controlling the drones, then it isn’t really an advantage.”

Last fall, Taylor was invited to Microsoft headquarters in Redmond to talk with the company’s researchers about his work and his belief that the development of machines that can be programmed or trained by anyone is key to AI’s expansion.

He described what he sees as a necessary cooperative approach.

“I’m really interested in techniques that work with normal humans,” he told the roomful of research scientists, drawing a rumbling chuckle from the audience. “A lot of our research is computer geeks teaching robots or teaching agents how to do things. And the problem is, we already know how the machine-learning algorithms work.

“So, ideally, however we’re doing this teaching it would work for non-expert humans—people who don’t understand AI.”

Taylor also considers it important for machines to be able to pass along learned lessons to other machines so people won’t have to start from scratch whenever they get an upgraded version.

That’s a concept he knows might frighten many people, but he downplays any concern.

He sees artificial intelligence as improving lives and aiding independence, particularly as people age.

And while he, like others, acknowledges the potential for workplace disruptions, he doesn’t consider that to necessarily be a bad thing—provided it’s the right jobs being taken over. Taylor says AI tech is particularly well-suited for the jobs that tend to be “dirty, dangerous, and dull,” noting those are the ones people typically don’t want, anyway.

Bodley, meanwhile, has given thought to what the world might be like where machines do nearly everything faster and more efficiently.

The transition will, of course, be difficult for some, she acknowledges, and fears about an identity crisis for the human race likely aren’t exaggerated.

But she finds comfort in the wisdom of philosophers who long ago sought to define what it meant to be human.

“I’d like to think that instead of disorder, society reaches a place where individuals could use the time that used to be consumed by the demands of daily work schedules and careers to focus on what actually makes us human,” she says. “That’s the ability to create, to innovate, and to love. Perhaps even love our robotic companions.”

---

**Taylor, the robot lab director at WSU, believes the era of easily programmable consumer AI is near.**

“Where I want to see this go is getting robots that can learn from humans into homes,” he says, explaining there’s a significant difference between the hard-coded AI limited to pre-defined tasks and autonomous machines that can learn and adapt to various needs. “We’re seeing more and more AI in the home already but it’s pretty much all preprogrammed. We need to take it to the next step.”

Taylor, an Allred Distinguished Professor, also is working on commercial applications, including autonomous drones that work together to protect fruit orchards by chasing away flocks of hungry birds. Half of Washington’s growers identify birds as a significant contributor to crop loss.
World-Class Technology, Made in the Northwest

Every day, we invent, design, and build the systems that protect power grids around the world. SEL's employee owners are dedicated to making electric power safer, more reliable, and more economical.

To learn more, visit www.selinc.com.
Careers that really clicked

As she stepped up to the employee store counter to pay her bill, LEGO® specialty products manager Katie Regan’08 pulled out a credit card bearing Washington State University’s famous logo. Jordan Paxton ’04, behind her in line, let out a shout of recognition. “Bumping into Cougars on the East Coast is a big deal,” explains Paxton, a consumer service specialist at LEGO. “It rarely happens, so when you come across a Cougar, you’re instant friends.”

Regan and Paxton soon learned they had more than Cougar pride in common. The two attended WSU at the same time, then both accepted jobs with The Walt Disney Company, but it wasn’t until they joined the LEGO team at its main U.S. office in Enfield, Connecticut—Regan in 2012 and Paxton in 2013—that the two actually met. These days, they both spend their days working with the famous LEGO play materials that have entertained and educated children for over 80 years.

Regan oversees in-store displays and works directly with designers at company headquarters in Billund, Denmark to create unique sets for top product retailers like Walmart, Target, and Toys ‘R’ Us. “Designers come to Denmark from around the world to create new products, and it’s fascinating to see such a mix of cultures, backgrounds, and educational experiences coming together in the service of play.”

“We try to recreate our entire portfolio every 12 to 18 months, which translates to roughly 400 new sets or products every year,” notes Paxton. “Not every LEGO set interests every kid, so new offerings help to keep kids engaged and also allow us to reach new audiences.”

Among the latest offerings that delight Paxton is the LEGO Group’s new set of minifigures honoring four women of NASA: computer scientist Margaret Hamilton, astronaut Sally Ride, astronomer and executive Nancy Grace Roman, and astronaut Mae Jemison. “It’s a very exciting set for us,” he says. “We’re honored to be able to create these groundbreaking women in minifigure form to recognize their accomplishments and promote STEM programs.”

Regan also appreciates the constantly evolving mix of learning and fun that LEGO sets offer. An educator at heart with a bachelor’s degree in human development and a master’s degree in higher education administration, she is happy to work for a company she admires and knows well. “I grew up in Enfield and worked for LEGO in high school, and my mom worked for the company for 21 years,” she says. “When I decided I wanted to come home to Connecticut, LEGO was a natural choice.”

A sociology major from Olympia, Washington, Paxton says he came to work for the company because being around LEGO makes him happy. “I played with LEGO bricks as a kid, and when I was in college, my mom and dad used to send me LEGO sets during finals to provide a diversion and keep me calm.” Now as a consumer service specialist, Paxton keeps others calm, overseeing child safety and consumer escalations and acting as a liaison to the advisors who staff the company’s customer service lines. “Our team builds and tests all the products so that we’ll have firsthand knowledge of what kids will experience when they use the sets. We then share this knowledge with advisors so they’ll know how to respond when kids call with questions or problems.”

Whatever your role, the company is keen on engagement, Regan notes. Most meeting rooms have buckets or bowls of bricks sitting around that you can play with during meetings, she says, and her department hosts “Snack-n-Build” events where everyone gets together and makes something. “It gives us all a break and reminds us how fun—and sometimes difficult—it is to build,” she observes.

“The company encourages us to use the toys, not just sell them. Every day we focus on play.”

BY L ORI FERGUSON

PHOTO PETER MORENUS
On the surface...

BY BRIAN CHARLES CLARK

Cancer, that malignant force that maims and kills as it rampage through bodies and lives, may have met its match in the person of James Wells ’79 PhD. Wells speaks quietly but with urgency. You have to lean in to not miss anything.

Wells is explaining that cancer’s de-reangement of our lives actually begins at the surface of individual cells. The complex chemical ecology of the cell membrane surface deserves its own term of art, so Wells dubs it the “surfaceome.” “The cell membrane is the eyes, ears, nose, and mouth of a cell,” he says.

Cancer cells, in order to avoid detection by the immune system, “remodel the surface proteome,” the cell membrane and the way it interacts with the world. That’s how cancer cells are able to “proliferate like crazy—metastasize—and nourish themselves.”

If Wells and his colleagues could get antibodies—engineered proteins—to bind to the surface of cancer cells, they’d no longer be hidden from the immune system. Like the fog shrouding the enemy suddenly lifting, the immune system’s cavalry can charge in and clean up.

Unfortunately for cancer, Wells is a protein engineer and pharmaceutical chemist nonpareil.

But that almost wasn’t the case, as Wells is also a highly accomplished jazz guitarist. He plays a style known as chord melody, a one-man-band approach made famous by Joe Pass and others when Wells was a teen. But, while music is full of creative discoveries, as a job, Wells says, “it is so uncertain!”

Fortunately for human health, then, Wells came to Washington State University back in the 1970s to study with the eminent and now emeritus professor Ralph Yount.

“I decided to become a sponge,” Wells says of Yount and the other faculty he worked with. “I was determined to learn everything I could.”

The sponge thing must have worked, as Wells left WSU with a doctorate—and nine first-author papers, a level of production that a seasoned professional would be happy with. He’s published over 100 more since then.

Coming to study with Yount was, Wells says, one of the great positive decisions of his life. Another was marrying his girlfriend, Carol, while living in Pullman.

“We got married on the lawn of the house we were renting at 1215 Latta Street,” he says. Latta Street is long gone, but the house was near the present-day intersection of Valley Road and Stadium Way. “There were about 100 people there. We ate steaks and played volleyball.

“On our way out of Pullman, Carol and I cried. We loved this place so much!”

One of Wells’ first jobs was with Genentech. He started work with a question that, at the time, everyone thought was already answered: Can we improve enzymes? The answer, so obvious to everyone but Wells, was a resounding “No!” You can’t improve on nature, which, after all, has had millions upon millions of years to get the function of enzymes exactly right.

Wells and his team got going on a protein called subtilisin (most proteins function as enzymes). After Wells made a few alterations to it, subtilisin became a commercial hit: It’s the enzyme used in Tide detergent and many other products. And along the way, Wells made some major discoveries about the interactions between the cell surface and proteins that would fuel his future work.

Now at the University of California, San Francisco, Wells and his team focus on inventing tools that enable rapid drug development. Wells brings interdisciplinary teams together, including computer scientists and experts in automation, in order to accelerate the discovery process.

Wells returned to the Palouse this year as the recipient of the 2017 Regents’ Distinguished Alumnus Award, the University’s highest honor, in recognition of his contributions to protein engineering and pharmaceutical chemistry. ✫
Calling All Cougs!

Take it from Butch...

Helping WSU is as easy as 1, 2, 3!

1. Join the Alumni Association today!
2. Get yourself a WSU license plate!
3. Show your pride by giving to WSU!

alumni.wsu.edu/EasyAs123
Honored and Dishonored Guests: Westerners in Wartime Japan
W. PUCK BRECHER
HARVARD UNIV. ASIA CENTER: 2017

There was little surprise when the Japanese military police arrested and imprisoned a number of British and U.S. citizens on their soil after the 1941 attack on Pearl Harbor. Some, like the Reverend Samuel Heaslett, were held and interrogated for a few months, then released and eventually sent back to North America. However, outside prison walls, Western civilians did not face much persecution or racial animosity from the Japanese public.

W. Puck Brecher, associate professor of Japanese history at Washington State University, addresses the complexities of Pacific War-era treatment of Western civilian residents in Japan in his book. Through their stories, we can better understand how the Japanese treated the “others” within their borders.

Documentation of Western lives inside wartime Japan is scarce, since many records were destroyed post-war. However, Brecher gathers memoirs, letters, and other sources to tell the little-heard testimonies of Europeans and North Americans in 1940s Imperial Japan. Some enemy civilian Westerners were imprisoned, others fled to mountain towns where they spent the war, and still others were repatriated to their home countries.

Without denying the racial hatred and atrocities of the Japanese military during the war, these stories show the often stark contrast in how the Japanese public actually regarded Westerners stranded in Japan.

As Brecher illuminates the lives of Westerners in WWII-era Japan, he asks why Japanese state propaganda was relatively unsuccessful in overcoming the racial ambivalence of their public, and how race consciousness in the Japanese public differed from what we commonly consider racism.

The existing research on race relations during the Pacific War shows race hatred on both sides of the conflict. However, as Brecher writes, that research often means government and military elites, “those who tell the rest what to think and believe .... What the public actually thought and believed has been omitted from the conversation.”

Assumptions of racial enmity were true among the military, and the government certainly tried to instill it in soldiers, but the Japanese civilians often treated the Western people in their country with compassion. On the other hand, brutal treatment of prisoners by the Japanese secret police increased as the war’s prospects worsened for the Japanese military.

While the Japanese government and military followed the racist playbook of their allies in Nazi Germany when it came to treatment of other Asians, by asserting moral superiority based on race, the Japanese did not subscribe to a singular approach toward Caucasians. It’s further confused because Japan focused more on asserting its own spiritual and moral supremacy. In other words, they didn’t denigrate Westerners, but did maintain a sense of superiority.

—Larry Clark

How Plants Work
LINDA CHALKER-SCOTT
TIMBER PRESS: 2015

Anyone interested in how plants do what they do will enjoy How Plants Work. Washington State University associate professor of horticulture Linda Chalker-Scott has brought the essentials of plant science together and made them entertaining for gardeners and the otherwise curious.

Chalker-Scott digs into the science of plants while keeping the narrative rooted in successfully growing a garden. Along the way, she evaluates a variety of products commonly marketed to gardeners, explaining why they work—if they do. Vitamin B1, for instance, is commonly sold as a way to reduce transplant shock. But plants make their own B1, so adding more does nothing. The same is not true, we learn, of auxin, a growth hormone that stimulates root development.

Chalker-Scott advocates for “garden care, not control” and learning how to “think like a plant” so that you can deal with the unexpected—and bust through our intuitive misconceptions of how plants grow and thrive.

Even if you’re not a gardener, this book is a worthwhile read simply because plants are fascinating. They’re the original hosts of “alien” life forms. The mitochondria powerhouses in our cells were, probably, independent bacteria that were engulfed by plant-cell ancestors millions of years ago. Same thing with chloroplasts, the site of the still-mysteries of photosynthesis, which has DNA more like blue-green algae than the plants they energize.

In a world of click bait and alternative facts, Chalker-Scott has produced a book that lives up to its straightforward title.

—Brian Charles Clark

BRIEFLY NOTED

Atomic Geography: A Personal History of the Hanford Nuclear Reservation
By MELVIN R. ADAMS
WSU PRESS: 2016

One of the first environmental engineers at Hanford recalls his two decades of study of both the toxic soil and water at the nuclear site, and the wildlife and plants that thrive on the 586 square miles...
We love our volunteers—they are the best. But we need more! If you love WSU, and are dedicated, passionate, and a die-hard Coug, we need you. Contact the WSU Alumni Association at 1-800-ALUM-WSU or wsuaa.volunteers@wsu.edu to speak with a member of the Alumni Engagement team about ways you can help us help WSU.

Go Cougs!

The BEST ALUMNI ASSOCIATION IN THE WORLD NEEDS VOLUNTEERS

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

Go Cougs!
BY KRYSTLE LYRIC ARNOLD

What do the ABC’s have in common with a treble clef? How about a children’s theater production and creative problem-solving? These questions are not riddles, says BECKY CAIN-KELLOGG ’91, owner of the Puyallup Children’s Theater and Music Academy.

Cain-Kellogg opened the theater in Puyallup seven years ago, although she has taught music and theater for nearly 30 years. During that time, Cain-Kellogg also worked as an arts integration specialist, combining music and the arts with subjects such as math and history in schools.

Research says that children who are involved with music and theater early on gain lifelong skills—in part because there are so many aspects involved with learning and performing.

Cain-Kellogg says music helps with discipline and focus while theater encourages children to have a greater sense of self-confidence and increases their problem-solving skills.

For example, imagine a lit-up stage and a full audience. Suddenly a prop breaks and someone forgets their lines—what now?! Such scenarios can teach younger children a valuable lesson, says Cain-Kellogg. Theater helps children learn to be more confident and creative when dealing with minor crises. She says it’s the same with music.

“Music’s in real time,” Cain-Kellogg says. “If you missed your line of the song where you’re supposed to sing or play, it’s done, it’s over, it’s gone. It doesn’t wait for you.”

But that’s not all.

Learning to read sheet music early helps children learn to read. Additionally, music therapy has been shown to help with anger management and attention-deficit/hyperactivity disorder. Some studies even suggest it can help with post-traumatic stress disorder.

Cain-Kellogg describes a student she worked with who couldn’t vocalize his internal anger. She gave the boy a drum and had him express his anger with music. Cain-Kellogg played the beats back to the boy using her own drum. And, according to Cain-Kellogg, it helped. The young boy felt that his anger was being identified and validated.

Music is just “another pathway of communication,” Cain-Kellogg says.

Cain-Kellogg also uses her research and experience to work with special needs children. She says these kids are often excluded from activities in school, but the time the child spends on stage or playing an instrument inspires and empowers the child, the family, and the audience. ♫
'91 PhD Comm.) retired as a professor of communication, most recently at California Polytechnic State University. Throughout his 30 years of teaching, Ausmus worked at three different universities. Now he is a full-time novelist, having already published his first novel, The Adamantine Heart, written under the pen name William Russell Sheridan.

After over 20 years working with teams around the country, BRIAN FLAJOLE (x’84 Comm.) has returned to Washington as the new director of the Boeing Classic, the PGA Tour Champions event at The Club at Snoqualmie Ridge. KRAIG R. NAASZ (’84 Hist.) is the president and CEO of the Distilled Spirits Council, the trade association representing producers and marketers of distilled spirits sold throughout the country. A new exchange-traded fund for whiskey and spirits has been created for the New York Stock Exchange (NYSE). In late December, as the stock market rose, Naasz toasted the new fund and joined in ringing the closing bell at the NYSE. The City of Temecula, California appointed PATRICK THOMAS (’84 Civ. Eng.) as their interim public works director. Thomas is a licensed civil engineer and has worked with cities throughout California.

Simmons Hanly Conroy, one of the nation’s largest mass torts firms, announced that the firm has grown its shareholder ranks with the elevation of 14 attorneys, which includes BRENT ZADOROZNY (’84 English). Zadorozny has 25 years of experience as a trial lawyer handling asbestos and mesothelioma matters, as well as arbitration of various matters in non-U.S. jurisdictions.

CHRIS CASEY (’86 Fin.) is the new senior vice president and relationship manager at Puget Sound Bank in Bellevue. With over 25 years of experience in revenue cycle and health care, KAREN DINKINS (’86 Ag. Econ.) has become the new revenue cycle manager at Cabinet Peaks Medical Center in Libby, Montana. The Chehalis Foundation has announced its newest board member as JOHN ROTHLIN (’86 Comm.). Rothlin worked for nearly 18 years in the Washington State House of Representatives. While working there, he was the chief of staff for the House Republican Caucus for over five years.

BEN HARP (’87, ’96 MS Mech. Eng.) has been named the new deputy manager
It may be dangerous to anthropomorphize, but the pleasure on Tag’s face is pretty hard to miss as he follows his master, STACY SLADE ‘00, around the ring at the prestigious Westminster Dog Show. And the glow emanating from Slade is clear, too, as she leads her handsome and graceful Bernese mountain dog to a Best of Breed win in February this year.

“I’ve been showing dogs since I was 10 years old,” Slade says a few days after she and—to use his full name—Villainous Tag You’re It got back from the show in Manhattan. “I was in Snohomish County 4-H. That’s one of the reasons I went to WSU. I wanted to become a vet. That obviously did not happen.”

Instead, she majored in marketing, her education enabled by a scholarship from the Trafton family. The scholarship meant she only had to work two jobs while going to college. As both a resident assistant and a youth director at a church, Slade was already paying forward the mentorship she received as a 4-H member.

After Tag’s big win, “I called my old 4-H leader and said, ‘You know where I started!’”

Slade is a bit unusual in that she trains and shows her own dogs, rather than hiring a professional to do it for her. “They are my kids. When I’m not working, I’m home with my dogs, socializing, grooming, conditioning, maintaining body and mind. We go hiking, playing with friends, drafting with our carts, tracking.”

After college, Slade snagged a marketing job with the Columbus Crew pro soccer club. Later, she donned the purple, working for six years with the athletics department at the University of Washington. There, she helped overhaul the mascot program and train the new husky.

“The first time I worked a UW game,” she confides, “I had to wear my WSU t-shirt underneath the UW shirt—the purple was just too much.”

Now with the Seattle Sounders, Slade continues to mentor 4-Hers. “My assistant is Shahnorraine Martinez. She’s in 4-H and just went to Westminster for the first time, as she qualified in junior handling. She was there with her mom, showing her field spaniel.”

Slade says anything is possible if you work hard enough at it. That’s certainly how she and Tag got to Westminster. “What a thrill to be down there on the floor with my dog on national TV.”

of the Department of Energy’s Hanford Office of River Protection. He joined the DOE in 1991 as a lead project engineer and began working with the senior executive service of the Office of River Protection in 2010. ✹ The Bureau of Land Management announced KRISTIN BAIL (’88 Geol.) as acting director for the agency. Bail has worked in public land management for more than 30 years in several states. She was assistant director for the BLM’s Resources and Planning Directorate as well as the agency’s assistant director for National Conservation Lands and Community Partnerships. ✹ NICK PAVELICH (’88 Acc.) is the new managing director at the Seattle offices of Andersen Tax. He has over 28 years of experience, including 18 years practicing tax and 10 years with a family office. Previously Pavelich was the CFO and president of real estate at Laird Norton Company, partner at Clark Nuber, and a director at KPMG and Arthur Andersen. ✹ PAUL SZERSZEN (’88 MS Elec. Eng.) is the new vice president for the Department of Homeland Security business development account at Advanced Concepts and Technologies International, LLC. ✹ CELESTE MASTIN (’90 Chem. Eng.) has been appointed as one of three new directors to the Granite Construction Incorporated board of directors in California. She has served as CEO of Distribution International, Inc. since 2013 and has held various other managerial positions related to chemical and building products industries. ✹ VICTORIA BLACHLY (’93 Biol.), a partner with the Portland-based law firms of Samuels Yoelin Kantor LLP, has been appointed to the Commission on Uniform State Laws. Blachly was appointed by Oregon Gov. Kate Brown for a four-year term. She will be one of Oregon’s three commissioners, all of whom are attorneys who volunteer their time as a public service. ✹ KEVIN NAUGHT (’93 Comm.) has been appointed to the Yakima County Superior Court bench by the Washington state Gov. Jay Inslee. Naught has been a commissioner since 2014 and previously worked for the firm of Finney, Falk, Naught, and Remey. Additionally, he served as an attorney in the U.S. Army’s Judge Advocate General’s Corps in Germany and Bosnia-Herzegovina. Naught received the Pro Bono Attorney of the Year award in 2003. ✹ AARON PRICE (’94 Ed.) has been named the new head football coach at Hanks High School in El Paso, Texas. ✹ Former state Rep. CHRIS REYKDAL (’94 Soc. St.) was elected as Washington’s new state superintendent of public instruction last November. He served in the legislature since 2011 and had worked for the State Board for Community and Technical Colleges since 2002. ✹ ANDREW WALKER (’95 English) was named department head of Instructional Technology and Learning Sciences at Utah State University in late 2016. ✹ CHARITY HUFF (’97 Comm.) is the new chief executive officer of Okanjo Partners Inc., a firm that offers e-commerce tools. Huff has cofounded several other businesses within the media industry. ✹ GEORGE CAMACHO (’98 Poli. Sci.) is the new head of the Criminal Justice Planning Agency on the island of Saipan. He was a legislative assistant at the Commonwealth of Northern Mariana Islands legislature’s Legislative Bureau before being
elected a member of their House of Representatives.

JEFF MARTINEAU ('00 Crim. Jus.) joined the Gig Harbor Police Department in January, after 13 years policing with the Orting Police Department. ★ BOB PECKENPAUGH ('03 HBM) has been appointed general manager at The Edgewater Hotel in Seattle. Peckenpaugh has more than 20 years of executive level experience and has worked in many hotels and resorts including one in Texas and two in California. ★ Former NFL and Seahawks player MARCUS TRUFANT (x'03 Busi.) has cohosted a podcast called "The Barbershop" since 2014. In 2012 he launched a mobile car-detailing business that is often used by the Seahawks players. Recently, he acquired and developed a self-storage unit. ★ Ave Maria University in Florida has named JOHN LAMANNA ('04 Kinesio.) the new director of athletics. Lamanna is currently, and will remain, the head coach of the men’s basketball team. ★ NICK GONZALES ('06 Const. Mgmt.) was promoted to vice president at Bouten Construction in the Tri-Cities. He joined the company in 2005 as an intern and worked as an engineer and project manager on a number of projects, including on the WSU Tri-Cities Bioproducts Sciences and Engineering Laboratory. ★ AUTUMN HEWITT ('06 BS Arch.) has joined Bernardo | Wills Architects as a BIM/CAD technician. She has five years experience as a BIM/CAD technician and has worked on several projects involving new credit union branches in eastern Washington. ★ ERINN QUINN ('06, '11 MN Nursing) was appointed to serve on the Klickitat County Board of Health. Quinn has worked as a nurse-practitioner, a public health nurse, and as nursing director at the Klickitat Health Department. ★ COLE WHITE ('06 MHPA) is the new CEO of the Community Health Centers of Central Wyoming. White has more than a decade of experience in health care leadership. He has worked in both Montana and Colorado, overseeing hospitals and clinics in the Rocky Mountain region. ★ MATT ZAREMBA ('06 MIS) is an entrepreneur and the owner of Zulu’s Board Game Café in Bothell. His café, which was designed to imitate a pub from the Lord of the Rings trilogy, combines tabletop gaming with a restaurant.

Washington State University now offers BS in Software Engineering degrees in Pullman and Everett and online MS in Software Engineering. Scholarships and financial aid are available.

Enroll Today!

school.eecs.wsu.edu/academics

GET YOUR SOFTWARE ENGINEERING DEGREE AT WASHINGTON STATE UNIVERSITY
John Yeager wants to know what happens to materials all the way down to the nanoscale, even when they detonate. His curiosity led to three WSU materials science degrees, and a recent award.

YEAGER ’06, ’08 MS, ’11 PHD, now works for the Los Alamos National Laboratory’s High Explosives Science and Technology group in New Mexico. He received the Presidential Early Career Award for Scientists and Engineers in January.

Established in 1996, the Presidential Early Career Award is the highest honor bestowed by the U.S. government on outstanding scientists and engineers in the early stages of their independent research careers. Yeager is among 102 scientists and engineers from 12 government agencies who received this year’s awards.

“It is an incredible honor,” says Yeager. “I believe it means that my work is valued by my institution, Los Alamos National Laboratory.”

Yeager began working at Los Alamos during his doctoral study in 2009 and continued his research at the laboratory as an Agnew National Security Postdoctoral Fellow. He has been a technical staff member since 2013.

Throughout his career, Yeager has studied a variety of materials science problems, ranging from glass formation and corrosion to fuel-cell production and plastic-bonded-explosive performance.

“John is an innovative early career scientist, exemplifying a generation of scientists applying world-class cutting-edge science to pressing national security missions,” says Eric Brown, Los Alamos’ Explosive Science and Shock Physics division leader.

“I try to establish relationships between how the material is made and how it performs in normal use and also under abnormal conditions like a burning building,” says Yeager. “We can never control how the material behaves if we don’t understand how it is made.”

COURTESY JOHN YEAGER

Scholarship of $6,000 from the Chinese government. Che has published seven articles in peer-reviewed journals and is currently participating in a postdoctoral fellowship at the University of Toronto.

ANNE MCCASLIN (’16 Music, Psych.) was hired as the new concert band and elementary music teacher at Saipan Community School, located on Saipan Island, north of Guam. She has a background in both instrumental and choral music and has had ensembles showcased at such venues as Downtown Disney in Disney World, and various venues in Seoul, Sokcho, and Gyeongju, South Korea. Veterinarian AUDREY RABY (’16 DVM) joined Core Animal Clinic in Minot, North Dakota, at the beginning of 2017. Fall Creek Farm & Nursery, Inc. has named PAUL SANDEFUR (’16 PhD Hort.) as manager of the company’s U.S. breeding program. The program is intended for breeding mid- and high-chill blueberries in Oregon.


see you soon

150 E. Spring Street, Pullman, WA 99164 visitor.wsu.edu (509) 335-INFO

Monday – Friday 7 a.m. – 5 p.m., Saturday 9 a.m. – 2 p.m.

Academic displays • Visitor information • Event venue • WSU daily parking permits

Brelsford

WSU Visitor Center

WASHINGTON STATE MAGAZINE SUMMER 2017

50


Robert Smawley 1928–2017

Bob Smawley, “Mr. WSU,” embodied what it meant to be a Cougar for generations of Washington State University students, staff, and alumni, through his selfless service to the University, his caring nature, and his deep knowledge of WSU history, all delivered with a dry sense of humor and true compassion.

For over six decades, Smawley worked under six WSU presidents in several departments, volunteered and led in the Alumni Association, taught many the history of WSU through engaging slideshows, and mentored thousands of students.

“He was the heart of WSU,” says Malia Martine Karlinsky ’92. “Bob had a magical way of making you feel valued and welcome.”

Robert B. Smawley died January 1, 2017, at the Guardian Angel Home in Liberty Lake, Washington. He was 88 years old.

Smawley was born in a farmhouse about a mile from Pullman in 1928 to Lewis and Linnie Smawley, the fifth of six children. The family moved into Pullman when he was in first grade.

After he graduated from Pullman High School, Smawley served in the Navy from 1946 to 1948. With the GI Bill in hand, Smawley returned to Pullman and became the first in his family to attend and graduate from college.

After he graduated from Pullman High School, Smawley served in the Navy from 1946 to 1948. With the GI Bill in hand, Smawley returned to Pullman and became the first in his family to attend and graduate from college.

Smawley joined the Sigma Nu fraternity, and it was through his Greek connections that he met Carol Frost, a member of Alpha Gamma Delta sorority. They eventually started dating, and then married in 1950 while still at college. It was the beginning of a lifelong partnership and a shared desire to give back to the community they would make their home.

It also helped Smawley finish up his degree, joking that Carol was his live-in tutor. “You can’t believe how my grades improved during the next two years, and I give Carol full credit for that,” Smawley told Pat Caraher ’62 in 2005, when Caraher, editor-emeritus of Hilltops and retired senior editor of Washington State Magazine, interviewed his longtime colleague Smawley for an oral history.

Bob and Carol started their family while studying in Pullman, and had three daughters: Debbie Olsen ’73, Laurie Sahlberg ’77, and Susie Waananen ’85.

“He was such a great provider and protector, always looking out for his daughters and Mom,” says Sahlberg.

After he graduated in 1952, the Smawleys moved briefly to Spokane for work, but soon returned to Pullman. His first job at the college in 1953 as athletic tickets manager and Cougar Club coordinator kicked off more than 60 years of work and volunteer positions at WSU.

From ticket manager, Smawley joined the purchasing office, which he eventually led. He then became director of general services and superintendent of the University Police. In the late 1960s and early 1970s, he assisted with protest sit-ins, the arson fire that destroyed Rogers Field stands, and bomb threats.

In 1972, Smawley became the first director of the new Beasley Performing Arts Coliseum, while he still kept the job of general services director. He became interim director of University Relations, spent nine years in that department, and then “retired” in 1982.

His retirement was short-lived, as then-President Glenn Terrell asked Smawley to stay on to help the new vice president of University Relations, Stan Schmid, in the transition. Smaw-
Smawley remained as an assistant to Schmid for 11 more years, retiring again in 1993.

Smawley also volunteered around the University throughout his tenure: selection committee for the WSU Athletic Hall of Fame, building and facilities naming committee, WSU Parents Association, and many others.

Both Bob and Carol Smawley devoted time and energy to Pullman, as well. In addition to other groups, Bob Smawley was president of the chamber of commerce in 1977–78, president of the Lions Club, and a member of the hospital board.

Smawley was very committed to WSU alumni, serving in many capacities in the Alumni Association, including president of the Alumni Association in 1989–90, WSU’s centennial year.

Spokane attorney Bill Hyslop ’73 later succeeded Smawley as president, as did current WSU Regent Mike Worthy ’77, and Rich Lemargie ’70. All of them admired Smawley tremendously: “We had so much fun working with him that we were dubbed ‘Bob’s Boys.’ We even had sweatshirts made up for a retreat.”

Hyslop met Smawley in the early 1970s, when Hyslop was a student leader and they worked on fundraising for building Martin Stadium. “I was one of hundreds he mentored. He loved people, and people loved him,” says Hyslop, who went on to become a U.S. attorney and president of the Washington State Bar Association.

Smawley assisted Alumni Association Director Keith Lincoln ’61 and others in designing the distinctive Lewis Alumni Centre out of the old beef barn. Bob and Carol Smawley, along with Lincoln, laid the donor tiles on the floor themselves, says Alumni Association manager Mark Wilcomb ’85.

He started at the WSUAA in 1989 and recalls Smawley’s friendliness and warmth as he taught Wilcomb how to give tours of the building.

One of Smawley’s favorite jobs was unofficial historian of the University. Beginning in the early 1980s, his famous slideshows educated and entertained everyone from student groups to retiring University presidents and regents. Smawley said he had around 8,000 slides in 20 categories.

“Bob was a walking history book,” says Hyslop. “He knew more about WSU than anyone else who has graced the campus.”

His presentations, carefully tailored to each group, originally used a slide carousel, but Smawley began digitizing in the mid-2000s with the help of WSU staff members Rich Scott ’71 and Henry Moore.

Beyond all of his other work, Smawley was a mentor and sounding board for many WSU students. Karlinsky says that “Coug daughters” such as herself and Victoria Miles Suzuki ’93 benefitted from Smawley’s friendship and encouragement. When she was ASWSU vice president, says Karlinsky, “he would take me to coffee or ice cream and we’d chat. He became like my second dad.”

It kept Smawley connected, too. “He was so energized by the college and the students,” says his daughter Sahlberg.

Smawley received many awards at the University: Alumni Achievement award, Outstanding Service Award, Staff Member of the Year, and, most of all, the Weldon B. “Hoot” Gibson Distinguished Volunteer Award in 2011, a fitting tribute to his life of service to WSU.

The love of his life, Carol, passed away in 2013 at the age of 81. She had completed her WSU degree in 1983, a master’s in education in 1985, and worked for the Pullman schools.

One of Smawley’s other passions was gardening, and he applied his green thumb to grounds around the Alumni Centre through 2015. Lincoln and other Alumni Association leaders designated the entrance as The Bob Smawley Courtyard.

Smawley told Caraher in 2005 he had worked at an on-campus tree nursery as a high school student: “If somebody had asked me how I got started at Washington State, it was pulling weeds. And how did I finish? I’m out at the Alumni Centre pulling weeds for Keith Lincoln, so I guess I’ve made the whole circle.”

Smawley’s care of plants came from his desire to see them grow and prosper, just as his sincere and caring nature for students, alumni, his family, WSU, and the entire Cougar nation led him to give so much to so many of us. ✪
IN Memoriam


JANE DERR BETTS ('80 Home Econ.), 68, October 27, 2013, Weiser, Idaho.


JANE DERR BETTS ('80 Home Econ.), 68, October 27, 2013, Weiser, Idaho.


JANE DERR BETTS ('80 Home Econ.), 68, October 27, 2013, Weiser, Idaho.


JANE DERR BETTS ('80 Home Econ.), 68, October 27, 2013, Weiser, Idaho.


JANE DERR BETTS ('80 Home Econ.), 68, October 27, 2013, Weiser, Idaho.


JANE DERR BETTS ('80 Home Econ.), 68, October 27, 2013, Weiser, Idaho.


JANE DERR BETTS ('80 Home Econ.), 68, October 27, 2013, Weiser, Idaho.


JANE DERR BETTS ('80 Home Econ.), 68, October 27, 2013, Weiser, Idaho.


JANE DERR BETTS ('80 Home Econ.), 68, October 27, 2013, Weiser, Idaho.


JANE DERR BETTS ('80 Home Econ.), 68, October 27, 2013, Weiser, Idaho.


JANE DERR BETTS ('80 Home Econ.), 68, October 27, 2013, Weiser, Idaho.


JANE DERR BETTS ('80 Home Econ.), 68, October 27, 2013, Weiser, Idaho.
HOW DO VIRUSES AFFECT ANIMALS?

Dear Gianni,

Our planet is home to more than seven million amazing animal species. While we have our differences, we also have something in common: We are all made up of a bunch of cells.

My friend Jeb Owen told me all about it. He’s a scientist at Washington State University who is really curious about how insects eat blood and interact with animal hosts. He’s even been called a disease detective, tracking down viruses transmitted by insects.

We can think of animal cells as water balloons, Owen said. Of course, cells hold more than just water. Inside cells are different parts—almost like a little working kitchen—making things our bodies and cells need. The cell also holds the animal’s genetic material, or DNA, that acts like a little cookbook. The cookbook is the genetic material that has all the instructions for what makes you, well, you. The outsides of cells have small openings to move things in and out of the cell.

But viruses don’t have all the parts cells have. In fact, a virus is really just a bit of genetic material wearing a protective coat. It’s like a little cookbook without a kitchen. So, viruses can’t make anything on their own. A virus needs a cell to make more viruses using the cell’s kitchen. In a way, viruses are a bit like burglars. They’ve got special “keys” on their coats they use to get through the openings on the outsides of cells.

Once a virus breaks in, it can trick the cell into making more of the virus. The cell makes so much virus the cell bursts like an overfilled water balloon, releasing all the new virus copies. When the cells burst, it can make it hard for the body to work, which causes sickness. The immune system, which defends the animal’s body against infection, may recognize something unusual is up.

Sometimes if enough virus gets in, the immune system that works to protect you also ends up causing harm. Cells that protect you and kill off the virus end up killing healthy cells in the process. This can also make us sick.

Some viruses put their genetic material into the genetic material of the animal’s cells. This can make animal cells misbehave and become cancerous. Cancer cells cause your tissues, or the community of cells working together, to fail. This can make you very sick, too.

Most viruses only infect one kind of animal. Even though animals are related, there are small differences in the cells of each kind of animal. It is like the cells of different animals have specific doors and locks on the outsides of the cells. Viruses open those “locks” and can only use that kind of animal as a host. When viruses develop “keys” that work on more than one kind of cell, they can move between different kinds of animals.

It’s a great question you ask, Gianni. Scientists are curious about it, too. After all, knowing more about viruses can help us understand how they move around and how to prevent them. In that way, we can help our animal—and people—friends live even better lives.

Sincerely,

DR. UNIVERSE

Jeb Owen also leads an elementary school program in Pullman that brings together art and science. Send us your drawings or write your own story about animals, cells, or viruses: Dr.Universe@wsu.edu
As we celebrate the achievements of WSU graduates statewide and beyond, we also thank the tens of thousands of alumni and friends whose generous gifts throughout the year help to make the WSU experience rich and rewarding for all students every day.

Open doors for future Cougs with a gift to WSU today.

foundation.wsu.edu/give
WHAT'S ONLINE * SUMMER 2017

magazine.wsu.edu

WEB EXTRAS
WSU history with Bob Smawley, AI sportswriters, fresh peas

FACEBOOK
Like the WSM page on Facebook for extra content

TWITTER
Follow us on Twitter for frequent updates

eLetter
Subscribe to WSM's monthly email newsletter

ORIGINAL VIDEO
Vaccinating against rabies in Tanzania

PHOTO GALLERY
Mr. WSU’s life and times

PINTEREST
Art and WSU-themed pins on our WSM boards

INSTAGRAM
Photographs from WSU campuses and around the state

eMAG VERSIONS
Read the magazine as you like it, on your tablet, phone, computer, or e-reader

mystory
Post your class note and browse news from fellow Cougs