



IMPACT  
2016

INNOVATION, LEADERSHIP AND EXCELLENCE

FOR **OREGON**  
THE NATION AND THE WORLD

— SINCE 1868 —

**Oregon State**  
UNIVERSITY



# IMPACT

Since 1868, Oregon State University has made a positive difference through teaching, research and outreach in every corner of the state. But our impact extends much further. Because at Oregon State University, leadership knows no borders. Excellence makes lives better everywhere. And innovation changes the world.

# THE MOMENTUM CONTINUES

The incredible momentum achieved over the past decade at Oregon State University continues to propel OSU to the forefront of new ideas, excellence, leadership and innovation each day.

As an internationally recognized public research university, OSU's impact in the state, the nation and the world furthers our rising reputation as Oregon's leading comprehensive university. Oregon State set a record in research funding last year — \$309 million — which totaled more research dollars than the state's six other public universities combined.

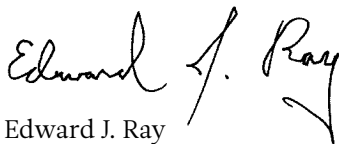
For the second straight year, OSU is the largest university in the state with more than 30,000 students. But Oregon State's mission is about more than big numbers. As Oregon's statewide university, we are committed to excellence, innovation and leadership in teaching, research and service to others.

This Impact 2016 brochure features stories that showcase the university's students, faculty, staff and alumni whose

achievements are changing the world. I'm hopeful that you will take some time to learn more about the impacts Beaver Nation is making.

As we continue to build upon the successes of the past decade — all evidence of a remarkable transformation at OSU — I can assure you that the best is yet to come for Oregon State University.

Now in my 13th year as Oregon State's president, I am inspired and continually appreciative of our students, faculty and staff. As OSU approaches its 150th anniversary in 2018, I am proud to serve this university and the state of Oregon, and I look forward to many more great accomplishments in the future.



Edward J. Ray  
President  
Oregon State University



# LEADING NUMBERS

Statistics are just one indicator of achievement — and Oregon State University is a leader in multiple categories



## **30,592** STUDENTS

Oregon's largest university continues to grow strategically, with enrollment up by 2.4 percent in 2015. Oregon State has 24,466 students in Corvallis, 1,016 students at OSU-Cascades in Bend and 5,110 students in its nationally ranked Ecampus online distance learning program.

## **5,803** FIRST-GENERATION STUDENTS

With an increase of 4.5 percent over 2014, nearly one out of four Oregon State undergraduates are first-generation college students.

## **6,754** U.S. MINORITY STUDENTS

Oregon State continues to build a diverse, inclusive and welcoming community, increasing minority student enrollment by 6.9 percent from 2014.





## **1,146** HIGH ACHIEVERS

Students with a high school grade point average of 3.75 or higher make up 41.6 percent of Oregon State's 2015 freshmen class.

## **62** PORTLAND-AREA VALEDICTORIANS

Oregon State was the No. 1 college choice for the top academic achievers from Portland-area high schools in 2015, attracting nearly twice as many high-achieving students as the next-closest university.

## **11.3%** INTERNATIONAL STUDENTS

More than 100 countries are represented among Oregon State's 3,328 international students.

## **6,038** GRADUATES

The class of 2015 was Oregon State's largest ever with graduates from all 36 Oregon counties, 49 states, four U.S. territories and 63 countries.

# RECORD RESEARCH FUNDING DRIVES ECONOMY, INNOVATION

Oregon State’s record \$309 million in research funding in 2015 – by far the most of any comprehensive public university in the state – reflects a growing research enterprise.

Oregon State continues to build industry partnerships with companies such as Hewlett-Packard, Nike, Boeing, Benchmade Knife, Sheldon Manufacturing and NuScale Power. Also in 2015, the Oregon State University Advantage/RAIN Corvallis business accelerator program nurtured 15 startup companies, including:

- Onboard Dynamics, a Bend company designing a compressed natural gas-powered vehicle engine that can be fueled from an existing low-pressure gas line.
- Vallislor, a Corvallis manufacturer of ultra-pure chemicals for the pharmaceutical, agricultural, polymer and electronics industries.
- MyExposome, a Corvallis company that empowers citizen scientists to monitor chemicals in their environment.
- eChemion, a Corvallis company that develops and markets technology to extend battery life.

## OREGON STATE RESEARCH BY THE NUMBERS

**\$10**  
MILLION  
in licensing revenue

**\$309**  
MILLION  
in research grants and contracts – a new record

**72** invention disclosures with commercial potential

**15** companies launched with support from OSU

**\$40** MILLION  
in private-sector funding

**73%**  
increase in licensing revenue over 2014

**\$670**  
MILLION  
in economic and societal impact from OSU research



## NEW APPROACH TO TREATING CANCER MAY BE A GLOWING SUCCESS

Imagine an approach to cancer surgery that offers a virtual road map to show which tissues are malignant and which are not.

Then imagine that even if some cancer cells were left behind, they would die.

The approach sounds almost too good to be true. But thanks to pioneering research in the Oregon State College of Pharmacy, this discovery may ultimately change the efficacy of cancer surgery and treatment around the world.

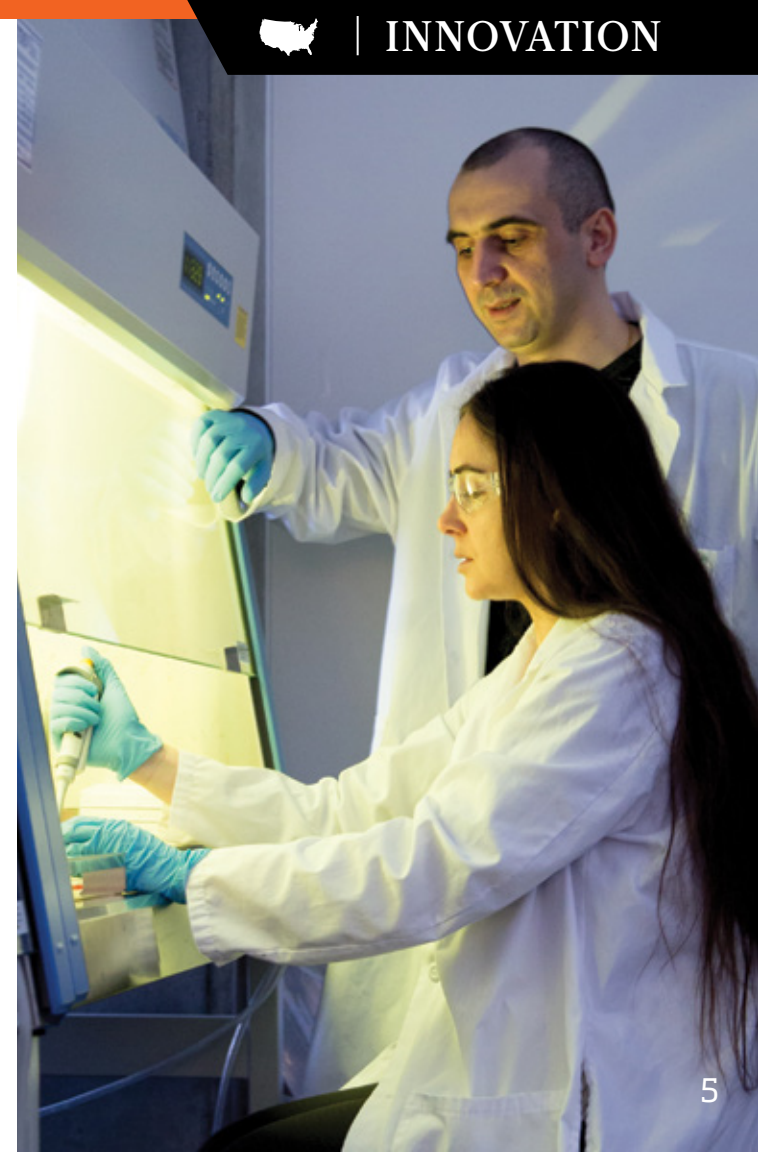
For decades, the primary treatments for most cancers have been surgery, chemotherapy and radiation. That list may soon include phototherapy — a remarkable concept in which cancer cells are made to glow and guide surgical removal with a precision never before possible — and at the same time kill remaining cancer cells.

“This system that can make cancer cells glow is like giving the surgeon an extra pair of eyes,” says Olena Taratula, a research assistant professor in the College of Pharmacy and lead author on one of the most recent studies. “And the compound we’re working with now is inexpensive and appears effective at killing any cancer cells that remain.”

Taratula and her husband, Oleh Taratula, also an assistant professor in the College of Pharmacy, have collaborated to make several important advances just in the past year. A single agent has been identified that can be concentrated in cancer cells. Then, in the presence of near-infrared light, those cells glow, even as the compound is helping to kill them.

Tumors have been completely eradicated without side effects in laboratory animals. More animal research is planned, including studies with dogs in collaboration with Shay Bracha, a veterinary oncologist, and Milan Milovancev, a veterinary surgeon, at Oregon State’s College of Veterinary Medicine.

Human trials will be needed before the system is ready for wider use. But the potential of this concept is extraordinary.





# RECORD FUNDRAISING ADVANCES UNIVERSITY PRIORITIES





A year after completing the \$1.14 billion Campaign for OSU, the OSU Foundation has kept the momentum going with gifts totaling \$130.8 million in 2015 – the foundation’s best fundraising year ever.

Donor support continues to make a significant difference across the university. More than 3,100 students at Oregon State receive donor-funded scholarships and fellowships, helping recruit more high-achieving and diverse students. Donors are also boosting university research through 129 endowed faculty positions, along with investments in facilities and programs.

“Our donors see the university’s potential for leadership on issues critical for Oregon’s future as well as key challenges facing our world,” says OSU Foundation CEO and President J. Michael Goodwin. “Their investments in Oregon State build the critical mass and excellence that make real progress possible.”

The OSU Foundation is launching a series of strategic fundraising initiatives to support the university’s areas of distinction and its goals for student success. Current initiatives include:

- The Marine Studies Initiative, which, in addition to state funding, includes a \$40 million fundraising effort to support construction of a new facility in Newport, as well as provide funding for university-wide education, research and engagement programs in marine studies.
- The Oregon Forest Science Complex, a public-private partnership totaling more than \$60 million that will result in a combination of new and renovated facilities to accelerate forestry education programs and research on advanced wood products that can be manufactured in Oregon.
- A \$42 million renovation and expansion of the Valley Football Center, which will include facilities for all of Oregon State’s 500 student athletes. The project began construction last fall, with completion expected to occur in phases in August and October.

## Anonymous gift, state funding move marine studies forward

The Marine Studies Initiative, a university-wide effort to address the challenges facing the world’s oceans, is moving closer to reality with support from donors and the Oregon Legislature.

In 2014, an anonymous foundation made a \$20 million grant to support the Marine Studies Initiative. The grant – contingent on raising an additional \$20 million from private donors by June 30, 2017 – will support construction of a \$50 million facility at the Hatfield Marine Science Center in Newport.

Of the additional \$20 million from private donors, about \$5 million will support the facility construction, and \$15 million will provide funding for marine studies education, research and engagement on issues ranging from rising sea levels and ocean acidification to sustainable fisheries and economic stability.

The marine studies facility won approval for \$24.8 million in state bonds from lawmakers in July 2015. The new facility will allow the university to add 20 to 25 new teaching and research faculty and support 400 to 500 students-in-residence across multiple disciplines from every college at Oregon State.



## FINANCIAL AID PROGRAM BRIDGES THE GAP TO MAKE COLLEGE POSSIBLE FOR MORE THAN 2,500 STUDENTS

Oregon State's Bridge to Success — the largest financial aid program of its kind in Oregon — has been helping students pursue their dreams for nearly a decade.

Launched in 2008, the program combines federal, state and university funds to help qualified Oregon residents attend Oregon State tuition-free. On average, 2,500 students — about 10 percent of Oregon State's total undergraduate enrollment — receive Bridge to Success support each year. Since inception,

the program has provided \$25.7 million in university and donor grants and scholarships for Oregon students.

Bridge to Success is designed to consider all eligible students. Financial aid applicants who meet Pell Grant and Oregon Opportunity Grant eligibility are automatically considered.

Ji Yun Hwang, a junior from Salem majoring in chemical engineering, says the Bridge to Success program allowed her to explore all areas of her major before deciding on a focus,

something that would have been unaffordable otherwise. Now she can follow her dream of becoming a researcher for the U.S. Department of Energy and work to develop energy systems from environmentally friendly sources.

“If you are passionate about learning and achieving your future goals, the Bridge to Success program will open the door to opportunities you never thought you'd have,” Hwang says.

## FEARLESS LEADER

“If there’s something you want to do, just go out there and do it.”

It’s what Jeannie Sullivan says — and does. She spent six days “knee-deep in whale” with a team of volunteers when a blue whale washed up on southern Oregon’s Ophir Beach. The necropsy — an animal autopsy — was Sullivan’s chance to work with the world-renowned whale expert who inspired her to move all the way from Buffalo, New York, to attend Oregon State: Bruce Mate, director of the university’s Marine Mammal Institute.

“Sometimes you have to get outside of your comfort zone because that’s where you learn the most about yourself,” says Sullivan, a senior majoring in agricultural sciences with minors in speech communication and leadership.

Sullivan is constantly pushing boundaries. She immersed herself in the cultures of 15 nations through the Semester at Sea program, and she says it was such a great experience that she’s doing it again with a new slate of countries to visit.

On campus, Sullivan is a mentor for the Louis Stokes Alliance for Minority Participation (LSAMP), which focuses on bringing underrepresented students to the STEM fields — science, technology, engineering and math.

“Not a lot of students of color go into STEM,” she says. “I really want to help other students realize they can do this.”

In LSAMP, Sullivan found a community, one that helped her realize how powerful it is to be an African American woman in STEM and convinced her to pursue a career in advising or recruiting at the university level.

Sullivan also works as an ambassador for the Office of Admissions. On tours, she encourages potential students to explore their options when choosing a new activity, meeting people or planning a career.

“Don’t say you can’t do something. You can always do something,” Sullivan says.

She’s done plenty.



## FOCUSING HER ENERGY ON PROBLEM-SOLVING

When Oregon State University-Cascades welcomed its first cohort of freshmen and sophomore students, Gertrude Villaverde was among them — and laser-focused on using her studies in Energy Systems Engineering (ESE) for the greater environmental good.

“I am a problem solver, and engineering solves problems at the highest level,” she says. “OSU-Cascades is giving me tools for my utility belt.”

Oregon State’s ESE degree — offered exclusively at OSU-Cascades in Bend — is the fourth of its kind in the nation to receive full accreditation from ABET, the body that accredits academic programs in applied science, computing, engineering and engineering technology. The curriculum addresses complex engineering and business issues, producing graduates who can design both traditional and alternative energy systems that maximize efficiency.

Villaverde has a unique learning opportunity to see the concepts she’s studying put to work as OSU-Cascades expands. The new campus under construction is designed to be net-zero energy ready, a concept where buildings produce as much energy as they use. Once completed, the campus will continue to serve as a living laboratory for teaching and research.

Villaverde looks forward to participating in the Multiple Engineering Cooperative Program (MECOP). Students in this competitive program complete two six-month internships where they can gain real-world experience with state, national and international engineering companies.

Villaverde believes her generation can help solve the environmental problems facing the world today.

“It starts with the individual, and then collectively we can tackle the big issues,” Villaverde says. “Engineering shows you the many different ways to solve a problem.”







## OSU-Cascades welcomes first freshmen class, begins campus construction

Oregon State University's campus in Bend achieved major milestones in 2015.

OSU-Cascades' first freshmen began classes in the fall. Of the 60 new students, 43 percent are from Central Oregon; 48 percent are from other Oregon communities; and the balance are from out of state. Total enrollment at OSU-Cascades grew by 3.7 percent in 2015 to 1,016 students.

Meanwhile, construction for OSU-Cascades' new campus began last summer and is progressing quickly. A 44,000-square-foot academic building will open in September 2016. The 3-story facility features 11 classrooms, labs, common areas and student

service offices. A 4-story, 113,000-square-foot residence hall and dining complex is expected to open in early 2017, with housing for approximately 300 students.

The 10-acre campus emphasizes sustainability with buildings that will be net-zero energy ready. A net-zero energy building produces as much energy as it uses. Mechanical and electrical systems in the new buildings will be ready to connect into future renewable energy sources such as photovoltaic panels, geothermal loops or biomass boilers. They will also feature high-efficiency, triple-glazed windows and increased insulation to reduce heating and cooling demands.

Landscaping will use plants native to Central Oregon's high desert to reduce irrigation needs. And sustainable transportation initiatives encouraging students and faculty to walk, bike and take public transportation to campus will reduce dependency on single-occupancy vehicles.

Madeleine Edwards, who came from Shaver Lake, California, was attracted by OSU-Cascades' strong natural resources program and its proximity to skiing, hiking and biking.


"It's super exciting being part of the first freshmen class because we are trailblazers," she says. "We are leading the way for future classes to follow."



# GLACIERS TO OCEANS, CLIMATE CHANGE HAS FAR-REACHING IMPACTS







Oregon State researchers have been tracking the effects of climate change on Mount Hood's Eliot Glacier since the 1980s.

It's not just glaciers in Alaska, Greenland and Antarctica that are melting due to climate change. It's also happening in Oregon's Cascade Range. In fact, it's been happening for more than a century.

Eliot Glacier — on the northeast slope of Mount Hood at an elevation of 7,733 feet — has shrunk dramatically since geophysicist Harry Fielding Reid took the first scientific photo in 1901. Oregon State's Peter Clark, his colleagues and students have been monitoring Eliot and other Oregon glaciers since the 1980s.

“The thing that's most striking to even the non-scientist visitor should be the amazing amount of retreat that the glacier has experienced. It's only a small fraction of its size from 100 years ago, and it will largely be gone within the next 100 years,” says Clark, a professor of geology and geophysics in the College of Earth, Ocean, and Atmospheric Sciences.

Clark studies the history of glaciers and ice sheets and their connection to the ocean. What he sees on Mount Hood is a good example of how glaciers worldwide are retreating — and contributing a large

amount to the sea-level rise that's been occurring across the world's oceans over the last century. According to the United Nations, half of the world's population lives within 37 miles of the sea, and three-quarters of all large cities are located on a coast. So even small changes in sea levels can have very large impacts, Clark says.

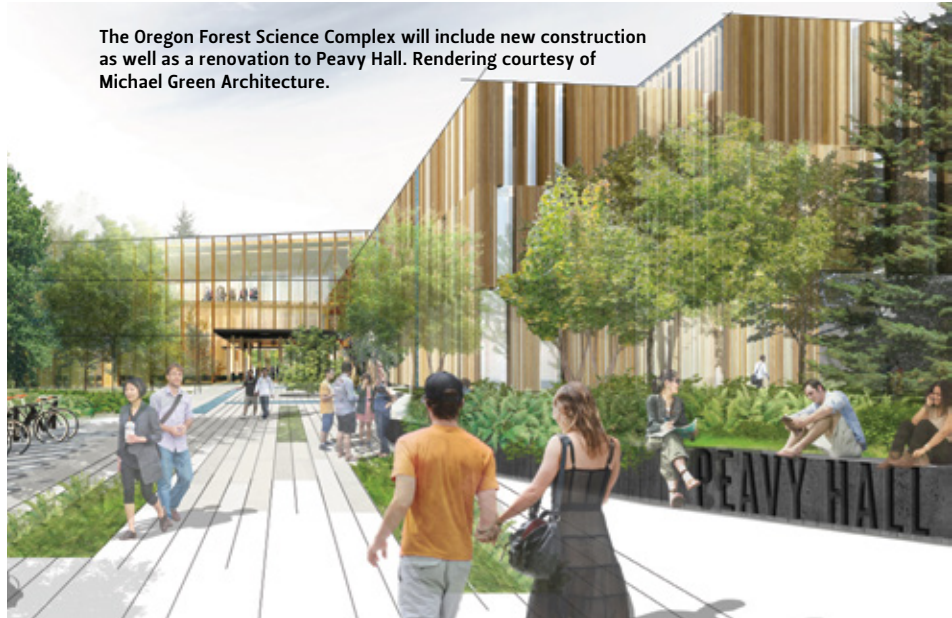
Clark, who oversaw projections on sea-level rise for the most recent report by the global Intergovernmental Panel on Climate Change, believes preventing the damaging impacts of climate change will require government policy decisions as well as grass-roots efforts by society. He's encouraged by his students.

When Clark started teaching a class on climate change for non-geosciences majors 20 years ago, enrollment was small, and awareness was low. Today, the course is oversubscribed, and students are much more informed about climate-change issues. Having students go out into society and share the knowledge they've gained to inform others, Clark says, “will be a hopeful sign of things to come.”



# INNOVATIVE WOOD PRODUCTS PROMOTE SUSTAINABLE DEVELOPMENT, CREATE OREGON JOBS

The Oregon Forest Science Complex will include new construction as well as a renovation to Peavy Hall. Rendering courtesy of Michael Green Architecture.



Framework, a planned multi-purpose building in Portland, will be built using engineered wood products. Rendering courtesy of LEVER Architecture.



Future high-rise construction projects in the Pacific Northwest and beyond may be built using an advanced, yet familiar, material: wood.

But not just any wood. Researchers in Oregon State University's College of Forestry are working with the forest products industry to develop production processes for cross-laminated timber panels. The panels consist of three, five or seven layers of lumber, which are glued together at 90-degree angles for exceptional strength.

Lighter than steel and concrete, cross-laminated timbers offer a number of advantages, including fast installation, structural simplicity, design versatility and sustainability. Research indicates cross-laminated timber structures are capable of meeting and exceeding seismic and thermal building design standards.

For rural Oregon, cross-laminated timber has the potential to create much-needed manufacturing jobs. Lech Muszynski, an associate professor of wood science, and other Oregon State researchers are collaborating with

D.R. Johnson Lumber, a second-generation, family-owned wood products manufacturer in Douglas County. In 2015, D.R. Johnson became the first company in the U.S. certified to produce structural cross-laminated timber.

One of the nation's first wood-framed high-rise buildings is being planned in Portland. Framework, a 12-story mixed-use development of retail space, offices and affordable housing in the Pearl District, will incorporate a mix of cross-laminated timber and glue-laminated timber, also known as glulam. The project, one of two winners in the U.S. Tall Wood Building Prize Competition last year, is envisioned as a catalyst for future developments using engineered wood products that are harvested from sustainably managed forests in Oregon and the Pacific Northwest.

## Innovative forestry center wins industry, state support

The Oregon Forest Science Complex, a state-of-the-art research and teaching facility for the College of Forestry, made progress toward its funding goals in 2015 with support from the Oregon Legislature, the timber industry and other donors.

In addition to \$29.7 million in state bonds approved by lawmakers last summer, the project has received more than \$32 million in private support.

Oregon State was ranked 9th in the world for agriculture and forestry by QS World University Rankings in 2015, and the Oregon Forest Science Complex will strengthen the university's international reputation for excellence and innovation in forestry, natural resources and sustainability. The 85,000-square-foot facility will support the College of Forestry's plan to meet industry demand for forestry professionals by doubling enrollment to more than 2,000 students.

The new complex, to be built near existing College of Forestry buildings on campus, includes a 20,000-square-foot Advanced Wood Products Laboratory for research and development of sustainable materials such as cross-laminated timber that can be used in tall buildings. The laboratory will also help researchers develop adhesives and production processes in collaboration with industry so these engineered wood products can be manufactured in Oregon.

## CONNECTING SCIENCE AND THE HUMANITIES

Kylie Welch doesn't limit herself. A senior from Bend, she came to Oregon State intrigued by the power of DNA, proteins and other molecules. But she also wanted a human connection.

"I wanted to know what this science means for people across the globe," she says.

Welch is pursuing a double major in biochemistry and anthropology, combining molecular biology with the richness of culture.

"Biochemistry allows me to see the technical side, but then I could see how it actually affects people," she says. "Cultural anthropology brings it all together. They're two pieces of the same puzzle. Biology affects culture, and culture affects biology."

Welch also joined Oregon State's Honors College, drawn to its small class sizes and the research opportunities where she could bridge the gap she perceived between science and the public.

For her thesis, Welch began a coastal ocean project in Professor Miguel Goni's lab in



Kylie Welch (right) collected samples on Beaver Creek near Ona Beach as part of a research team studying how carbon moves through ecosystems.

the College of Earth, Ocean, and Atmospheric Sciences. Goni's research focuses on how the land influences coastal waters, so Welch analyzed water samples and created maps of carbon and nitrogen concentrations along the California Current in the Pacific Ocean.

And just for good measure, Welch participated in two service projects overseas — one to Romania with Habitat for Humanity and the

other to Ethiopia through The Community Project: Ethiopia.

"When I came to Oregon State, I never imagined I'd be doing all this," Welch says. "There are so many opportunities that I don't want to close myself off to them. If I had done that in the past, I wouldn't have gotten to where I am today."



## A PASSION FOR THE OCEAN OPENS DOORS

Growing up in Southern California, graduate student Jessica Andrade developed a love for the ocean. Her journey to fisheries science at Oregon State began with a group project during her undergrad work at the University of San Diego where she focused on how ocean acidification affects fish behavior.

Andrade is now performing behavioral experiments on flatfish at Oregon State's Hatfield Marine Science Center (HMSC) in Newport. She says the combined resources of the National Oceanic and Atmospheric Administration, Environmental Protection Agency and the Oregon Department of Fish and Wildlife at HMSC help in her research.

For her tests, Andrade exposes the fish to scents of predators, then presents feeding opportunities for flatfish in normal seawater and seawater with a

higher concentration of carbon dioxide, simulating the predicted acidic ocean conditions at the end of the century. She records activity levels, posture, how quickly the fish begin eating and the number of feeding attempts.

When she finishes collecting data from these tests, Andrade will compare the results of the control seawater fish to the fish in acidified water. Andrade hopes her research will shed light on the impacts of human activity on marine life and the health of the world's oceans.

The combined stressors of increasing CO<sub>2</sub> levels, higher temperatures and pollution concern Andrade.

"Fish are a large source of food for people around the world, and they are a big part of the local and global economy," she says.

Andrade believes her work is "more than just research," but real, meaningful study that can help bring about change. "I'm really thankful that Oregon State opened up new horizons for me," she says.





## A VALUE-ADDED CAREER FOR OREGON STATE ALUMNUS

Trey Winthrop fell in love with Oregon State long before he became a student.

Back in the early 1980s, on a picture-perfect snowy evening in December, 8-year-old Winthrop and his family were visiting Corvallis and stopped at the Memorial Union, which was decked out for the holidays.

“It was the most beautiful place,” he says. “It really touched me.” In that moment, Winthrop decided he was going to be a Beaver.

Winthrop graduated from the College of Business in 1994. Through a twist of fate in 2005, he connected with Bob Moore, founder of Bob’s Red Mill. Bob and Charlee Moore are longtime collaborators with Oregon State’s College of Public Health and Human Sciences, and their \$5 million gift established the Moore Family Center for Whole Grain Foods, Nutrition and Preventive Health in 2012.

That meeting led to a job offer a few months later. Winthrop started as an accounting clerk and was named chief financial officer



of the global company in September 2015. Although his job focuses on the numbers or what he likes to call “corporate storytelling,” Winthrop believes in the company’s values and mission of helping people eat healthy through whole grains.

Winthrop attributes much of his success to the strong honors program in his fraternity at Oregon State, as well as his strategic planning professor, Barry Shane.

“He taught me to ask all the right questions,” Winthrop says of choosing a career. “It really shaped my future.”

Winthrop remains actively connected to Oregon State. He speaks at Business Roundtable events and works one-on-one with business students by participating in mock interviews and providing real-world advice. Bob’s Red Mill has hired several Oregon State alumni, and Winthrop plans to offer student internships in the future.





## TAKING CHARGE TO IMPROVE NUTRITION

Oregon State University is teaming up with local educators, youth, communities and businesses to meet a common goal: to help Oregonians thrive.

The Healthy Communities Outreach Project is a partnership between Milwaukie-based Bob's Red Mill and multiple programs in the College of Public Health and Human Sciences: the Moore Family Center for Whole Grain Foods, Nutrition and Preventive Health, OSU Extension Service Family and Community Health and Oregon 4-H programs. The project aims to empower diverse communities to make healthy food choices by providing a positive environment where youth and families can learn to prepare and incorporate more whole-grain foods into their diets.

The statewide initiative distributed \$300,000 across all 36 Oregon counties. In Multnomah and Washington counties, for example, OSU Extension faculty

transformed teenagers into teachers, showing them how to become mentors and educate younger children about food safety, healthy recipes and gardening. In addition, more than 1,000 adults received food and nutrition guidance in English, Spanish and Russian.

In Clackamas County, Story Walk — a series of community paths where families can read pages of a storybook in English and Spanish as they walk — was created with the help of local schools, businesses and the Molalla Area Chamber of Commerce. The six stories, with themes promoting healthy eating and physical activity, were produced by local authors and illustrators.

Statewide, the Healthy Communities Outreach Project is helping to build a framework for future community-based programs and research on healthy living. And after its pilot year, the project is generating positive feedback.

“So many different people — from kids to local artists to the dentist office around the corner — saw this as an opportunity to improve the community,” says Emily Ho, endowed director of the Moore Family Center. “Everyone stepped up and joined together.”



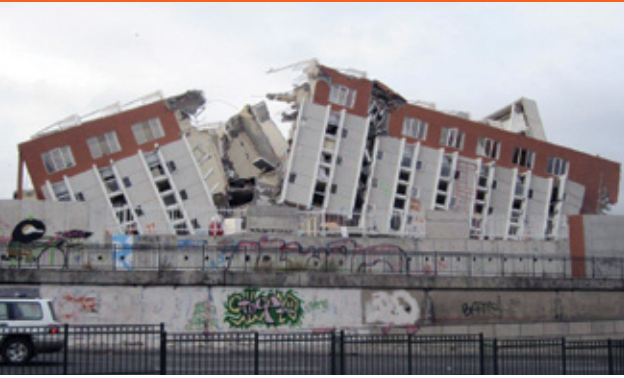


# DON'T PANIC – PREPARE

Oregon State leads outreach to channel earthquake, tsunami concerns into pragmatic action



Bob Yeats, a professor emeritus of geology and geophysics, documented damage to a high school running track in Taiwan after an earthquake in 1999. Top right: College of Engineering dean and earthquake expert Scott Ashford assessed damage after a 2010 earthquake in Concepcion, Chile. Bottom right: Ashford measures ground upheaval in Japan following a major earthquake in 2011.



A 2015 article in *The New Yorker* outlined the Pacific Northwest's vulnerability to a major earthquake, drawing a rather seismic reaction from many area residents. Though little can be done to reduce the threat of an earthquake, communities and residents can take action now to mitigate potential damage.

"We need to find a sweet spot between fear and action," says Patrick Corcoran, an Oregon State University education and outreach specialist who works with coastal communities on disaster preparedness. "What I try to do is temper people's tendency to toggle between the poles of 'it won't happen here' and 'it will be so bad there's no use worrying about it.'"

Oregon State scientists have been warning about the potential for a major earthquake in the Cascadia Subduction Zone since the 1980s. The subduction of a tectonic plate beneath North America could trigger a quake of magnitude 9.0 or greater, similar to the 2011 earthquake in Japan. It would wreck the power grid and other infrastructure throughout western Oregon and Washington, and it might also trigger a tsunami that could devastate coastal communities.

College of Engineering Dean Scott Ashford is spearheading the Cascadia Lifelines Program, a research consortium of public utilities, transportation agencies and others, to begin preparing for life after a major earthquake. "Communities need to think about restoring vital services after an earthquake," Ashford says, "including mobility, power, water, sewer and others."

For Corcoran, the first step to preparation is recognizing that an earthquake and tsunami are likely to happen. "Imagine the specific scenarios you and your loved ones will be facing," he advises. "Then work to improve your family's odds of survival and your ability to bounce back afterward."

For example, those living in tsunami inundation zones must identify high ground where they live, work and play; make those areas accessible; and practice evacuation drills.

Such preparedness proved effective in Japan. Although nearly 20,000 people died, mostly from the tsunami, nearly 200,000 people in inundation zones safely evacuated. Corcoran calls that 90-percent evacuation rate a worthy goal for the Pacific Northwest.

"We are behind the curve on this, but we can rise to meet the challenge," he says.



## STEM LEARNING A FOUNDATION FOR LIFELONG SUCCESS

Learning in the STEM fields — science, technology, engineering and mathematics — contributes significantly to rewarding work and an engaging life. However, whether advancing from elementary to middle school, high school to college or career and beyond, math is often a barrier to student success. Building confidence in math abilities — and getting students and families to see the value of learning math and applying it in their lives — is an ongoing focus at Oregon State.

“We’re seeking to use partnerships with schools and community colleges to apply research at scale to prepare students for each transition,” says College of Education Dean Larry Flick. “We see math and the other STEM subjects as central for preparing students for employment in a competitive global economy.”

The Center for Research in Lifelong STEM Learning is working to better understand how people learn in all aspects of their lives. An ambitious project by College of Education



faculty that studies STEM learning in Portland’s Park Rose neighborhood will have national implications, Flick says. The ongoing research, funded by the National Science Foundation, will build a computer model that can be used to understand where investments can be made to improve student and public knowledge of STEM subjects.

According to Flick, Oregon is one of eight states with the highest percent of English-

language learners, and 77 percent of those speak Spanish. Oregon State faculty are partnering with the Oregon Department of Education and Stanford University to analyze statewide data on outcomes for K-12 students who enter school not yet fluent in English. Insights from this research are informing policy at a statewide level, including new legislation to improve programs for English-language learners across Oregon.



## INITIATIVE PROMOTES MORE DIVERSE FACULTY IN STEM FIELDS

Susan Shaw sees a future for Oregon State University where all faculty come to work feeling affirmed.

“We are a place where people are happy because they are treated fairly and have the resources they need,” says Shaw, a professor of women, gender and sexuality studies and director of the School of Language, Culture and Society in Oregon State’s College of Liberal Arts. “A person’s gender or race are pluses for the job, and people don’t feel like they are disadvantaged.”

Institutional transformation at Oregon State isn’t simply an aspiration. It’s a work in progress through Oregon State ADVANCE — an initiative to recruit, retain and promote more women faculty in the STEM fields — science, technology, engineering and mathematics. The National Science Foundation, which launched the ADVANCE program in 2001, awarded a five-year, \$3.5 million grant to Oregon State in 2014.

“We would like to see more women and a more diverse faculty,” Shaw says. “But we don’t want people to simply get hired and promoted. We want them to feel that it happened in a way that was fair.”

A group of 28 university administrators completed a two-week course in the summer of 2015 built on Oregon State’s Difference, Power and Discrimination curriculum. In 2016, the training will be repeated for tenure-track faculty. Shaw believes these changes are not only good for women in STEM but also for everyone connected with the university, including students.

“We want to be sure we are attentive to issues of power and privilege and do our best to be equitable and just,” she says.





## PROMOTING HEALTH THROUGH SHARED EXPERIENCES

Oregon State graduate student Jafra Thomas has a lot on his plate, but he approaches his work with a sense of purpose and excitement. Simultaneously, he is pursuing a Graduate Certificate in College and University Teaching, a Master of Public Health and a Ph.D. in Kinesiology.

Thomas has focused on health promotion via health education throughout his academic career, teaching classes and leading numerous community outreach projects. His teaching plan follows a pragmatic approach that encourages students to ask questions

that promote peer-to-peer interaction and helps them discover how the topics relate to their lives.

Since Thomas was young, “community involvement and betterment has been a primary interest,” he says. At Oregon State, one aspect of his research examines how social roles and social constructs either detract from or promote healthy behaviors. His community outreach centers on the shared experiences of everyone in a community and finding innovative ways to encourage healthy lifestyles.

For example, at a California nonprofit, Thomas promoted rowing to youth who would not normally consider the sport. The program gave them an opportunity to experience their communities in new ways on the water while learning valuable lessons about working together to overcome challenges.

Thomas’ outlook on his heavy academic workload reflects his beliefs about promoting healthy behaviors: When the opportunity presents itself, focus on the broad goal of bettering yourself and your community, and be willing to communicate with others to make change happen.



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