

FOCUS

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Oregon State University
College of Forestry



Dear College of Forestry community,

Our brains are hard-wired for certainty. Certainty makes us feel safe and calm while uncertainty leaves us feeling vulnerable, threatened and on alert. When I think about all the ingredients that make up fire, uncertainty seems to be a key ingredient. When it comes to fire, we lack certainty about when we might expect a big fire year, we lack certainty around historical fire frequency, we lack certainty about long-term fire impacts with increasing fire severity, we lack certainty about the vulnerability of different forest management systems to stand-replacing fire. The list goes on and on.

Our faculty and researchers are committed to helping us better understand the world around us and to generating practical solutions to complex problems we face as a society. But science itself is not certain, and how do you even find certainty in a changing world where there is no “normal” or baseline with which to ground yourself? How do scientists use their expertise when uncertainty swirls around the data, the models or even the future?

But then again, uncertainty is part of what drives us as scientists to seek answers to these complex and everchanging challenges and advance concepts, practices and products that are relevant and resilient. College of Forestry scientists are looking at how to build resilience into forest management in an increasingly hot, dry (summer) climate. They are looking at shifting existing management strategies that are finetuned for economic gain, but poorly tuned for flammability, heat domes and novel insects. And they are looking at how we can look to the past and respectfully weave Indigenous Knowledge and practice into strategies that reduce uncertainty and visualize a better approach to working with fire and improving resilience to fire.

We don’t have all the answers yet, but after all, that’s part of the scientific process. As you read this edition of Focus, you will see us leaning into these questions, taking steps forward when we have answers, and staying humble and curious for when we need to pivot or change course.

To thrive and be resilient in 2024, and beyond, we must acknowledge that whatever got us here won’t necessarily be what takes us forward. But one thing we do know, it will take all of us, and all ways of knowing, to help build a stronger, more resilient world.

Tom DeLuca

Cheryl Ramberg-Ford and Allyn C. Ford Dean
Oregon State University College of Forestry

MAPPING WILDFIRE HAZARD

Using science to inform policy for a wildfire adapted Oregon

In response to longer and more severe wildfire seasons, a growing population living in the wildland-urban interface and the extensive impacts of the 2020 Labor Day fires, the Oregon Legislature passed Senate Bill 762 in 2021, laying the groundwork for statewide wildfire community adaptation efforts in a rapidly changing wildfire environment.

As part of this broader statewide effort, SB 762 directed Oregon State University, in collaboration with Oregon Department of Forestry, to create a map identifying where wildfires pose the most hazard to structures and other human developments. OSU was also directed to map the wildland-urban interface, or WUI, to be used in tandem with the wildfire hazard map to guide new defensible space and fire hardening building code standards in high-risk areas, bolstering community protection across Oregon. Additionally, SB 762 called upon OSU to map social vulnerability to help decision makers further allocate limited resources to those most in need.

The College of Forestry led an interdisciplinary team from across OSU. Their diverse expertise included wildfire risk science, rural economic development and social vulnerability, community combustion and impacts and communications and outreach. This team worked directly with a 26-member rulemaking advisory committee, county commissioners and planners, and engaged the public to co-produce maps that used the best available science, grounded in local knowledge of landscapes and communities.

“The hazard map was designed to give the state agencies implementing those codes a science-based foundation for deciding where to prioritize implementation,” said Andy McEvoy, a College of Forestry wildfire risk scientist involved in the maps’ development. “The state of Oregon wants to invest resources, people power, dollars, education and outreach into the communities where they can most positively affect risk reduction.”

Informed by science and practice

When the initial maps were released in the summer of 2022 according to the legislatively mandated timeline, they sparked many questions and concerns from people across Oregon. The pushback was strong enough that ODF rescinded the first maps less than two months after they were released.

Since then, the OSU science team working on the maps have been reviewing public feedback, coordinating with local professionals and planners, and incorporating changes into draft maps that address the primary concerns expressed about the first maps. Two significant changes reflect how fuels are less likely to burn on agricultural lands that are either irrigated or managed as hay and pasture. OSU researchers relied on input from fire modeling specialists, fire and fuel professionals and ranchers to develop the specific changes.

Public feedback in 2022 also caused the legislature to pass Senate Bill 80 during the 2023 session. SB 80 clarified that the map reflects environmental

hazard rather than risk, an important distinction that more accurately captures the science behind the map and how to interpret it.

The OSU team, along with five other state agencies and groups, also embarked on a comprehensive public engagement effort to provide information about the draft maps and how they’ll be used by state agencies, and to address concerns about how community wildfire disasters across the West are affecting Oregon’s insurance market.

Looking to the Future

As a dynamic tool, Oregon’s wildfire hazard map will continue to be updated every five years based on current data, best available science and policy direction to support statewide strategic community wildfire programs. By engaging with policymakers and the public, OSU scientists gained firsthand scientific knowledge, learned from practitioners’ experience, and found gaps in public outreach and engagement processes fostering new and nontraditional partnerships and collaborations to address some of Oregon’s most pressing needs.

“Our efforts here in Oregon have demonstrated the challenge, but also the importance of leveraging science to inform policy decisions,” said Chris Dunn, a College of Forestry assistant professor of wildfire risk science. “It will be a big help in Oregon as well as other Western states grappling with increasing community wildfire risk.”

Learn more about the map at beav.es/pft.

How was wildfire hazard calculated?

To create the wildfire hazard map, OSU researchers combined two primary datasets: (1) burn probability, the average annual likelihood a location will experience wildfire, and (2) fire intensity, measured in flame length. Both were modeled across Oregon using the best available science with the help of state and local fire professionals using four criteria: climate, weather, topography and vegetation.

Who was involved?

Led by the College of Forestry, the OSU research team included experts in:

- **Wildfire risk science:** Assistant Professor Christopher Dunn and Andy McEvoy
- **Rural economic development and social vulnerability:** Associate Professor Mindy Crandall and Caitlyn Reilly
- **Community combustion and impacts:** Professor Erica Fischer
- **Communication, project coordination and public interface:** Shannon Murray and Myrica McCune

External agency collaborators included Oregon Department of Forestry, Oregon State Fire Marshal and Department of Consumer and Business Services.





Photo: Ariel Cowan



Photo: Christopher Adlam



Photo: Carrie Berger

BY THE PEOPLE FOR THE PEOPLE

Extension Fire Program fosters place-based partnerships

As a land grant university, Oregon State University takes research and innovation out of the labs and puts them into practice in the communities and landscapes around the state through Extension programs. While OSU’s influence extends globally, our success is also measured by our ability to equip and support every Oregonian—both rural and urban.

Oregon faces increasing challenges and opportunities related to wildland fire. In response, Oregon State created a dedicated Extension Fire Program in 2020 to help foster fire-adapted communities and resilient ecosystems through place-based partnerships. Six regional fire specialists provide wildland fire outreach, education and engagement. Two outreach program coordinators lead special initiatives focused on fire science application and workforce equity. A manager and director support their work and provide overall program direction.

This team helps build “place-based partnerships,” meaning they live and work in each of their service areas and have deep regional fire history and ecology knowledge. They also collaborate with communities and partners on shared visions for fire adaptation that fit the local geographical and social

context. This place-based work is guided by the program’s Theory of Change, which is an approach that supports strong and equitable processes for living with fire at all scales.

The work of the Extension Fire Program is diverse, and includes community fire preparedness like wildfire protection planning and tools for evaluation and adaptation; and efforts to increase landscape resiliency, such as prescribed fire education, training and capacity building. The team emphasizes partnerships with communities facing disproportionate wildfire risk and those with less access to mitigation and recovery resources.

Emily Jane “EJ” Davis, an associate professor in the College of Forestry and social scientist, is the director of the Extension Fire Program.

“Research shows that community-based approaches to living with wildfire that engage local people are the most effective. The Extension Fire Program leads by those principles, and seeks to bring together all the agencies and organizations in wildland fire so that we can do more collectively,” explained Davis.

Meet the fire team and learn more on page 8.

OSU Extension Fire Program—Theory of Change

The OSU Extension Fire Program uses its Theory of Change to focus their place-based work on the goals of resilience and adaptation, using four distinct strategies as represented below:



NICE TO MEET YOU!

Across Oregon, our Extension Fire Team is there for the many different communities, climates and ecosystems of the state. Serving over 4.2 million Oregonians, six agents, two coordinators, a program manager and director work hard to ensure communities are wildfire ready and wildfire safe. Meet the team and learn more about the regions they serve:



EMILY JANE "EJ" DAVIS
Fire Program Director

I love supporting and learning from our diverse team. We each have different backgrounds, experiences and values, which come together to make our program multifaceted and interesting. As a social scientist, I am interested in understanding how diverse people and organizations can work together to support more fire-adapted communities and resilient landscapes.



CARRIE BERGER
Fire Program Manager

As the manager of the program, I love the diversity of people I get to meet and developing a connection with them. These relationships allow us to find common ground to work on (wildfire) solutions for the benefit of Oregon's communities and landscapes.



MANUEL MACHADO
Outreach Program Coordinator

My favorite part about this role is that it aligns with my personal values and does not place limitations on what can be done to empower our communities and change systems of inequity. Here in the Rogue Valley, I feel fortunate to work alongside and learn from a community so full of passion and grit.



AUTUMN ELLISON
Outreach Program Coordinator

I find it really energizing when I can connect people with each other for information, resources or to help answer questions. Watching new partnerships grow from these efforts is inspiring!



CHRISTOPHER ADLAM
Regional Fire Specialist, Southwest

Southwest Oregon landscapes and communities are incredibly varied but all of them have a fire story. It's a privilege to work across the region to help write the next chapter!



ARIEL COWAN
Regional Fire Specialist, Central

The rural and urban communities of the Central Region have deep connections with the outdoors, including our fire-adapted ecosystems. As the region grows quickly, I enjoy demystifying fire for people of all ages and backgrounds through experiential learning of local fire ecology and empowering readiness for wildfire seasons.



KAYLA BORDELON
Regional Fire Specialist, Willamette Valley & Cascades

The counties I serve are home to half the population of the state, including the urban core of Oregon *and* many small, rural communities. This diversity means that I support community and landscape resilience in a variety of ways—from crafting resources for smoke and wildfire preparedness for outdoor workers in the heart of the Willamette Valley, to working with partners to prioritize landscape treatments across large rural landscapes. No matter where I am in my region, momentum is strong to develop pathways to fire resilience that are community-driven and locally-relevant. [Read more about Kayla's work on page 15.](#)



AARON GROTH
Regional Fire Specialist, Northwest Coastal

Wildland fire has played a key role across the Coast Range and the loss of cultural or Indigenous fire has led, with other factors, to the loss of over 90% of Oregon's coastal grasslands and decline in oak habitat in the eastern foothills. As highlighted by the Echo Mountain Fire Complex, even relatively small fires can have devastating impacts on homes, recreation, timber, habitat and water.



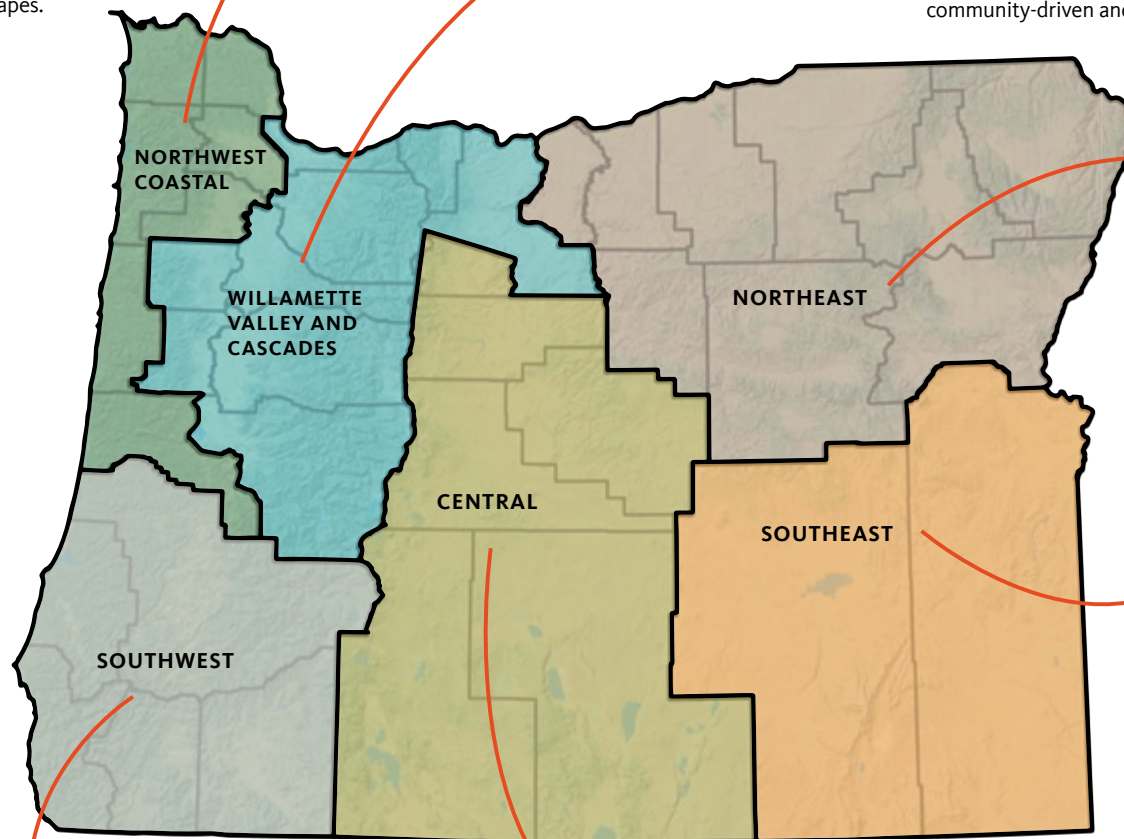
MICAH SCHMIDT
Regional Fire Specialist, Northeast

A unique thing about my region is that northeast Oregon is filled with small communities in which the people take care of each other. I enjoy my position because I can help these communities prepare for and interact with fire in a positive way.



KATHERINE WOLLSTEIN
Regional Fire Specialist, Southeast

While I help individuals, organizations and communities apply rangeland and fire science, one of the more meaningful aspects of my job is helping these groups find ways to effectively organize and work together toward fire adaptation. In my region dominated by public land and where ecological, social, and political dynamics and resource-dependent livelihoods all intersect, this work is endlessly interesting.



Learn more, ask questions and stay connected with OSU Extension Fire Program at beav.es/pgu.

FIRE STORIES

Fire research, education and collaborations

Tree Ring Lab studies fire history through dendrochronology

The College of Forestry's Tree Ring Lab takes a deep dive into learning from tree rings—through the science of dendrochronology. By analyzing tree rings, lead scientist Andrew Merschel, Oak Ridge Institute for Science and Education (ORISE) postdoctoral scholar with the U.S. Forest Service and Oregon State University, is uncovering important new information about fire history, forest stand development and Indigenous burning that informs our understanding of forest ecosystems, the complexity of old-growth development and how we might better steward the diverse forests of the Pacific Northwest.

Merschel works with a large team of management collaborators, science partners and students to collect, process and interpret the stories trees tell through their rings and wood. Associate Professor Meg Krawchuk and Amanda Brackett co-direct the lab and all three work together to support the research, training and teaching opportunities the lab provides.

"This research allows us to travel back in time and provide evidence of historical fire regimes that created the mature and old-growth forests we value so much today," said Merschel. "There's a surprising amount of fire in our forests documented by tree rings—it's the basic ecology work that I wish we would've been doing decades ago to inform management of our forest ecosystems today."

Graduate students in the Tree Ring Lab are applying this research in various ways. Ph.D. student Jennifer Bailey Guerrero is studying the development of marbled murrelet nesting habitat in relationship to fire. Sven Rodne's master's degree research involves historical stand and fire reconstructions in southwest Oregon. Charles Drake, who is also pursuing his master's degree, is looking at historical fire throughout the McDonald and Dunn Research Forests. A team of undergraduate students and field technicians are critical to collecting and processing samples, and are aspiring tree ring scientists, ecologists and practitioners of the future.

"Tree rings provide a shared understanding of the history of forests, people, fire, climate, wind, water, management—it's all there," said Krawchuk. "When you walk into a room with a cross section of tree rings and their stories, it opens up a rare opportunity to talk through ideas and worldviews about trees and forests that draws people in and brings them together in an astonishing way."

Reconstructing historical, cultural fire regime in Oregon's Coast Range

Glenn Jones, a master's student in the department of forest engineering, resources and management, is an Oglala Lakota descendent, an enrolled member of the Hoopa Valley Tribe of rural Northern California, and an active prescribed fire/cultural fire practitioner. Jones is working with Assistant Professor Chris Dunn to reconstruct a historical, cultural fire regime in the east slope of the Central Oregon Coast Range. Through a cultural lens, Jones sees the past seven generations (approx. 150 years) of land management as the crux of contemporary forest conditions. By better understanding forest conditions of our ancestral past, through Indigenous Knowledge and fire history, it informs our future seven generations' land management strategies in forests that are threatened by contemporary wildfires, climate change and contain critical habitat for culturally and ecologically important species. Funded by the Seeds of Success Bureau of Land Management grant, Jones will be working in conjunction with the Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians of Oregon and BLM lands to carry out his research.

New dual degree to focus on wildland-urban interface issues

Assistant Professor Chris Dunn is working on a new dual degree program with Erica Fischer, an associate professor in the College of Engineering, to train the next generation of wildland-urban interface researchers. It aims to bridge the gap between modeling and mitigating wildfire in natural landscapes and the built environment as more fires intrude upon communities. He is also part of a collaborative spatial fire planning process across the Pacific Coast states that bring partners, stakeholders and Tribes together to pre-plan wildfire response to be more proactive instead of reactive. A third project takes a critical look at using prescribed and cultural fire in recently burned areas to maintain the reduced risk, while protecting recovering areas from a reburn fire.

Assessing post-fire regeneration after the 2020 Holiday Farm Fire

John Bailey, professor of silviculture and fire management, is evaluating post-fire regeneration and recovery four years after the Holiday Farm Fire near Eugene, Oregon, including the potential to use drones to assess forest recovery. He's also examining the fuel hazard implications of operational silviculture on Humboldt and Mendocino Redwood Companies' lands in Northern California, and how it can be used to address wildland fire risk. His newly released book "A Walk with Wildland Fire" covers these two topics as well as the dozens of other complex issues surrounding society's challenging relationship with wildland fire—before, during and after it occurs.

Expanded courses update "fire and restoration" curricular option

Led by Associate Professor John Punches, Guard School is a wildland firefighting course with field sessions on campus and in the OSU McDonald and Dunn Research Forests. Available in credit and non-credit versions, undergraduate and graduate options, and open to OSU students and employees, Guard School utilizes National Wildfire Coordinating Group and Federal Emergency Management Agency curricula and certifies participants as entry level wildland firefighters. Punches also leads the prescribed fire practicum, which teaches students how to use prescribed fire to achieve ecological and fuel reduction objectives, with an emphasis on private land efforts. The course includes student led prescribed fire implementation. Additionally, Associate Professor Daniel Leavell, in collaboration with Professor Mark Hoffman from the College of Health, has created a new Wildland Firefighter Health and Safety course, and work is underway on a Dealing with Stress in Wildland Fire Ecampus course. Funding for these new courses has been provided through a grant from the Bureau of Land Management.

Opposite: Cross section of a lodgepole pine from the Fremont-Winema National Forest shows a fire scar from 1889. Below, L to R: Andrew Merschel inspects fire scarring on a ponderosa pine in Central Oregon. Amanda Brackett takes a core sample of a mountain hemlock on the Umpqua National Forest and Sven Rodne catalogs a fire record on the Elliott State Forest.



research updates



Artificial intelligence enhances monitoring of threatened marbled murrelet

Artificial intelligence analysis of data gathered by acoustic recording devices is a promising new tool for monitoring the marbled murrelet and other secretive, hard-to-study species, research by Oregon State University and the U.S. Forest Service has shown.

The threatened marbled murrelet is an iconic and elusive Pacific Northwest seabird that relies on the sea for food but raises its young as far as 60 miles inland in mature and old-growth forests.

“There are very few species like it,” said co-author Matt Betts of the OSU College of Forestry. “And there’s no other bird that feeds in the ocean and travels such long distances to inland nest sites. This behavior is super unusual, and it makes studying this bird really challenging.”

A research team led by Adam Duarte of the U.S. Forest Service’s Pacific Northwest Research Station used data from acoustic recorders, originally placed to assist in monitoring northern spotted owl populations, at thousands of locations in federally managed forests in the Oregon Coast Range and Washington’s Olympic Peninsula. Researchers then developed a machine learning algorithm known as a convolutional neural network to mine the recordings for murrelet calls.

Findings, published in *Ecological Indicators*, were tested against known murrelet population data and determined to be correct at a rate exceeding 90%, meaning the recorders and AI are able to provide an accurate look at how much murrelets are calling in a given area.

“Our results offer considerable promise for species distribution modeling and long-term population monitoring for rare species,” Duarte said.

“Monitoring that’s far less labor intensive than nest searching via telemetry, ground-based nest searches or traditional audio/visual techniques.”

College of Forestry graduate student Matthew Weldy joined Betts and Duarte in the study, along with Zachary Ruff of the College of Agricultural Sciences and Jonathon Valente, a former Oregon State postdoctoral researcher now at the U.S. Geological Survey, and Damon Lesmeister and Julianna Jenkins of the Forest Service.

Indigenous Knowledge and western science braided into recommendations for land managers

Two College of Forestry faculty are among the lead authors of a report that combines Indigenous Knowledge and western science for the purpose of informing future climate-adapted land management decisions across the United States. The authors say their recommendations include “practical and cultural management interventions that could help avert the loss of thousands of acres of old-growth forest.”

The report, co-led by Cristina Eisenberg and Michael Paul Nelson of OSU and fire ecologists Susan Prichard of the University of Washington and Paul Hessburg of the U.S. Forest Service’s Pacific Northwest Research Station, urges that Tribal stewardship practices such as thinning and burning be considered in future land management decisions by the U.S. Forest Service. The Forest Service had expressed interest in gaining a better understanding of the connection between Indigenous Knowledge and western science in land management planning.

“Our forests are in grave danger in the face of climate change,” said Eisenberg, the College of Forestry’s associate dean of inclusive excellence. “By braiding together Indigenous Knowledge with western science, we can view the problems with what is known as Two Eyed Seeing, to develop a path forward that makes our forests more resilient to the threats they are facing. That is what this report is working to accomplish.”

Eisenberg, who is Native American, is the associate dean of inclusive excellence and the Maybelle Clark Macdonald Director of Tribal Initiatives for the college and Nelson is a professor of environmental philosophy and ethics.

“Our report is deeper than changes in policy and management—it proposes a fundamental change in the worldview guiding our current practices,” Nelson said. “Our writing team’s cultural, geographic and disciplinary diversity allows for guidance on a shift in paradigms around how we approach forest stewardship in the face of climate change.”

Represented on the core writing team are Tribal members and Forest Service personnel as well as faculty from North Carolina State University, the University of Missouri, the University of Idaho, the University of Minnesota, the University of Arizona, the University of California and Universidad Nacional Autónoma de México. Read the report at beav.es/c24.

news & notes



The College of Forestry is on the cusp of acquiring a new property, the Tualatin Mountain Forest, which has historically been managed intensively as an industrial plantation. This forest, located just north of Portland, will help us research alternative forest management strategies and contrast them with traditional ones. We also hope this forest, positioned next to a large urban center, will become an important community recreation and youth education resource.



The Indigenous Natural Resource Office, launched in 2022, has successfully garnered over \$6 million in grant funding so far. The college is currently conducting a nationwide search for a tenure track Assistant Professor of Indigenous and Community Perspectives on Land, Ecosystem, & Cultural Stewardship. This position will help develop much-needed curricula and work with faculty, staff and students interested in understanding and applying Indigenous Knowledge for greater climate resilience in western forest ecosystems.



Tallwood Design Institute (TDI), a collaborative effort between Oregon State University and University of Oregon to advance mass timber design and manufacturing, has been designated a Pacific Northwest Mass Timber Tech Hub by the U.S. Department of Commerce Economic Development Association (EDA). TDI is also a member of the Oregon Mass Timber Coalition and in 2022 the coalition received \$41.4 million in federal funding, with about \$24 million going directly to TDI. The coalition recently submitted a \$55.5 million proposal to the EDA.



Oregon State University celebrated Dam Proud Day in April and the College of Forestry finished the day #1 on the leaderboards with the most money raised. Our marketing and communications team won the Spirit Award, the highest award the OSU Foundation bestows, for their outreach strategy. This strategy included placing Dean DeLuca and others, like Professor Emeritus Loren Kellogg and Zak Hansen, the senior director of development, in a dunk tank. Thank you to everyone who supported OSU and the college.



On May 29, the college hosted a dinner and reception at the Peavy Forest Science Center honoring the accomplishments of three talented alumni: Randy Hereford, B.S., Forest Engineering and Forest Management '77; Valerie Hipkins, M.S. Forestry and Genetics '89 and Ph.D, Forestry and Genetics '94; and Kendall Conroy, B.S. Renewable Resources '16 and M.S. Wood Science and Engineering '18. Randy joined Starker Forests in 1978 and became president and CEO in 2019. Valerie served as the associate deputy chief for research and development in the Washington office of the U.S. Forest Service and was recently appointed as the director of the Pacific Northwest Research Station. Kendall is the marketing director at Timber Products. Thank you for inspiring College of Forestry students to make a difference and shape the world we live in for the better.



Curious to learn more about the breadth of our work? Meet some of our incredible community members via our new video at beav.es/pfk.



Oregon State University was recently ranked one of the nation's 10 best online education providers for the 10th consecutive year by U.S. News & World Report. The College of Forestry is proud to offer many certificates, micro-credentials and degrees online. New this fall, our tourism, recreation and adventure leadership undergraduate degree will be available online. We will also be offering new online master's and certificate programs in the coming terms, with focus areas including mass timber, forestry, the timber circular economy and more.



In collaboration with local and regional partners, Kayla Bordelon, Oregon State Extension regional fire specialist, secured a nearly \$6 million grant for Wasco county, Oregon through the federal Bipartisan Infrastructure Law, which designated a \$1.5 billion investment into wildland firefighting and wildfire resilience.



Students in Associate Professor Ron Reuter's FES 445/545 Ecological Restoration class take an educational tour of Starker Arts Park wetlands.



Jaime Ortega Melendez, M.S. '24, inspects a research site after the Lookout Fire in the H.J. Andrews Experimental Forest.



Mariapaola Riggio, associate professor and Richardson Chair in Wood Sciences and Forest Products, works with student Hillary Johnson on a mass timber installation.



Students in Senior Instructor Jim Kiser's FE 207 Forest Surveying class take measurements in an area of the OSU McDonald and Dunn Research Forests.

COLLEGE OF FORESTRY
HOMECOMING
TAILGATE CELEBRATION

Saturday, October 19

Hatfield Courtyard, 2 hours before kickoff



GO BEAVS!



Oregon State
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