Healthy Forests, Healthy People

COLLEGE OF FORESTRY BIENNIAL REPORT

2017 AND 2018

Oregon State University

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Fog covers the forest near Larch Mountain in Multnomah County.

Welcome

Our college, our impact

The Oregon State University College of Forestry is recognized for our global research presence, teaching that transforms, and award-winning outreach and extension programs. This report summarizes much of our activity over the past two years and highlights the meaningful impact we have at all scales. Beyond the work accomplished by our community, this report is dedicated to the memory and impact of **Thomas Maness**, our dean who passed away on July 12, 2018.

Dean Maness knew our college had all of the tools to be the best in the world because our facilities are contemporary and state-of-the-art; and our people are collaborative, supportive and bring the intellectual horsepower needed to address the biggest challenges facing our forest landscapes and ecosystems. He knew our work addressed complex challenges while improving and changing lives across the globe. This report is a statement on the impact of his leadership, highlighting how he transformed our college by engaging a broad range of stakeholders, faculty, researchers, staff, students and alumni.

Thanks to his creation of the Institute for Working Forest Landscapes, the college is well-positioned to inform Oregonians about the connections between and benefits of healthy ecosystems, healthy communities, healthy people and healthy economies. Like Dean Maness, we recognize the need to provide global and local leadership that addresses the intersections of resource management and conservation, of traditional and emerging economies and the use of science-based management in the stewardship of our lands and resources.

Perhaps most of all, we believe in our students and recognize they are the lasting legacy we come together to collectively offer. Dean Maness consistently emphasized that their success and ability to make a difference is critical to the college, and encouraged us to value the important role faculty, staff and partners play in transforming their lives.

Our accomplishments over the past two years embody Dean Maness' innovative and collaborative spirit by highlighting the adoption of new practices, products and principles across a wide range of fields. His visionary and transformational leadership forever changed the College of Forestry for the better, and we will continue to deliver on the promise and potential we hold, and to lead in ways that would make him proud.

ANTHONY S. DAVIS
Interim Dean

College of Forestry students listen attentively during a forest engineering course taught in one of the college's eight research forests.

Education

#2

WORLD RANKING IN FORESTRY

CENTER FOR WORLD UNIVERSITY RANKINGS, 2017

1,206

TOTAL COLLEGE ENROLLMENT

AS OF FALL 2018

#3

IN THE NATION FOR NATURAL RESOURCES EDUCATION

COLLEGE FACTUAL, 2018

10

DEGREE PROGRAM OFFERINGS

EDUCATING FUTURE LEADERS

The College of Forestry offers students a variety of opportunities to experience hands-on work in the field.

Big Knife enjoys participating in undergraduate research.

HANDS ON LEARNING

makes a difference

Growing up in Madras, **Quinton Big Knife** worked for timber companies during breaks from school and soon decided he wanted to pursue a forestry degree at Oregon State University.

"I just really like being out in the woods," says the Oregon State senior. "It's exciting to see a forest go from unmanaged to managed and to see the difference it makes."

To ease his transition to Oregon State, Big Knife participated in the Louis Stokes Alliance for Minority Participation (LSAMP) program.

The LSAMP program at Oregon State, funded by the National Science Foundation, is dedicated to increasing the number of traditionally underrepresented students successfully completing science, technology, engineering and mathematics (STEM) baccalaureate degree programs. LSAMP also works to increase the number of students interested in and qualified for undergraduate research and graduate level studies.

"The program was really helpful," Big Knife says. "The college community is really great, and I have made a lot of great connections, especially since I started professional school."

Big Knife participates in the Oregon State student chapter of the Society of American Foresters (SAF), serving as vice chair. He is also involved in undergraduate research.

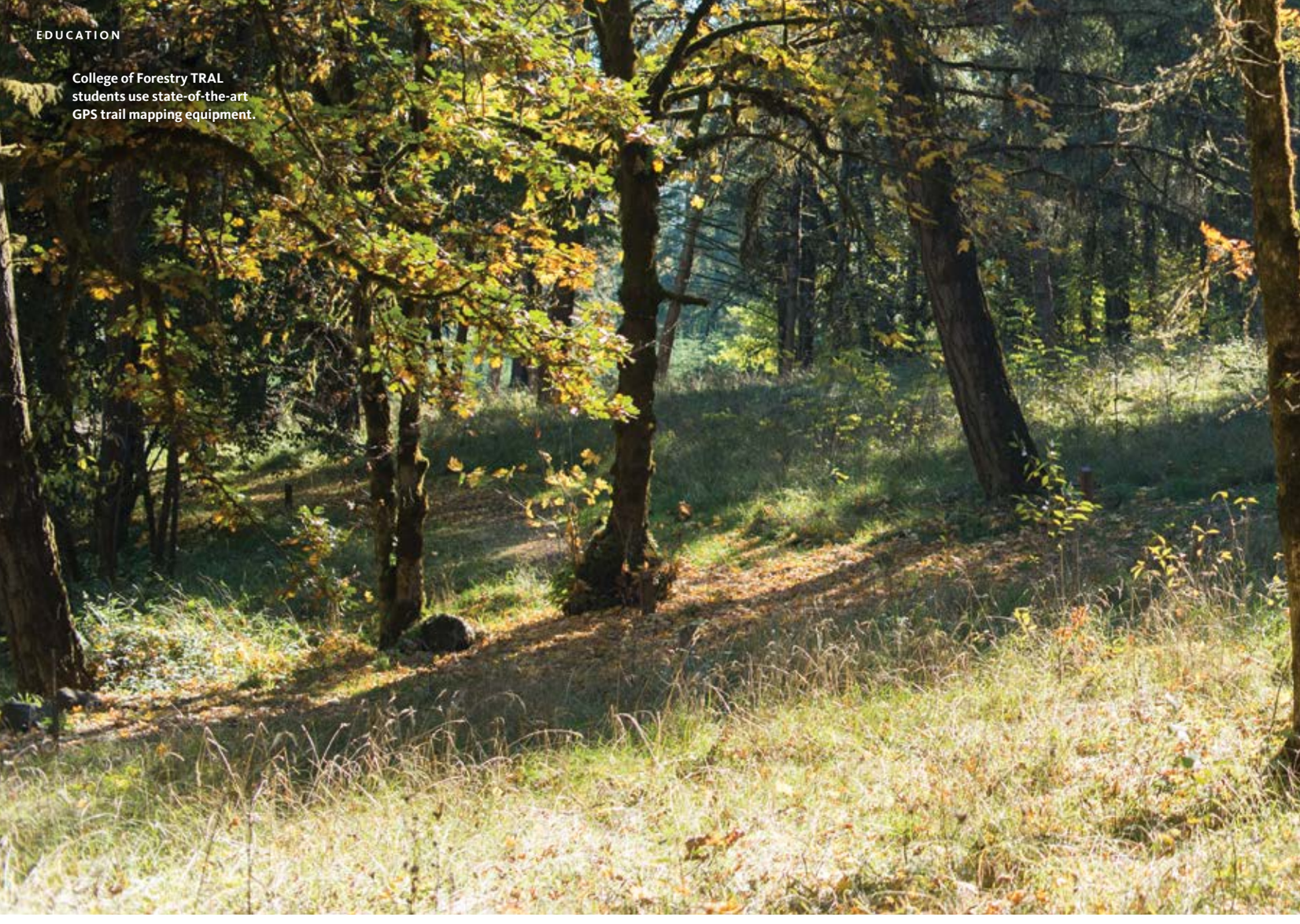
"The work is really fun and educational," Big Knife says. "The project is biomass research. We sample and take measurements of trees on different national forests, and help make biomass equations to inform land management decisions."

To conduct his research, Big Knife often spends eight days in the forest at a time, which he enjoys.

"I love going out to the College Research Forests for labs. Having them so close to campus is awesome. Learning how to timber cruise from a book is different from doing it yourself. You get your measurements, get your data, and really understand what the numbers mean," he says.

While Big Knife isn't sure where life after graduation will take him, he feels prepared to work in the forestry industry and is excited to implement active forest management techniques across our landscapes.

"I think agencies need more resources to carry out active forest management plans," Big Knife says. "And the public needs more information about what active forest management looks like. I am excited for my future career as a forester and silviculturist."



College of Forestry TRAL students use state-of-the-art GPS trail mapping equipment.

COLLEGE OF FORESTRY

undergraduate degrees

The Oregon State College of Forestry offers six distinct and top-ranked academic programs in a small, friendly environment where students get personal attention and guidance from faculty, staff and advisors.

Career paths take students into a forest, a factory, a laboratory or an office, and graduates leave Oregon State with knowledge and skills that are in demand in both the Pacific Northwest and worldwide.

All programs lead to a Bachelor of Science (BS) degree and allow students to focus on a particular forest landscape or ecosystem area.

FORESTRY

Oregon State is **world-renowned** for forestry education and research. In this program, students train outside, in forests and with real, cutting-edge technology and equipment. Students graduate with real-world experience, ready to actively plan for, observe and manage the health of the entire forest ecosystem. Graduates often go on to gain employment with either federal or state agencies or private timber companies.

The forestry program offers three options for students to focus on: forest restoration and fire, forest management and forest operations.

FOREST ENGINEERING

Oregon State offers **the nation's only ABET-accredited program** in forest engineering. This program emphasizes analytical skills required for evaluating engineering systems and integrates the mechanical and economic requirements of forest operations with the biological requirements of the forest.

Forest engineering students graduate ready to help meet global demands for wood products while sustaining water, habitat and other forest resources.

Students in this program have the option of a dual major in civil engineering offered in partnership with the OSU College of Engineering.

NATURAL RESOURCES

Oregon State is **ranked third in the nation** (*College Factual*) for natural resources education. Students in this program have a working knowledge of a board span of natural resources, their diversity and interdependence and the critical relationships between humans and the environment. This program is for students interested in an interdisciplinary approach to resource management and a career dealing with land use, water resources, environmental policy, natural resource education and related endeavors.

This program is available at the flagship Corvallis campus, in Bend at OSU-Cascades and online through OSU Ecampus.

RENEWABLE MATERIALS

The renewable materials degree program teaches students how to help the world replace oil-based and other non-renewable materials with plant-based renewable alternatives and shape the future of wood products design and advanced manufacturing.

Students learn how wood, bamboo and other materials can be used to provide housing, consumer products, energy and other benefits to society.

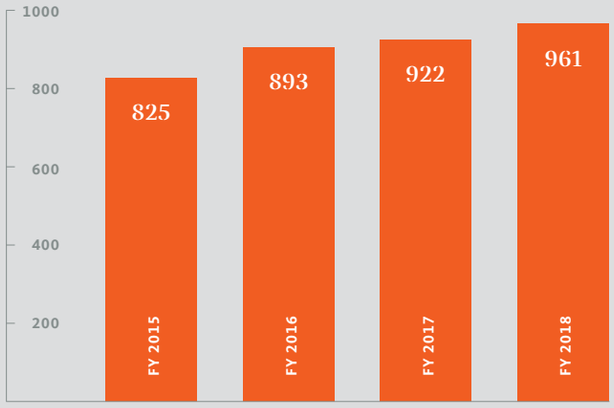
Students in the renewable materials program have four options of study to choose from: art and design, marketing and management, science and engineering and advanced manufacturing.

TOURISM, RECREATION + ADVENTURE LEADERSHIP

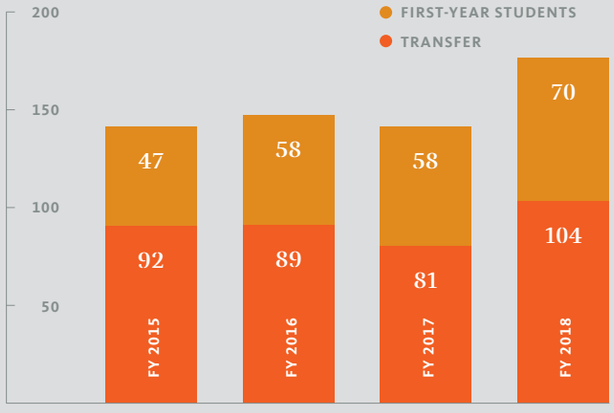
The tourism, recreation and adventure leadership (TRAL) degree program prepares students to work in the fast-growing outdoor industry. Courses explore how people relate to environments and how recreation and natural spaces can work together for the benefit of both the population and land.

Students have four options of study to choose from: adventure leadership education; nature, eco and adventure tourism; outdoor recreation management and sustainable tourism management.

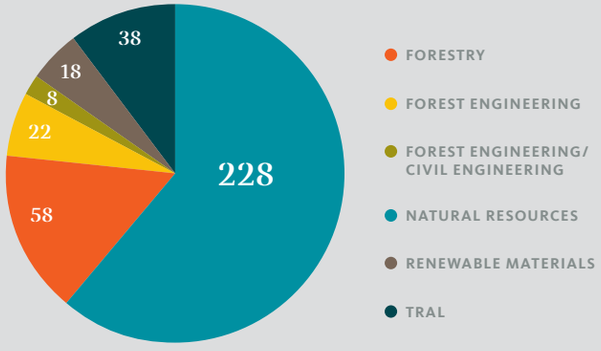
This program is available on the Corvallis campus and at OSU-Cascades in Bend.



UNDGRADUATE ENROLLMENT
NUMBER OF STUDENTS ENROLLED DURING FY 2015–2018



FIRST-YEAR STUDENT AND TRANSFER ENROLLMENT
DURING FY 2015–2018



TOTAL DEGREES AWARDED BY MAJOR
NUMBER OF DEGREES AWARDED BY MAJOR DURING FY 2017 – FY 2018

Undergraduate education

AMONG THE BEST IN THE WORLD

Oregon State University consistently ranks among the top in the world for forestry, natural resources, recreation and wood science research. **OSU was recently ranked number two in the world** in forestry by the Center for World University Rankings and ranked third in the nation for natural resources studies by *College Factual*.

GRADUATING OUR FUTURE LEADERS

Dedicated to preparing the future leaders of our working forest landscapes, **the college awarded 372 undergraduate degrees** in FY 2017 and FY 2018.

MAKING OPPORTUNITY AFFORDABLE

Through the generosity of our donors, the college regularly awards more than $500,000 in undergraduate scholarships each year. During FY 2017 and FY 2018, **the college awarded more than $1.10 million in undergraduate scholarship support** with individual awards ranging from $1,000 to $9,000.

EXPERIENTIAL LEARNING IS KEY

The college prides itself on educating and preparing its students to be competent, innovative and professional members of fields across the forest landscape. **Students in all programs are encouraged, and in some majors, required, to complete work experience in their chosen fields.** The Mentored Employment Program enables faculty to hire undergraduate students on research and other projects with an expectation of at least one hour of direct mentoring per week. The program supports about 20 students per year.

A PATHWAY TO SUCCESS

The college remains a strong partner with Oregon's community colleges. In FY 2018, the **college entered detailed pathway agreements with Umpqua Community College and Southwestern Oregon Community College**. This enables students to find financially accessible pathways to the college's degree programs.

A GROWING COLLEGE

Since the launch of the college's recruitment plan in 2017, enrollment has increased. In FY 2018, applications and admitted students to college programs were up almost 20 percent. Traffic to program websites increased by 300 percent over previous years. **The college welcomed 174 new first-year and transfer students to its degree programs for fall 2018, a 25 percent increase over the previous year and the largest incoming class in college history**.

PARTNERING WITH TRIBAL COMMUNITIES

The college continues to provide leadership and facilitation of OSU faculty, staff, and Tribal partners in the development of a Native American Educational Pathways proposal. The college co-organized and co-sponsored the Oregon Indian Education Association's annual conference, held on the Corvallis campus May 1-2, 2018. In addition, the college is collaborating with OSU colleagues on an Oregon Sea Grant proposal entitled "Engaging Collaborative College Pathways for Native American Youth in Coastal Tribes," and **partners with the Intertribal Timber Council to provide an additional $2,5000 in scholarships** to recipients of the ITC Truman D. Picard Scholarships.

$1.1M

AWARDED IN UNDERGRADUATE SCHOLARSHIPS

FY 2017 – FY 2018

33%

HIGH-ACHIEVING OREGON HIGH SCHOOL STUDENTS

ENROLLED AS OF FALL 2018

17%

UNDERREPRESENTED MINORITY STUDENTS

ENROLLED AS OF FALL 2018

41%

FEMALE ENROLLMENT

AS OF FALL 2018

AN OREGON STATE DEGREE FROM

2,000 miles away

Breeka Li Goodlander spent her childhood traversing the St. Croix River Valley in Minnesota on the way to her grandparents' house. Cut from glaciers, the placid river is surrounded by oaks and maples, and Goodlander found its beauty fascinating.

In high school, she began to explore the idea of turning her love for the natural world into a career. During an AP environmental science class, she earned college credit taking soil and water samples near her high school.

Goodlander decided to attend the University of Minnesota, but was more excited about her internship for the Minnesota Pollution Control Agency, which allowed her to further explore her love of the environment.

Looking for a better option

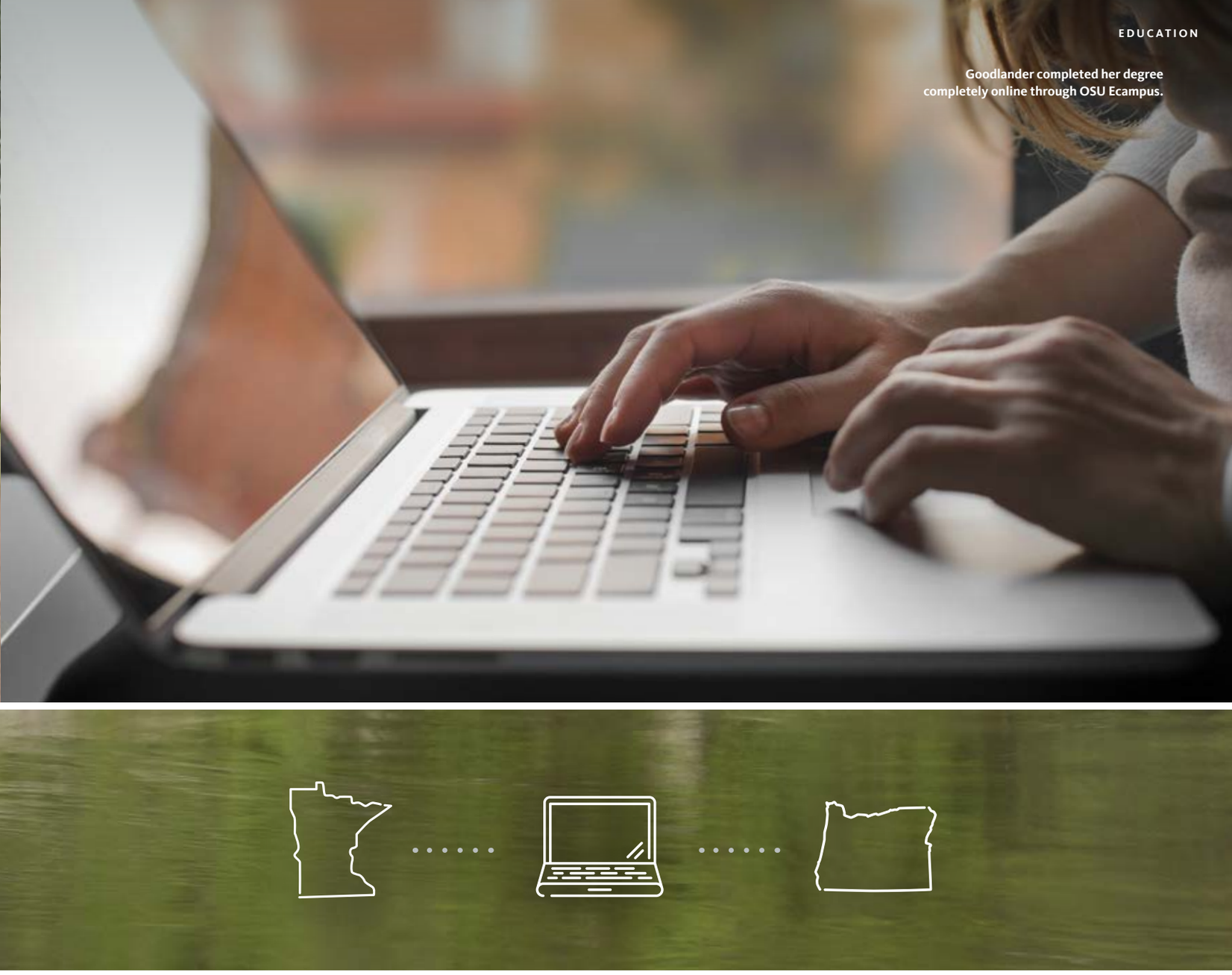
"After two years, I had the opportunity to work full time for the state, so I started looking for more flexible learning opportunities," Goodlander says.

She found Oregon State's Ecampus on a list of top distance learning programs. OSU Ecampus is consistently ranked in the top 10 in the nation by *U.S. News and World Report*.

"I sent a random email to an advisor, and I was really impressed with how welcoming and prompt she was in responding to me even though I wasn't a student yet," Goodlander says. "The advisor answered all of my questions about transferring and doing a degree completely online. If not for her, I might not have applied to Oregon State."

Goodlander found her student experience "liberating," thanks to the flexibility. She says connecting with her professors was easy, and she fit her studies into her schedule during lunch breaks and after work.

"My favorite class was restoration ecology because we got to come up with a practical plan," Goodlander says. "It was the first assignment I ever earned 100 percent on. It gave me the confidence to keep working hard."



Goodlander completed her degree completely online through OSU Ecampus.

"Find a job you enjoy doing, and you will never work a day in your life."

Mark Twain's quote rings true for Goodlander in her new position as a natural resources scientist for Pinnacle Engineering, Inc. She applies what she learned at Oregon State and spends her days exploring wetlands and writing reports about her observations.

"For example, I might be on site and notice a certain area is in the path of a butterfly migration, so it needs to be noted so that planned construction in the area doesn't interfere," Goodlander says. "I feel like I'm really making a difference. The people I work with are very like-minded, and it's a field I really enjoy."

She says that during the hiring process for her current position, her employers were impressed with the experience she was able to gain while in school.

"My position required three to four years of experience, and without Ecampus, I wouldn't meet that requirement," Goodlander says. "I also made so many professional contacts while I was going to school and working that I wouldn't have made otherwise."

What's Next

Goodlander's employer is supportive of her completing graduate work, and there are several Oregon State options she's interested in.

"Right now, I'm working on a certificate in wildlife management, and I hope to apply that to either a master of science or a master of natural resources degree."

For now, she recommends OSU Ecampus to anyone looking for a flexible educational experience. Goodlander says her ultimate goal is to own her own wetland area.

"I would love to have my own space and open a wildlife rehabilitation facility," she says. "I've always found the natural world very grounding. To me, it is what is real. It gives me inner peace."

COLLEGE OF FORESTRY

graduate degrees

Earning an advanced degree

The Oregon State College of Forestry enjoys a century-long reputation as a leader in forestry research, teaching and extended education. Currently the college has more than 200 graduate students, including 35 international students from all over the world. The college offers graduate degrees in four distinct areas administered by three separate departments. About 75 faculty members teach at the graduate level, and the college employs more than 300 faculty, staff and support personnel.

Graduate degrees offered include Master of Forestry (MF), Master of Science (MS), Master of Natural Resources (MNR) and Doctor of Philosophy (Ph.D.).

FOREST ECOSYSTEMS + SOCIETY MF, MS, PH.D.

The forest ecosystems and society graduate program develops interdisciplinary thinkers, highly capable scientists and natural resource leaders who are prepared to solve complex problems wherever they exist on the socioecological spectrum.

Students in this program learn to identify and contribute to collaborative solutions in ecology and natural resources-related social science. Students are not limited by mandated curriculum or required study tracks. Instead, faculty and professionals work with students to create their own course lists, program objectives and research projects, allowing students to focus on the skills and knowledge most relevant to their interests.

Students may earn an MF, MS or Ph.D. as they build the skills and knowledge needed for a fascinating career in research, teaching, management policy or outreach.

MASTER OF NATURAL RESOURCES MNR

The master of natural resources graduate program is an interdisciplinary program designed for natural resources professionals. The 45-credit program is taught entirely online through the nationally-acclaimed OSU Ecampus. The program is offered as a non-thesis option only, similar to the Master of Business Administration (MBA) or MF.

Students in the program develop analytical and problem-solving skills needed to provide workable solutions for complex natural resources challenges and learn how to balance competing economic, health and environmental interests.

Graduates of this program enjoy virtually unlimited career opportunities in natural resources management, ranging from GIS experts and water conflict managers to wildlife habitat specialists and environmental policy analysts.

SUSTAINABLE FOREST MANAGEMENT

MF, MS, PH.D.

The sustainable forest management graduate program emphasizes the conservation of forest-dominated landscapes to meet ecological, economic and social criteria over long time frames through active forest management.

Students in this program may earn an MF, MS or Ph.D., and can specialize in one of six areas of concentration: forest operations planning and management; forest policy analysis and economics; forest biometrics and geomatics; silviculture, fire and forest health; forest soil and watershed processes; or engineering for sustainable forestry.

The sustainable forest management graduate program provides graduates with the foundation for excellent career opportunities throughout industry, higher education, government and nonprofits.

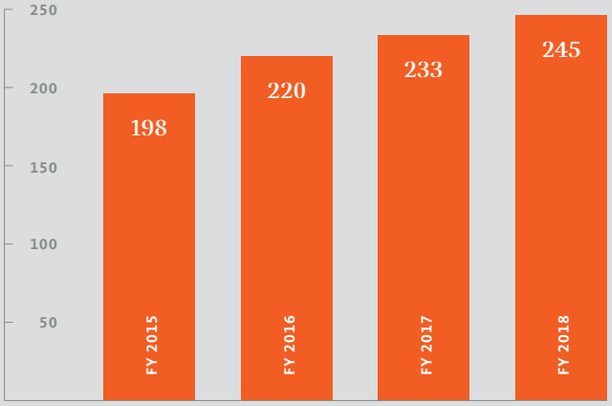
WOOD SCIENCE

MS, PH.D.

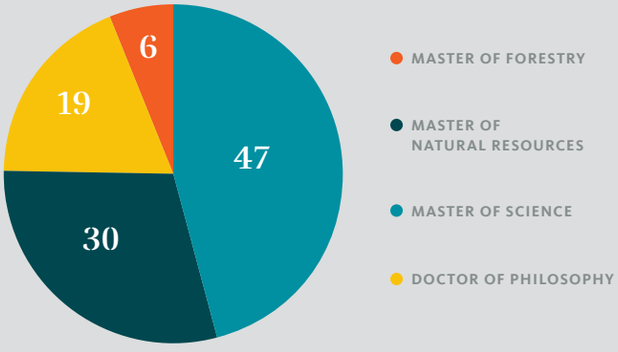
The Department of Wood Science and Engineering at the Oregon State College of Forestry offers a graduate education fully engaged in the dynamism and diversity of a rapidly evolving international field. Its wood science graduate program is fundamentally collaborative in nature and offers MS and Ph.D. degrees in a wide range of specialties, from chemistry to business.

Dual graduate degrees are encouraged. Common partner disciplines include civil engineering, mechanical engineering, materials science or forest science.

The demand for energy and thousands of consumer and industrial products made from wood and other renewable materials continues to grow as society becomes more aware of sustainability and green issues. The wood science program provides the foundation for great careers.



GRADUATE ENROLLMENT
NUMBER OF STUDENTS ENROLLED DURING FY 2015–2018



TOTAL DEGREES AWARDED
NUMBER OF DEGREES AWARDED DURING FY 2017 – FY 2018

Graduate education

GRADUATING OUR FUTURE LEADERS

Educating the future research, teaching and outreach leaders in forest landscapes and ecosystems, the college awarded **102 graduate degrees in FY 2017 and FY 2018**.

PARTNERSHIP IDENTIFIES TALENTED GRADUATE STUDENT CANDIDATES

In December 2017, an initiative for recruitment of Native Americans for the college's graduate forestry programs was developed, funded partially by the department with a supplemental Graduate Laurels Block Grant. A committee including Bureau of Indian Affairs, the Intertribal Timber Council, the USDA Forest Service, and Salish-Kootenai College assisted in identifying potential graduate student candidates. **Four Native American students were selected for admission in Fall 2018 and offered these tuition support awards.** These students represent 23 percent of the fall 2018 class of forestry graduate program students.

FELLOWSHIPS PROVIDE AFFORDABLE OPPORTUNITIES

• The Dean's Investment Fund funded two $30,000 matches to the Provost's Distinguished Doctoral Fellowship, awarded in FY 2017 and FY 2018. The college also **awarded more than $200,000 in graduate fellowships in FY 2017 and FY 2018**, with a portion of funds coming from the Dean's Investment Fund.

• With the goal of **recruiting and retaining graduate students based on diversity and/or academic merit,** the college **awarded and administered $140,000 in tuition scholarship funding** as part of the Graduate Laurels Block Grant from the OSU Graduate School.

SHARING GROUNDBREAKING RESEARCH

Organized by graduate students, the college hosted the fifth and sixth annual Western Forestry Graduate Research Symposium. The symposium showcases current graduate student research and promotes academic excellence by challenging students to present their work and receive feedback from their academic and professional peers. **In 2017 and 2018, the symposium showcased more than 80 combined poster and oral presentations.**

FERM graduate students work with drones to capture data.

During summer 2017, Larasatie participated in a faculty-led study abroad experience in Alpine Europe.

STAYING BUSY,

making an impact

Oregon State University College of Forestry Ph.D. Student **Pipiet Larasatie** doesn't have her head stuck in her books. She's a serious learner and researcher, of course, but she's not just concerned with her own projects. Instead, she's working hard to make the college community and industry setting more open and inclusive for all.

She began working toward this goal in her home country of Indonesia. After earning her bachelor's degree, she served as a civil servant in the forestry service and helped develop rural areas for ecotourism opportunities.

After earning her master's degree in New Zealand, Larasatie was awarded a prestigious scholarship from the Indonesian government – the opportunity to earn a Ph.D. anywhere in the world, as long as the program was highly ranked.

Larasatie chose Oregon State.

"I came here because I wanted to work with **Eric Hansen**, who now serves as department head of Wood Science and Engineering," Larasatie says. "All I knew about Oregon State was that Eric was here, and that he has expertise in forest products marketing and innovation, and that's what I wanted to study."

Hansen responded to Larasatie's inquiry about the wood science graduate degree program quickly, despite the 14-hour time difference.

"I knew that because he was responsive, it would be easy to build a relationship with him," Larasatie says.

And it was. Luckily, Larasatie likes living in Corvallis as well.

Since arriving in 2016, Larasatie has already completed one research project about the Pacific Northwest's public perception of mass timber buildings. What started as a class project became a peer reviewed, published research study, funded by the Oregon Forest Resources Institute, and a presentation to conference participants worldwide.

Larasatie enjoys presenting her

The 2017 Alpine Europe group poses together in Slovenia.

> “Increasing gender diversity is no longer a right thing to do, but becomes a smart thing to do.”

work to scientists, industry partners and even members of the public.

“I believe that science should be communicated,” she says. “I don’t want to write a dissertation that only lives in a library archive somewhere. We need to reach a broader audience. We need to let the public know what we’re doing. We shouldn’t limit ourselves, especially because of the digital age we live in now.”

To emphasize this, Larasatie serves as a digital communication coordinator for the Society of Wood Science and Technology and participates in the steering committee for the Western Forestry Graduate Research Symposium, hosted at Oregon State each spring.

“I campaign to my fellow graduate students to get them involved as well,” she says. “I really believe that we all need to practice communicating our science.”

Larasatie also serves on the College of Forestry Diversity, Equity and Inclusion Committee, which strives to make the college a diverse and welcoming environment.

“I felt that participating was the right thing to do,” she says. “It also relates to my dissertation topic.”

Larasatie’s dissertation is still in the research phase. She’s studying gender diversity in the forest sector, in the industry and in higher education.

“Increasing gender diversity is no longer a right thing to do, but becomes a smart thing to do,” she says.

Larasatie’s dream is to become a university professor.

“I like to do research, I like to teach, and I like to mentor young students,” she says. “I also like the university setting. Oregon State, for example, is a hub for international people coming in to reach their dreams. We all have the same goal: to make life better.”

The OSU College Research Forests span 15,000 acres across the state and aid in research and outreach activities.

Research forests

15,000

ACRES OF RESEARCH FORESTS

AS OF FALL 2018

- **BLODGETT TRACT**
- **CAMERON TRACT**
- **MARCHEL TRACT**
- **MCDONALD-DUNN FOREST, PEAVY ARBORETUM**
- **OBERTEUFFER FOREST**
- **RAM'S DELL**
- **SPAULDING TRACT**

Students who participate in the training program have the benefit of learning from experienced industry professionals in real-world situations and with advanced equipment.

TRAINING FOR the future

The simulator has prepared you for the task ahead, yet sweat starts to drip from your brow, and the controls feel stiffer than they should. The first lever is pulled harmoniously. The second seems to stutter before falling into place. The last one brings a hard feeling to your gut, and you look out to the landscape full of logs in front of you. You have successfully replicated the simulator and moved around your first tree.

Since the 1980s, The Student Logging Training Program (SLTP) has been a part of the College of Forestry, according to **Jeff Wimer**, a senior instructor with the Oregon State University College of Forestry. The program allows students to experience real-world logging systems up close.

Connecting with the community and getting into the field is forest engineering student **Dean Maben**'s favorite part of being a member of the SLTP crew.

"I love getting the chance to get into the field and apply the things I've learned in the classroom," Maben says. "It enhances my education as I am able to bridge the connection between the real world and what I am taught in class."

Maben credits the SLTP with molding him into the person he is today.

"I've developed relationships I'll have for my entire life," he says "It's taught me to be professional and to never stop learning."

Maben says lifelong learning is something Wimer preaches to the crew, as he educates the next generation of professional foresters who will leave Oregon State and lead the industry.

"We have the ability to slow everything down and take the time to better teach how the various systems work. The technology we utilize is real world," Wimer says. "We are fortunate that various machine manufacturers donate to us, on an annual basis, brand new equipment. On the crew, we continue to explore the rapidly changing technology of our industry."

Equipment in use includes a Koller 501 Yarder, Link Belt loader and a John Deere skidder.

The SLTP also provides students the chance to participate in unique outreach experiences. In 2018, the student logging crew participated in the Pacific Logging Congress' (PLC) Live In-Woods Show. The event invited the public to participate by viewing the latest forest industry technology in the woods.

"The show gave SLTP students a chance to interact with audiences they might now work with on a daily basis," says Wimer, who also serves as president of the PLC. "It provided them the unique opportunity to educate other students, teachers, government representatives, loggers and the general public on the positive and sustainable methods used in the forest industry today."

The SLTP helps Oregon State meet its land grant mission and reaches to a variety of audiences for education and training purposes.

"The program is quite unique in that there are very few universities that have such a program," Wimer says. "The students who go through the program tend to have a leg up with their class work. Their field experience with the program gives them a frame of reference and hands on experience which allows them to excel in many of their classes."

COLLEGE RESEARCH FORESTS
AS OF FY 2018

Name	Additional Information
Blodgett Tract	• 2,440 acres • Located in Columbia county • Management plan created in 1997 to encourage biodiversity and efficient timber production • Includes Douglas fir, western hemlock and Coho salmon
Cameron Tract	• 260 acres • Located in the Soap Creek Watershed near Corvallis • Donated by Elizabeth Starker Cameron in 1995 • Focuses on forest management for family-owned forests
Marchel Tract	• 71 acres • Located within the Willamette River floodplain south of Corvallis • Used exclusively for research on hardwood species including hybrid poplars
McDonald-Dunn Forest	• 11,250 acres • Located on the western edge of the Willamette Valley, 15 minutes from OSU • Used for university instruction, research and public recreation • 175,000 visits each year
Oberteuffer Forest	• Donated by Bill and Margaret Oberteuffer in 1994 • Used for outreach activities, teaching and research
Peavy Arboretum	• Named for former College of Forestry Dean George Peavy • Dedicated to the college in 1926 • Home of the original Oregon State Forest Nursery • Houses College Research Forest staff • Maintenance funded by revenue from College Research Forests timber sales
Ram's Dell	• 147 acres • Located in the Woodcock Creek drainage near Mollala • Acquired in two donations from Vittz and Elaine Ramsdell • Example of non-industrial private forest management
Spaulding Tract	• 160 acres • Located in Benton County on the northeast side of Mary's Peak • Acquired from Chuck Spaulding of the Chas K. Spaulding Logging Company • Demonstrates tree growth over an extended period of time

College Research Forests

The Oregon State College of Forestry owns 15,000 acres of research forests across the state where students learn, study and work. These research forests were donated to the College of Forestry to serve as a living laboratory and outdoor classroom for students, researchers and managers to learn about forest ecosystems and management.

RESEARCH FOREST ACCOMPLISHMENTS

• The forests have a total of **nine forest tracts and one agricultural property** (used for hardwood research) around the state totaling **nearly 15,000 acres**. The largest forests are the McDonald and Dunn Forests on the northern edge of Corvallis, which total 11,250 acres.

• The forests occupy **seven counties including: Benton, Polk, Washington, Columbia, Clackamas, Union and Jackson**. Although the Research Forests are exempt from local taxes, management and harvest activities provide many direct and indirect jobs, which support local economies. Various studies have shown that timber harvests produce 11.28 to 16.13 direct and indirect jobs per million board feet.

• The college actively promotes and encourages the entire Corvallis and Oregon State community to **utilize recreation opportunities within the forests**. Throughout the more than 15,000-acres of managed forests, visitors can explore the area by foot, horseback or non-motorized bicycle. During FY 2017 and FY 2018, the **forests had more than 280,000 user-visits** to the forest to participate in recreation activities.

• According to a recent report, **recreation activity on the forests has a cost of illness savings, or health benefit, of more than $750,000**. These COI savings accrue to health insurers, providers and outdoor recreation participants, and are associated with mitigating the symptoms of eight chronic illnesses.

• **The forests hosted successful STEM Academy events the last five years**. The program engages high-level high school students in forest and forest ecology to further their understanding of how forest ecosystems work and what is involved in their management. Approximately 20 students attend the program each year.

• The forests continue to execute sustainable timber management practices that guide timber harvests on college forests. **In 2017 and 2018, the college harvested more than 17.5 million board feet of timber generating more than $10 million in total timber revenues and $4.21 million in net revenues** to support college initiatives.

To learn more about the College Research Forests and their initiatives, visit cf.forestry.oregonstate.edu/

To overcome challenges in locating marbled murrelets, the Oregon Marbled Murrelet Project is capturing these elusive seabirds on the open ocean and monitoring their movements throughout the breeding season via small tracking tags. (Photo by Morgan Bancroft)

Research

400+

REFEREED JOURNAL PUBLICATIONS

FY 2017 – FY 2018

20

BROAD RESEARCH AREAS

AS OF FALL 2018

$48M+

IN RESEARCH EXPENDITURES

AS OF FALL 2018

$24M+

IN RESEARCH REVENUE

AS OF FALL 2018

FIRE SUMMIT

brings experts together

Students participate in prescribed burns and other management efforts within the College Research Forests.

In March 2018, Oregon State hosted the inaugural Fire Summit in Portland. This event aimed to identify viable forest management practices that could help mitigate the risks and impacts of high-severity fire events in the West.

About 30 scientists, land managers and forest policy experts were in attendance. They came from five states and British Columbia, and represented six universities, seven federal land management agency offices, departments or research units, four private forestland management entities, and two cities.

The summit closed with a call to action from Oregon Governor **Kate Brown**.

"It has been a great opportunity for us to reflect on the challenges our region has faced and the challenges to come, to share best practices, exchange data and research and discuss insights we learn from fighting wildfires," Brown said.

She went on to discuss the prevalence of wildfire in the West and the risk to communities, economies and livelihoods. Brown said that collaborations – like the Fire Summit – will be key in preventing devastating wildfires.

"By taking an 'all-lands, all-hands' approach and committing to work together across jurisdictional boundaries, we can sustain robust rural economies and preserve our natural resources for future generations," Brown said.

Anthony S. Davis, interim dean of the College of Forestry agrees, "The Western USA is home to the world's leading scientists who focus on fire on our landscapes. The Fire Summit was a unique opportunity for those scientists to interact with the policymakers who are asking for guidance in addressing this phenomenal challenge."

The collective remarks of the panelists and speakers offered a big-picture perspective of the intertwined views of fire in the West, from the variety of jurisdictions, landscapes and vegetation types, and cultural experiences and expectations.

The experts compiled their feedback and made specific recommendations:

- Expand strategic use of commercial thinning, prescribed fires, and managed wildfire as forest management tools.
- Improve coordination across jurisdictions and ownership boundaries.
- Develop and implement cross-boundary 'pre-fire response' plans and strategies.
- Address inequities associated with liability for cross-boundary fires.
- Invest in data mapping, risk assessment, and applied research that directly supports cross-boundary management and suppression.

Oregon State officials recognize discussions like this are critical for encouraging stakeholder engagement when it comes to wildfire issues.

Work is also underway to identify opportunities to directly and regularly inform federal elected officials and staff in Washington, D.C., about summit outcomes and subsequent efforts. Direct dialogue and discussion of the opportunities for real progress is an important goal of Summit participants seeking to inform policies designed to help mitigate the risks and impacts of high-severity fire events in the West.

"The scale of our fire problem is likely measured in decades and centuries, not a handful of years, and across millions of acres, not localized forests and landscapes," says Davis. "To address this serious challenge, we have to step out of our own way and not go back to the false promise of landscape stability maintained through unsustainable practices. The Fire Summit served to bring the widest range of partners to the table for a first conversation in this direction."

College research

The Oregon State University College of Forestry is known for collaborative research that brings real solutions to issues facing our forest landscapes and ecosystems. College research provides innovative approaches to enhancing people's lives while also improving the health of our lands, businesses and vital ecosystems. The college implements its research vision through the Institute for Working Forest Landscapes (IWFL), a college-wide effort to develop adaptive forest management techniques that integrate social, ecological and economic objectives at the landscape level. The College of Forestry has a longstanding role as Oregon's principal research engine for providing science-based information about forests and their value to people and communities.

KATY KAVANAGH APPOINTED AS ASSOCIATE DEAN FOR RESEARCH

Katy Kavanagh, a forest scientist whose research contributes to our fundamental understanding of how forest ecosystems function, **was hired to serve as the college's associate dean for research.** Kavanagh previously served as head of the Ecosystem Science and Management Department at Texas A&M University and faculty member at the University of Idaho. Kavanagh is an alumna of Oregon State where she obtained a Ph.D. in Forest Science after earning BS and MS degrees in Forestry from SUNY College of Environmental Science and Forestry.

FACULTY CONTINUE PUBLISHING PROLIFICALLY

College faculty continue to be recognized as active leaders in research related to our forest landscapes, ecosystems and products. **During calendar years 2016 and 2017, faculty produced more than 400 refereed publications.**

THE INSTITUTE FOR WORKING FOREST LANDSCAPES

In November 2013, the college launched the IWFL to focus research programs on innovative approaches for managing landscapes that will enhance people's lives and improve the health of our lands, businesses and vital ecosystems. **In FY 2018, the first collaborative projects funded by the IWFL were completed.** They explored how proactive management of forests can improve the health of rural communities and provide ecological integrity and long-term resilience of vital ecosystems:

- Quantifying Trade-offs and Synergies between Ecosystem Services (Lead PI: **Matthew Betts**)

- Opportunities for Biochar Production to Reduce Forest Wildfire Hazard, Sequester Carbon, and Increase Agricultural Productivity of Dryland Soils (Lead PI: **John Sessions**)

- Go Big or Go Home? Tools and Processes for Scaling Up Collaborative Forest Restoration (Lead PI: **Emily Jane Davis**)

IWFL researchers spend time in the field taking tree measurements.

FISH AND WILDLIFE HABITAT IN MANAGED FORESTS

The mission of this program is to provide new information about fish and wildlife habitat within Oregon's actively managed forests through research, technology transfer and service activities. Current priorities contribute to the scientific information base that supports the Oregon Forest Practices Act and Oregon's actively managed federal forest lands. This program provides important information to forest managers as they guide responsible stewardship of fish and wildlife habitat resources consistent with land management objectives while guiding forest policy and regulations. **In FY 2017 and FY 2018, 10 funded projects completed, started or are continuing their work**:

New Awarded (7/1/2018)

• Early Seral Habitat Longevity in Production Forests in the Oregon Coast Range (**Matthew Betts**)

• Biodiversity in Natural and Managed Early Seral Forests of Southern Oregon (**Meg Krawchuk**, **Matthew Betts**, **James Rivers**, **AJ Kroll**, **Jake Verschuyl**, **Mark Swanson)**

• Black-Backed Woodpecker Vital Rates in Unburned and Burned Forest Within a Fire-Prone Landscape (**Jim Rivers**, **Jake Verschuyl)**

• How Do Riparian Forest Gaps Affect Macroinvertebrates and Fish Diet in Headwater Streams (**Dana Warren)**

Continuing Awarded (7/1/2017)

• Experimental Evaluation of Plethodontid Salamander Response to Forest Harvest (**Tiffany Garcia**, **AJ Kroll**, **Jessica Homyack**, **Claudine Reynolds**, **David Shaw**)

• Does a Lack of Structures for Nest Building Limit Red Tree Vole Occupancy of Actively Managed Forest? (**Damon Lesmeister**, **John Bailey**, **Mark Linnell**)

• Identifying Distribution Boundaries at the Upper Extent of Fish in Streams Using eDNA (**Brooke Penaluna**, **Ivan Arismendi**, **Tiffany Garcia**, **Jessica Homyack**, **Taal Levi**, **Dana Warren**)

• Quantifying Fish Response to Management Creating Riparian Forest Canopy Gaps (**Dana Warren**, **Maryanne Reiter**)

Ending Awarded (7/1/2016)

• Predicting Stream Nutrient Concentrations from Landscape Metrics to Develop Better Nutrient Criteria (**Alba Argerich**, **Kevin Bladon**, **Jeff Hatten**, **Sherri Johnson**)

• Assessing Pollinator Response to Natural and Anthropogenic Disturbances in Mixed-Conifer Forests (**Jim Rivers**, **James Cane**)

For more information on College of Forestry research projects and to view results, visit forestry.oregonstate.edu/research.

RESEARCH EXPENDITURES BY SOURCE
FY 2017 – FY 2018

Sources	FY 2017	FY 2018	%
Grants and contracts	$10,249,114	$10,537,313	43.0%
Forest Research Lab Appropriation	$5,590,148	$5,920,756	23.8%
Forest Research Lab Harvest Tax	$3,318,757	$3,461,998	14.0%
Research cooperatives	$1,631,074	$1,429,643	6.3%
Endowments and gifts	$1,565,538	$1,148,872	5.6%
McIntire-Stennis Federal Formula	$1,291,258	$1,197,359	5.2%
Indirect cost recovery	$439,239	$442,883	1.8%
Other	$48,951	$46,077	0.2%

College research continued

RESEARCH AREAS
Research at the college is conducted within 20 broad research areas and is carried out primarily by faculty across three academic departments and OSU Forestry and Natural Resources Extension.

Forest Ecosystems and Society (FES):
Forest, wildlife and landscape ecology • Genetics and physiology • Integrated social and ecological systems • Science of conservation, restoration and sustainable management • Social science, policy and natural resources • Soil-plant-atmosphere continuum • Sustainable recreation and tourism

Forest Engineering, Resources and Management (FERM):
Engineering for sustainable forestry • Forest biometrics and geomatics • Forest operations planning and management • Forest policy analysis and economics • Forest soil and watershed processes • Silviculture, fire and forest health

Wood Science and Engineering (WSE)
Advanced manufacturing • Art, architecture and design • Competitive forest sector • Forest-based bio-products • Novel composite materials • Resource extension and optimization • Timber mechanics and structural engineering

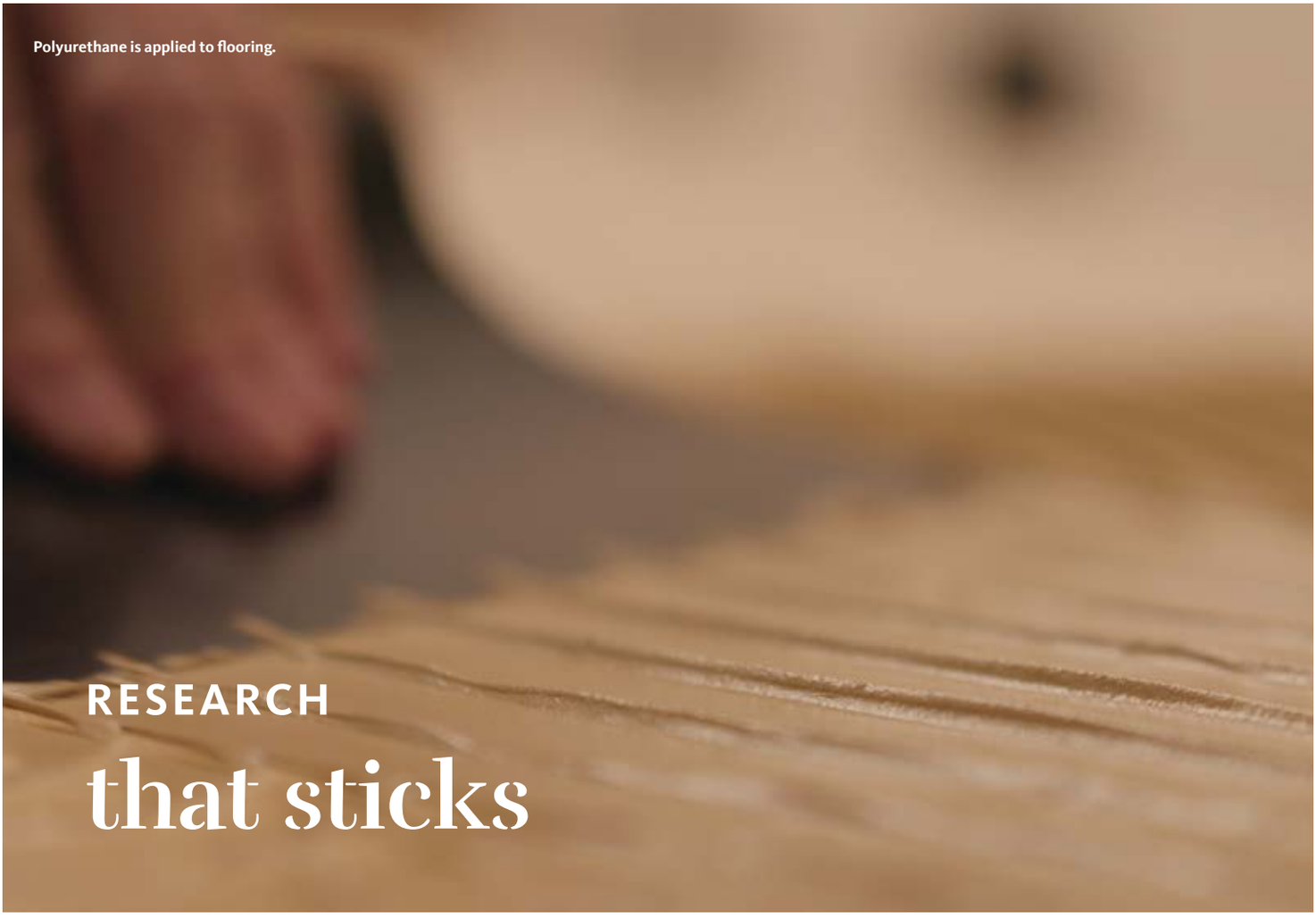
RESEARCH EXPENDITURES
In fiscal years 2017 and 2018, the college's total **research expenditures were $48,318,980**. These expenditures were evenly split between the two years. Approximately 50 percent of the expenditures represented externally sponsored research efforts.

RESEARCH REVENUE
The college received a total of **$24.36 million in research revenue** in FY 2017 and FY 2018. A total of $21.53 million was received from sponsored research awards with $2.83 million from research cooperative dues and revenues. **In FY 2018, the college received $11.04 million in new and continuing awards, a five-percent increase over the previous fiscal year.**

College researchers submitted proposals to a wide range of outside sponsors including the U.S. Department of Agriculture, National Science Foundation, USDA Forest Service, U.S. Department of the Interior Bureau of Land Management, NASA, Oregon Departments of Forestry and Parks & Recreation, industry and non-governmental organizations.

NEW AND CONTINUING AWARDS BY SPONSOR
FY 2017 – FY 2018

Sponsors	FY 2017	FY 2018	Grand Total
FEDERAL	**$9,419,536**	**$9,277,840**	**$18,697,376**
Department of Energy	$272,000	$584,827	$856,827
National Aeronautics & Space Administration	$30,000		$30,000
National Institute for Occupational Health & Safety	$274,892	$274,869	$549,761
National Science Foundation	$3,146,496	$1,864,939	$5,011,436
USDA Agricultural Research Service	-$580,583	$741,225	$160,642
USDA Animal & Plant Health Inspection Service	$120,000	$120,000	$240,000
USDA National Institute of Food & Agriculture		$2,450,220	$2,450,220
USDA United States Forest Service	$5,335,799	$2,397,209	$7,733,008
USDI Bureau of Land Management	$301,027	$387,045	$688,071
USDI National Park Service	$519,905	$432,132	$952,037
USDI United State Geological Survey		$25,375	$25,375
INDUSTRY	**$225,199**	**$199,749**	**$424,948**
Various	$225,199	$199,749	$424,948
OTHER	**$462,927**	**$838,525**	**$1,301,452**
California Department of Forestry & Fire Protection	$109,691	$221,271	$330,962
Foundations	$125,088	$82,135	$207,223
National Council for Air & Stream Improvement	$63,089	$165,000	$228,089
Non-profits (various)	$103,148	$80,712	$183,860
Subawards	$61,911	$289,407	$351,318
STATE	**$381,129**	**$726,570**	**$1,107,699**
Oregon BEST I (Vertue Lab)	$99,539		$99,539
Oregon Department of Fish & Wildlife	$27,118		$27,118
Oregon Department of Forestry	$35,000	$30,000	$65,000
Oregon Department of Transportation		$426,378	$426,378
Oregon Forest Resources Institute	$93,925	$177,492	$271,417
Oregon Parks & Recreation Department	$125,547		$125,547
Oregon Safety & Health Administration		$38,618	$38,618
Oregon Tourism Commission		$54,082	$54,082
Grand Total	$10,488,790	$11,042,685	$21,531,475
ADDITIONAL			
OSU cooperatives (11) - primarily industry	$1,027,637	$1,799,787	$2,827,423
McIntire Stennis - USDA Formula Funds Number of projects (FY 2017: 21, FY 2018: 14)	$1,113,108	$1,110,635	$2,223,743
Fish & Wildlife Habitat in Managed Forests (FRL) Number of new & continuing projects (FY 2017: 7, FY 2018: 6)	$325,275	$258,148	$583,423
Institute for Working Forest Landscapes (IWFL): three projects	$323,016	$177,467	$500,482



Polyurethane is applied to flooring.

RESEARCH that sticks

Oregon State University is one of two sites for the Wood-Based Composites Center (WBC), an industry and university cooperative research center funded by the National Science Foundation. The other is Virginia Tech University. The two institutions work with academic and industry partners to advance the science and technology of wood-based composite materials. The center completed a number of research projects in FY 2017 and FY 2018 that will lead to wood product innovations and improved performance.

Micron level 3D visualization of adhesive bonds in wood products

For the first time, researchers achieved a true characterization of the micro-structure of adhesive bonds in wood.

Laminated wood products, like glulam beams and plywood, rely on the integrity of adhesive bonds that are only a few microns thick. Adhesives penetrate the porous structure of wood. This project asked the question, 'does the extent of penetration affect mechanical performance of the final product?'

Fred Kamke, director of WBC and JELD-WEN Chair of Wood-Based Composites Science, says the goal of the project was to observe how adhesive bonds perform when subjected to mechanical loads and moisture, focusing on the analysis on the adhesive bond.

Richardson Chair in Wood Science and Forest Products, **John Nairn**, created a mathematical model to predict mechanical performance of an adhesive bond based on its microstructure. Kamke and his graduate students collected the 3D microstructure data and used micro and nano x-ray-computed tomography to create 3D digital models of adhesive bonds. While wood is an extremely porous structure that readily absorbs adhesives, the researchers found that as much as 50 percent of the adhesive that penetrates the cell lumens may not contribute to bond strength. However, penetration of adhesive into the cell wall helps to stabilize the bond against the effects of moisture.

"Cell wall penetration improves the moisture durability," Kamke says. "With this information, adhesive companies can improve their formulations and create adhesives to be engineered for a particular application, saving money for the manufacturers and improving performance of the products."

Natural formaldehyde emissions from wood

Left: Particleboard and fiberboard production is a $1.6 billion industry in the U.S. Right: Fred Kamke works with a student.

Some adhesives, such as urea-formaldehyde, emit low levels of formaldehyde over their lifetime as they slowly decompose. Modern adhesive formulations and test protocols ensure these levels fall within the acceptable federal guidelines. However, as formaldehyde detection technology improves, the adhesive industry faces pressure to reduce formaldehyde emission levels.

Kamke says there are still many unanswered questions about formaldehyde.

"People wonder if formaldehyde is in their house," he says. "Can it cause us harm? How much formaldehyde is OK? How low should emissions be? Although we don't know have all of the answers to these questions, government regulations still need to be met."

What researchers do know is that many substances, including human bodies, other animals and natural materials like wood, emit low levels of formaldehyde naturally.

Chip Frazier, Virginia Tech professor of sustainable biomaterials, wanted to learn exactly how much formaldehyde pure, natural, virgin wood does emit. The tests showed how formaldehyde levels in different wood species are affected by temperature change, and what formaldehyde levels are derived from wood itself.

"This data establishes a baseline level of source formaldehyde from wood, and will likely have a significant impact on future federal indoor air quality policy and the future of wood-based composite products, because just particleboard and fiberboard production alone is a $1.6 billion industry in the United States," Kamke says. "This study and the resulting policy changes will have impacts on everyone involved in bonding wood with adhesives, and will have a positive impact on future indoor air quality across America."

Outreach work continues

The WBC continues to educate the public through traditional classroom and online short courses. Seven online courses were added in 2016.

Kamke says the most popular is a basic course on wood adhesives that's been running for 15 years.

"Our plan is to add more online courses," Kamke says. "Enrollment is growing, and we are proud to continue to educate the producers and the public about the wonderful world of wood-based composites."

Research cooperatives

The College of Forestry provides science leadership for 10 research cooperatives that conduct research and apply the results to solve problems, develop new products, support long-term field studies and develop decision support tools. These research cooperatives provide valuable learning experiences for students from the undergraduate to the doctoral level. The cooperatives allow students to conduct meaningful research to help advance the overall goals of each cooperative.

More than 100 unique private industry members and eight government agencies make up the membership of the research cooperatives. A College of Forestry faculty member leads each cooperative, and members work together to develop a research program, pool dues to support the cooperative's operating budget and provide significant in-kind support to leverage dues payments.

CENTER FOR INTENSIVE PLANTED-FOREST SILVICULTURE (CIPS)

The CIPS is directed by **Doug Maguire**, Giustina Professor of Forest Management. It was established to facilitate collaborative research between existing cooperatives, institutions and scientists in a manner that addresses long-term and interactive effects of all possible treatments constituting a silvicultural regime. **CIPS has provided partial funding for 10 graduate students since 2010**. These students are involved in research as well as the purchase of field and lab equipment, travel to international meetings and building computing labs with high-end equipment. They've gone on to work in extension, academia and industry. Undergraduate student workers gain access to detailed lab and field work.

CENTER FOR WOOD-BASED COMPOSITIES (WBC)

The WBC is directed by **Fred Kamke**, JELD-WEN Chair of Wood-Based Composites Science. It is an NSF Industry/University Cooperative Research Center (I/UCRC), focused on research and education at the Universities of British Columbia and Maine, Oregon State, and Virginia Tech. Many students gain their first exposure to wood as a raw material in manufacturing thanks to WBC and go on to become wood experts in the companies they work for. **Seventeen students have received support at Oregon State and 20 graduate students have participated in WBC-related research since 2007**.

ENVIRONMENTAL PERFORMANCE OF TREATED WOOD RESEARCH COOPERATIVE/OSU AQUATIC COOPERATIVE (EPTW)

The EPTW research cooperative is directed by **Eric Hansen**, Wood Science and Engineering department head, with co-managers **Matthew Konkler** and **Jed E. Cappellazzi**, faculty research assistants. It conducts research on the potential impacts of treated wood use in aquatic environments and develops methods for reducing migration.

Members include chemical manufacturers, producers of treated wood products and trade associations. **The Aquatic co-op invites several international visiting scholars to Oregon State each year from the undergraduate to the professional level to support research and experience industry collaboration**. Many of these students pursue a career in forest products or a related field.

GENETIC RESEARCH ON ENGINEERING AND ADVANCED TRANSFORMATION OF TREES (GREAT TREES)

The GREAT TREES research cooperative is directed by **Steve Strauss**, Distinguished Professor of Forest Biotechnology and Leopold Fellow. The goal of GREAT TREES is to conduct research, transfer technology and educate others about the beneficial uses of genetically engineered trees in plantations. **GREAT TREES trains students from the undergraduate to postdoctoral level**. Five students have participated in research in the past five years. Once finished studying at Oregon State, the students continue their academic careers or land important industry jobs.

HARDWOOD SILVICULTURE COOPERATIVE (HSC)

The HSC is directed by **Glenn Ahrens**, assistant professor. It is a research and technology transfer program focused on the ecology, reforestation and stand management of Northwest hardwood species, especially red alder. **The HSC has the oldest and most extensive red alder growth database in existence**.

NORTHWEST TREE IMPROVEMENT COOPERATIVE (NWTIC)

The NWTIC is directed by **Keith Jayawickrama**, professional faculty. **It oversees cooperative breeding of Douglas-fir, western hemlock and other species of the coastal forests of the Pacific Northwest**. Guidance for technical aspects of implementing these tree improvement programs is provided. Test data is stored, analyzed and interpreted to provide expertise and training in tree breeding.

PACIFIC NORTHWEST TREE IMPROVEMENT RESEARCH COOPERATIVE (PNWTIRC)

The PNWTIRC is directed by **Glenn Howe**, associate professor. **The purpose of the PNWTIRC is to conduct genetics and breeding research on Pacific Northwest tree species with the goal of providing priority information that will enhance the efficiency of tree improvement efforts**. The PNWTIRC supports and trains graduates and undergraduate students in forest genetics and tree breeding research, which contributes to the cooperative. Sixteen students have participated since the inception of the PNWTIRC. They often continue to study forest genetics throughout their careers.

SWISS NEEDLE CAST COOPERATIVE (SNCC)

The SNCC is directed by **Dave Shaw**, associate professor and extension specialist. The focus of SNCC is to conduct research on Swiss needle cast of Douglas-fir for forest landowners in Western Oregon and Washington. SNCC trains students to collaborate with agencies, companies and nonprofits. **The SNCC has fully funded 17 graduate students who participate in SNCC research.**

UTILITY POLE RESEARCH COOPERATIVE (UPRC)

The UPRC is directed by **Eric Hansen**, Wood Science and Engineering department head with co-managers **Matthew Konkler** and **Jed E. Cappellazzi**, faculty research assistants. The UPRC conducts research aimed at prolonging the service life and improving the performance of wood poles, cross-arms, and other in-service wood used by electric utilities and the wood products industry. Members include utilities, chemical companies, wood treaters and inspection agencies. Research topics include developing treatments for controlling internal decay, assessing methods for pole inspection, improving specifications for initial treatment and offering short courses to educate utility users. **More than 100 undergraduates, 50 graduate students, and 20 visiting scientists have participated in and benefited from UPRC research**. These students typically advance to careers with chemical companies, wood companies, and some have started their own related businesses.

VEGETATION MANAGEMENT RESEARCH COOPERATIVE (WMRC)

The VMRC is directed by **Carlos Gonzalez-Benecke** , assistant professor. **The VMRC is a research program focusing on plant competition, vegetation control and early growth of forest stands**. The VMRC educates undergraduate and graduate students by participating in the Mentored Employment Program, which matches students with researchers within the College of Forestry. Undergraduate student workers assist in the field and with lab activities. Cutting edge research in reforestation and vegetation management is being conducted by the VMRC, allowing funds and research topics for grad students. Many of these students go on to work for public agencies.

Graduate Student Herman Flaminco conducts research in the field.

HERBICIDE RESEARCH answers questions

The use of herbicides in forests is a controversial topic in Oregon, throughout the country and the world. For the past eight years, Oregon State Professor of Landscape and Wildlife Ecology **Matthew Betts** and his research team have studied them closely, in a study partially funded by the college's Institute for Working Forest Landscapes. The research team paid close attention to the effects on wildlife and timber production.

"This study is relevant locally because herbicide use is commonly-used on Oregon Department of Forestry and industrial lands," Betts says. "In the Pacific Northwest, it's the primary silvicultural method that follows clearcutting."

Betts says the topic is becoming relevant globally as herbicides become more popular in plantation forests worldwide. Currently, about 35 percent of timber comes from plantations, and in the next 50 years, experts project that most timber will come from this source. Betts believes now is the time for forest managers to have adequate scientific information to inform decisions about whether or not to use herbicides.

His study on intensive forest management is the largest of its kind in the world. The research team worked together with industry and the State of Oregon to study 32 stands of 15 acres or more with four different levels of herbicide treatments ranging from no treatment at all in the control group through more heavily treated stands similar to those in a commercial setting, and an extreme treatment that exceeds current spray practices.

Stands that have or haven't been treated with herbicides can usually be recognized based on the amount of vegetation growing at the foot of young forests whose canopies haven't yet closed. Untreated forests tend to have green floors, whereas heavily treated forest floors are initially quite bare.

Eight years into the experiment, Betts says the saplings they started with are huge in relative terms. The research team has also learned how herbicides affect various species of plants and animals within the forest.

"There's little doubt that on the timber side, trees grow faster when herbicides are sprayed," Betts says. "Our study shows that the most heavily sprayed stands produce up to 30 percent more volume, but there is an effect on biodiversity."

The study measured herbaceous plants, birds, pollinators such as bees, deer, elk, moths and other insects.

"There were more bird species in areas where we didn't spray herbicides," Betts says. "Wilson's Warbler was one of the most affected species. We also saw depressed numbers of pollinators. Surprisingly, we did not detect much of a change in populations of deer, elk and moths."

Betts says that around year five of the study, for the most part, the number of species began to equalize and recover.

Betts' research found more bird species in areas unsprayed by herbicides.

"Even the heavily-sprayed stands began to turn green," he says. "In the end, some species responded negatively, some species have been resilient and some responded negatively and then recovered."

Land managers pay up to $200-250 per acre for herbicide spray. Money is spent up front and not returned until stands are harvested at age 40-50.

On the economic side of the study, the research team concluded that herbicide isn't cheap, and that spraying does not always generate additional financial value.

"You could spend $250 per acre now, or invest that money in a bank somewhere. If your expectation is a financial yield of seven percent or greater, we've found that it doesn't make economic sense to spray, all other things being equal," says Betts.

He emphasizes the study saw no failed stands or plantations, and valuable biodiversity tended to increase without herbicide use.

The research team will continue to monitor the stands up to the 15-year mark when the canopy will start to close, limiting sunlight to shrub species. They also plan to survey the general public about aspects of the study and perceptions about herbicide use.

That's where **Mark Needham**, Oregon State professor of social science, policy and natural resources, comes in.

"We began surveying in early 2019," Needham says. "We're focusing on a number of small, rural communities in the coast range near the stands in the study. We plan to ask residents about their knowledge, attitudes and perceptions associated with the herbicide issue. We hope to survey at least 400 people."

Instead of asking one-off questions, Needham says that in this context, it's important for survey respondents to make tradeoffs and prioritize their interests.

"This study spans so many different areas including wildlife, soil, water, pollinators and economic impacts, so it's important to make sure we look at the tradeoffs people are willing to make within the context of herbicide use," Needham says.

Betts agrees land managers and the general public need to decide if they want forests with more biodiversity but less timber growth per acre, or less biodiversity and high rates of timber production. "Without spray," he offers, "you need to spread out forestry operations to get the same amount of lumber. With spray, you have more tightly-packed and intensely managed stands, which can potentially free up land for conservation."

Betts realizes these are hard decisions.

"The results of this study are just not as straightforward as we expected them to be," Betts says. "We hope this science will help managers and the public make educated decisions about herbicide use amid the controversy."

FES's integrated social and ecological systems research area studies species including elk, deer, birds and insects.

Forest Ecosystems and Society (FES)

The Department of Forest Ecosystems and Society at Oregon State is world renowned for its education, outreach and research in the areas of forest science, natural resources, tourism and recreation. Students and faculty study and work in Corvallis, at OSU-Cascades in Bend and around the state, nation and world. Graduates go on to work outside in forests and national parks, on state lands, in important government agencies and non-governmental organizations. The department's research impacts policy and land management decisions worldwide, and its outreach programs benefit communities throughout Oregon.

EDUCATION

• **Janean Creighton assumed the role as director for the large and growing master of natural resources program**. Recent improvements geared toward enhancing student success include creating a comprehensive graduate student handbook, reviewing and refining processes for assessing student learning outcomes, appointing a new curriculum committee and conducting follow-up interviews with all graduates.

• **FES faculty and instructors guide students on individual, projects outside the classroom that provide hands-on experience with research or land management**. Students in the tourism, recreation and adventure leadership (TRAL) degree complete six months of work experience to gain skills that will help them in the future and see how their coursework applies to potential careers. The natural resources degree was revised to be more student-friendly by allowing students to use study abroad and internship credits in place of traditional classroom instruction.

• FY 2018 marked the first-year **students could enroll in the TRAL program**, a promising program that offers two options in Corvallis (outdoor recreation management and sustainable tourism management) and two options at OSU-Cascades (adventure leadership education and nature, eco and adventure tourism). **To meet demand, OSU-Cascades hired a full-time instructor** to increase the capacity to offer core skills courses.

• The FES **on-campus graduate program received positive feedback from the Oregon State Graduate School as it completed its five-year review**. To address suggested areas of improvement, FES department coffees involved speakers and discussion around learning-related topics, including flipped classrooms, mentoring graduate students and dealing with bias incidents in the classroom.

• **To improve student success outcomes, the natural resources program initiated** a complete review of all courses listed in the natural resources core, breadth, and specialty options. The program also introduced a new integrated conservation analysis option and developed new approaches to assessment of student learning outcomes. Finally, the program created a faculty curriculum committee to supplement the existing program committee.

RESEARCH

• To address the need for standardized, landscape-scale data that can enhance Earth systems models, **FES researchers made a long-term dataset (1999-2014) of plant and plot measurements for 35 tree and shrub species at 239 field sites in Oregon and California available to the public**.

• A study led by Distinguished Professor **Steve Strauss**, demonstrated that genetic engineering can prevent new seedlings from establishing. This study was the largest field-based study of genetically-modified trees ever conducted. This result could ease societal concerns over gene flow – the spread of genetically engineered or exotic and invasive trees or their reproductive cells beyond the boundaries of plantations.

• Predicting how plant species will respond to climate change – including the possibility of migration – is a major scientific challenge. **FES researchers and colleagues developed a model that incorporates geographic and physiological variables related to tree reproduction and movement for 15 tree species in the Pacific Northwest**. This work highlighted how geographical barriers to movement, such as landscape fragmentation, will substantially impede the natural migration of species and that scientists should only seriously consider assumptions about where species may migrate based on climate variables.

• Due to uncertainty in regulations, financial instability and pressures from urbanization, FES research on family forests in Oregon and Washington **showed why forest owners are not successful in transferring forests to the next generation within families**.

• Assistant Professor **Ian Munanura**'s research on Rwanda's tourism revenue sharing policy at Volcanoes National Park revealed several structural and policy barriers are preventing conservation and livelihood benefits. As poor communities living near protected areas are affected by ecotourism in various ways, his work **explores how local communities can be effectively engaged in ecotourism and develop more sustainable livelihoods**.

OUTREACH

• **The HJ Andrews Experimental Forest and Long-Term Ecological Research Program celebrated its 70th anniversary in 2018**. The forest supports research on forests, streams, and watersheds. The forest connects more than 160 researchers and students across multiple disciplines. The program is a partnership between three organizations: the college, USFS Pacific Northwest Research Station and USFS Willamette National Forest. Over the last two years, the program hosted outreach events that engaged more than 3,200 people in classes, tours, and conferences. More than 1,200 undergraduate and graduate students from across Oregon used the HJ Andrews Forest field station for research and course work. In K-12 outreach, the program hosted more than 600 students in experiential learning experiences in the forest and engaged more than 80 K-12 educators in workshops and trainings.

• FES faculty **are active in the International Union of Forest Research Organizations and collaborate with partners around the world**. Several serve in advisory capacities to foreign governments or non-governmental organizations.

CREATING A SAFER
future for foresters

Cable-assisted harvesting systems are gaining popularity in the Pacific Northwest. Stewart Professor of Forest Operations **Woodam Chung** says there are about 20 systems in use in the Pacific Northwest already, and that number is growing.

The systems are undeniably safer than traditional cable yarding systems and manual cutting, because, thanks to mechanized harvesting, cameras and other technology, no one has to be on the forest floor near falling trees.

"One worker sits at the top of a hill with a camera," explains Graduate Student **Preston Green**. "He can see where his grapples are and grab the logs at a safe distance."

Chung says this process eliminates the need for choker setters and fellers – some of the most dangerous jobs in the forest industry.

The technology for cable-assisted harvesting was developed in Europe about 20 years ago, and recently adapted by Oregon State for use on steep slopes in the Pacific Northwest.

Once the tree is cut by a cable-assisted cutting machine, the machine swings and piles the tree along the skyline corridor, where it will be picked up and transported to a mill for processing.

In addition to the safety of the system, Chung is looking at other aspects including soil impact. His research team has already completed two studies on soil impact. He says industry professionals and members of the public perceive large equipment causes soil compaction, but two initial studies, one in the McDonald-Dunn Forest and one on Lone Rock Timber's land, concluded that, depending on soil types and moisture content, loosening may occur after machine traffic.

"Now the question is, what does this mean in terms of erosion or soil moisture content?" asks Chung. "That's what we're looking at now."

Chung and his team will continue to study interactions between soil, machine and water.

"We will use silt fences to look at erosion and measure the amount of erosion we collect," Chung says. Researchers want to learn what kind of impact this erosion might cause on water quality in streams and rivers at the base of logging operations.

Another aspect of the study is the economic impact.

"Cable-assisted mechanized harvesting is more productive than manual cutting, especially on steep slopes," Chung says, "But the machine is expensive. Timber companies will have to weigh the costs and benefits for themselves and decide how to harvest."

Green agrees, "If these systems can produce more timber at a reduced cost, then it's a win-win for everyone involved."

Woodam Chung's (right) graduate students focus on safe harvesting solutions.

Forest Engineering, Resources and Management (FERM)

The Department of Forest Engineering, Resources & Management strives to support decisions for healthy, sustainable forests in the areas of forest management, engineering, biometrics, hydrology, forest health and silviculture. The department's teaching and research emphasize all aspects of active forest management and restoration.

EDUCATION

• **Forestry field school remains a signature part of the curriculum for college students**. This two-credit course is required for admission into professional school and **provides students a hands-on experience in the major aspects of forestry**. Over the past two years, more than 130 students participated in the course.

• **FERM's sustainable forest management graduate program underwent a ten-year review** as a continuing program in FY 2018. Graduate student exit interviews continue to indicate a very high level of satisfaction. Ninety-one percent of FERM graduate students ranked their experience in the program as above average and exceptional.

• **Thanks to recent agreements, graduates from Umpqua and Southwestern Community Colleges will be accepted into FERM's professional school.** More than 10 students joined the program in FY 2017 and 2018 after receiving their community college degrees.

• FERM faculty developed a suite of **Ecampus** courses that allow students to complete lower-division admission requirements for FERM's professional school online, making the four-year BS forestry degree more **financially accessible for rural Oregonians**.

RESEARCH

• The **FERM department hired Kevin Lyons to serve as the Wes LeMatta Professor in Forest Engineering**. Lyons will provide research thought leadership in the field of forest operations and engineering.

• FERM is committed to safety in the logging industry, and **faculty are researching ways harvest workers can conduct their work away from steep slopes, where most fatal accidents occur**, by investigating the feasibility, safety and cost-effectiveness of cable-assisted, steep slope logging systems in Oregon forests.

• **FERM faculty have found the use of tethered cut-to-length harvesting equipment** can be used to operate on the slippery volcanic soils of central Oregon. Costs were much lower than cable systems **making forest restoration more affordable**. The estimated cost of biochar from the larger scale biochar facility evaluated in the project was only one-third of that of smaller facilities, making **applications in commercial agriculture potentially viable while sequestering carbon**.

• FERM faculty researched the impact of contemporary forest practices on watershed health and water quality. **Researchers found that there appears to be a reduction in sedimentation after the 1970s, possibly as a result of the effects of the Oregon Forest Practices Act**.

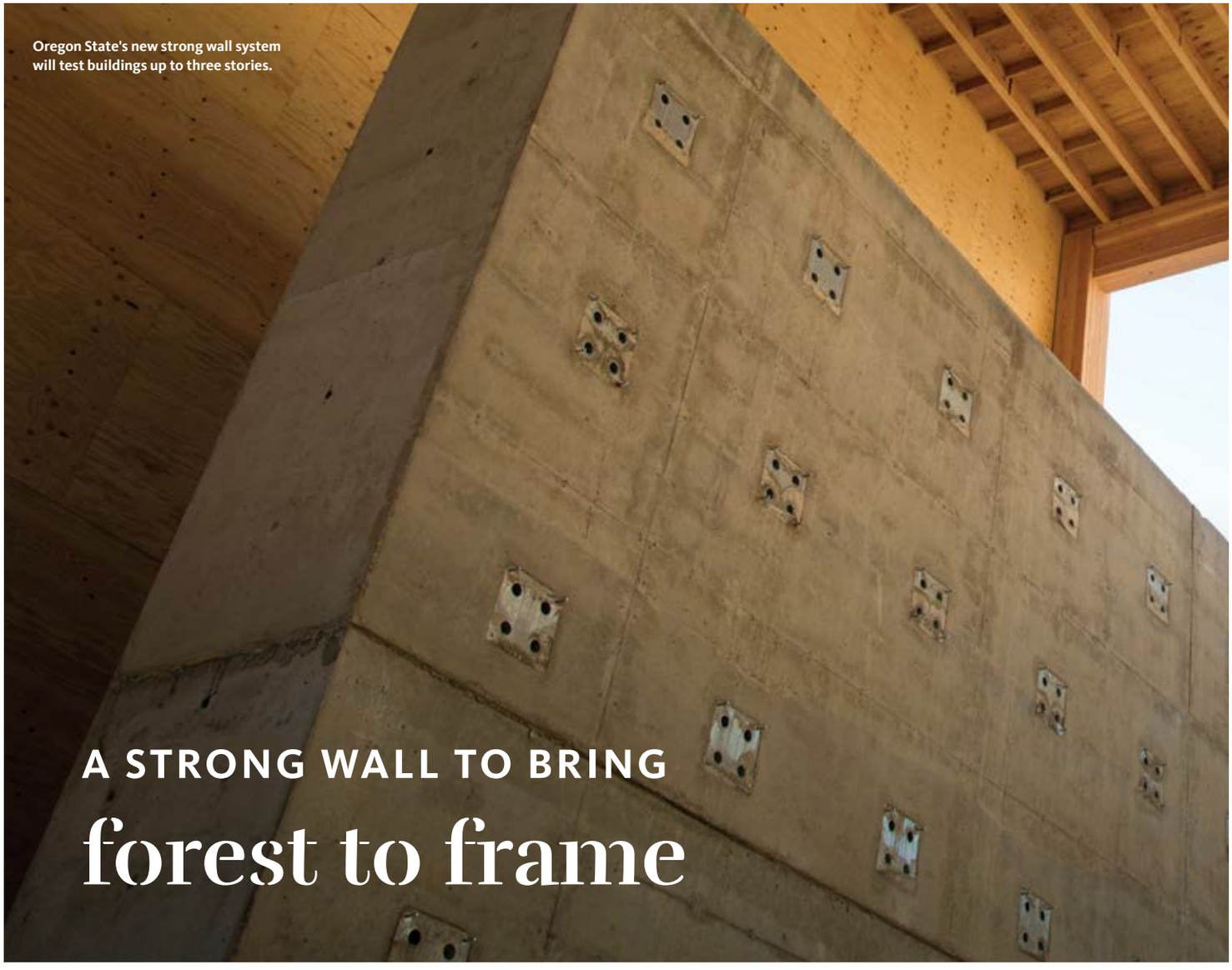
• **FERM researchers studied emerging and reemerging forest diseases of the Pacific Northwest**, including: Swiss needle cast, sudden oak death, black stain root disease, red needle cast and web blight on old growth and industrial forests to understand potential impacts and develop mitigation strategies.

OUTREACH

• **FERM continued its BS Forestry Curriculum Advisory Committee, consisting of external forestry employers**. The group worked throughout FY 2017 to improve curricula of the program and prepare students for future employer needs. FERM also renamed and refined the forest restoration and fire option of the forestry degree and successfully obtained **certification of the option by the Association of Fire Ecology**.

• Assistant Professor **Tamara Cushing** utilized survey instruments to **explore the needs and challenges presented to logging contractors when working with small woodlands owners**.

• Assistant Professor **Bogdan Strimbu** led an industry-focused meeting in FY 2018, **focused on starting up a new research area in precision forestry**. This expanded research focus will study the use of advanced technologies to improve forest-management results.



Oregon State's new strong wall system will test buildings up to three stories.

A STRONG WALL TO BRING forest to frame

Construction of the A.A. "Red" Emmerson Advanced Wood Products Lab is underway on the Oregon State University campus. The new lab will add 15,000 square-feet of structural testing space to the Oregon State College of Forestry, which already boasts some of the best technical research facilities in the nation.

A new state-of-the-art space

The laboratory will also be home to a 2,500 square-foot advanced wood products manufacturing area, a flexible demonstration and classroom area and the TallWood Design Institute offices.

"There are a variety of ways research and teaching can intersect in this new space," says **Arijit Sinha**, associate professor of renewable materials at Oregon State. "When we complete large-scale tests, we will need an army of undergraduate helpers. It will be a great experiential learning opportunity for students, while at the same time offering us new, world-class capabilities to test buildings at full scale."

Juliana Ruble, former advanced wood products lab manager and project engineer for Andersen Construction, agrees.

"The new lab will provide space for architects, engineers, wood products manufacturers and researchers to come together and develop new products and new building systems designs," she says.

A CNC panel processing center will be capable of creating large panels and straight beams as well as curved beams and other, smaller wood products. Another robotic machine will expand architectural fabrication opportunities.

A strong floor for large tests

A 60-by-80-foot strong wall and reaction floor system will facilitate testing of up to three-story wood structures.

The strong floor and accompanying reaction wall are composed of

The university worked with Andersen Construction to complete the new lab.

four-foot thick concrete. Anchors are attached to the floor and wall on a four-by-four-foot grid. Each anchor has a 60-kip capacity for a total of 240 kips for each cluster of four anchor points. The reaction wall is capable of withstanding a 150-kip reaction while the floor can withstand 500-kip compression across a twelve-inch diameter area.

"Our strong floor will be one of the largest related to wood and timber research in the U.S.," Sinha says. "We will use the floor and reaction wall to test materials and structures. The strong base of the floor mimics a rigid surface during tests."

Oregon State and TDI researchers anticipate using the facility to conduct seismic tests, connection tests, wall connection tests, loading tests and more.

"We do these tests now on a smaller scale," Ruble says. "This new facility will more than double our research capacity while increasing our manufacturing research capabilities and our ability to bring in industry, students and stakeholders to learn in an applied research environment."

Making connections, continuing research

Sinha researches connections within mass-timber buildings, and will continue this work inside the new lab. His current project focuses on nondestructive evaluation of mass-timber by exposing connection materials to extremes of modular and biological exposure on two different species of CLT.

Sinha will also assess how wood buildings react to biological attack including fungi. The research project is funded by the USDA, and the team includes collaborators from Portland State University.

"The results will be incorporated into building codes," Sinha says. "This project is important because it will tell us how things play out overtime in wood buildings with intrusion of moisture."

Wood Science and Engineering (WSE)

The Department of Wood Science and Engineering (WSE) is one of the largest and most diverse departments of its kind in North America. There is a rising need for wood science and renewable materials graduates thanks to the increase in demand for sustainable products, including mass timber buildings. The department's programs are focused on the science, technology, engineering and business practices that help society sustainably meet the world's needs for renewable materials and help ensure the global competitiveness of American business.

EDUCATION

• WSE established an industry partnership for student recruitment, Friends of Renewable Materials. **Eight companies/individuals committed $360,000 in scholarships and are assisting with recruiting efforts**.

• Every student that graduates from the renewable materials degree program **has at least six months of experience through an internship, exchange or summer jobs program**.

• In FY 2017 and FY 2018, the department offered three short-term study abroad experiences through the College of Forestry's Office of International Programs: **Rainforest, Rangeland and Reef: Exploring Australia's Coastal Landscapes; Peruvian Amazon: Tropical Woods and the Fungi That Love Them; and, Alpine Europe: Sustainable Manufacturing and Design**.

• WSE completed a **major overhaul of the renewable materials curriculum, including finalizing the addition of a new option: advanced wood manufacturing**. The department created five courses in direct support of the advanced manufacturing option: WSE 351 Advanced CAD, WSE 352 CAM for the CNC Router & Laser Cutter, WSE 450 Entrepreneurial Product Development I, WSE 451 Entrepreneurial Product Development II, and WSE 463 Advanced Manufacturing II. The option opened to students in fall 2018.

• **A new woodturning studio was built and stocked for the FY 2018 academic year**. Three new courses were developed to utilize this space and were held in the past year (Turning with Science I, Turning with Science II, and Sculptural Turning). All courses were cross-listed in art. The studio was also used by students as part of their senior capstone for the renewable materials art and design option, where they **completed a wood mural project for the United Way of Benton and Lincoln Counties**. The project created a more welcoming space for visitors to the building while highlighting Oregon's wood products history.

• The renewable materials program continues its **two-term series of specialized coursework** focused on the specifics of manufacturing, marketing and distribution of unique renewable materials-based products. These courses give students opportunities to apply what

they learn in the classroom and produce manufactured products from wood and other renewable materials. In 2018, **the courses were offered in close collaboration with the University of Oregon School of Architecture & Allied Arts**. As a result, **students successfully designed, developed, manufactured, and marketed a line of cheese cutting boards** under the Beaver Classic Wood Products brand.

RESEARCH

• WSE, with support from the U.S. Department of Agriculture, National Institute of Food and Agriculture's Education and Literacy Initiative, **offered a 12-week research and extension experience for 10 undergraduate students**. Projects included: cross-laminated timber and concrete composite diaphragm, virtual reality in timber construction, use of lesser-known species in mass timber, digital manufacturing, cross-laminated timber in modular construction, and mass plywood panel connections.

• **TDI and WSE completed several projects with industry partners** to test design elements for new building projects and new products to help drive rural economic development. A partnership with Freres Lumber, led by Associate Professor **Arijit Sinha**, resulted in **commercial production of a new mass plywood panel** at their plant in Lyons. These panels are being produced in a brand new $30 million facility capable of manufacturing panels three feet thick, 12 feet wide, and up to 60 feet long for use in large scale commercial buildings.

• Associate Professor **Seri Robinson** filed **a new patent on the use of pigments produced from spalting fungi to make batteries and solar cells**. This work could offer a renewable option for solar cell parts currently made out of rare earth metals and also provide a potential revenue stream for small forest landowners who could manage for the fungi, as the pigment produced cannot be synthesized.

• **Arijit Sinha**, Associate Professor **Scott Leavengood** and Professor **Jeff Morrell**'s work on design values **resulted in the inclusion of juniper in the National Design Specification, allowing juniper to be used for a multitude of applications**. This paves the way for it to be used in non-structural as well as landscaping purposes in government-funded projects. The enhanced utilization of juniper will have direct economic impacts for rural communities in Eastern Oregon.

• Professor **Lech Muszynski** and Professor **Rakesh Gupta** **conducted a series of large-scale fire performance tests on CLT floor and wall assemblies**. One wall assembly passed a 90-minute fire exposure test while five floor and wall assemblies passed a 120-minute fire exposure test. All assemblies were exposed in loaded condition, without any fire protection, and had an unprotected half-lap joint along the loaded direction. The results are great news for CLT manufacturers, architects and engineers interested in building with CLT technology in the United States.

OUTREACH

• Professor **Fred Kamke** assisted in **defining manufacturing requirements for Formology, Inc. to start up a new custom particleboard facility in Hubbard**. WSE provided all pilot-plant work and product evaluation. In a project primarily funded by Oregon BEST, he assisted EcoPro Polymers in establishing a relationship with Formology Inc., to exclusively use their adhesive system. The work with EcoPro resulted in development of a formaldehyde-free adhesive system.

• **Plywood and LVL companies are facing a wave of retirements**, and industry leaders expressed a need for training the next generation of industry leaders. In response, WSE faculty resurrected the **Structural Plywood and Veneer-Based Products Workshop**. Nearly 70 people attended including a diverse range of experiences – from those that had been in the industry for six decades to those who have been involved in the industry for just a few weeks.

• **Scott Leavengood** conducted several on-site quality control workshops for Oregon wood products companies. These workshops involve two days in a classroom with a mix of lecture and hands-on exercises. Participants also collect data in the mill followed by an analysis and discussion of the results.

Corvallis area families participate in hands-on activities during Get Outdoors Day at Peavy Arboretum.

Extension + outreach

240+

EDUCATIONAL EVENTS

FY 2017 – FY 2018

600+

HOURS OF INSTRUCTION

FY 2017 – FY 2018

12,700+

INDIVIDUALS REACHED

FY 2017 – FY 2018

The College Research Forests utilize prescribed burning. (Photo by Taylor Fjeran)

EDUCATING THE public on wildfire

Residents of the Western United States are living in a time of change. The forest is stressed from high tree densities, drought, and insect and disease outbreaks. The forest landscape neither looks nor functions as it did before fire suppression efforts began more than a century ago.

In 2017, Oregon experienced one of the worst wildfire seasons on record with more than 700,000 acres burned across the State resulting in ecological, social and economic damage. These damages cost the state of Oregon millions of dollars each year and billions across the nation.

Our forests need help

Oregon State researchers and extension agents have emphasized the need for viable forest management practices to help mitigate the risks and impacts of high-intensity and high-severity fire events.

Enter **Daniel Leavell**, Klamath and Lake County extension agent and Carrier Berger, extension associate and program coordinator for the Northwest Fire Science Consortium.

Their goal is to affect change when it comes to the unique and complicated nature of wildfire.

The pair are planning a comprehensive way to address fire in Oregon. It's called the Fire Program. The team believes a sound fire program uses science as a foundation to provide education and outreach to the public, leading to the promotion and strategic use of cross-boundary, landscape-scale restoration and wildfire risk-reduction projects.

Getting the work done

A successful fire program works to achieve the goals of the National Cohesive Wildland Fire Management Strategy, which encourages resilient landscapes, fire adapted communities, and safe and effective wildfire response.

Local partnerships are key, including one with the nonprofit group, Klamath-Lake Forest Health Partnership (KLFHP). KLFHP is working with the fire program to implement sound, science-based management across ownership boundaries in Klamath and Lake Counties.

"We collaborated across ownership boundaries to implement forest health treatments," Leavell says.

"This creates seamless, healthy forest landscapes resilient to disturbance while working with partners to implement work on the ground across private and public lands to achieve objectives."

Leavell hopes other individuals and communities use this as a model and modify it to meet the needs of their local circumstances.

What's next?

Leavell and Berger are seeking funding to support the statewide Fire Program.

"People are really grabbing onto the concept of this program and what we're trying to accomplish," Berger says. "Funding would bolster the program and help us get work done on the ground through our landscape efforts."

Leavell agrees and believes that partnerships are key in successfully bringing the program to life.

"Oregon State University's work in this area is critical," Leavell says. "Together with homeowners, landowners, and land managers (public and private), we can make a real difference and affect management changes that impact the health of our forests and communities."

OUTREACH HIGHLIGHTS
AS OF FY 2018

Event name	Event description
Get Outdoors (GO) Day	The fourth and fifth annual Get Outdoors Day events were held in FY 2017 and 2018, respectively. 'GO Day' is hosted by the Oregon State Research Forests, Extension Service and the Benton County Health Department. The free, public event takes place at Peavy Arboretum and aims to introduce first-time visitors to public lands and recconect youth to the great outdoors. In FY 2017 and FY 2018, more than 900 attended thanks to an active outreach approach to underserved populations.
Starker Lecture Series	The Starker Lecture Series, endowed by the Starker family since 1986, provides resources for lectures in the College of Forestry. Each year the series includes films, talks and a capstone field trip to a location related to the theme. Almost 900 attended, viewed live or watched recorded screenings of the FY 2017 series titled 'Recreation in the Forests: Finding a Healthy Balance.' The 2018 theme was 'What's next: The future of managing for healthy productive forests.' These events drew more than 1,300 attendees.
Wood Magic	Wood Magic is an educational program for third and fourth grade students that teaches them the basics of wood science. Students visit 11 stations and cover topics including wood strength, bendability, fire stability and pests. In FY 2017 and 2018, more than 2,400 students from Benton, Linn, Lane, Marion, Lincoln and Polk counties attended the program.

To learn more about these and other outreach activities, visit: forestry.oregonstate.edu/outreach

Extension

The Forestry & Natural Resources (FNR) Extension Program is one of seven established program areas within the Oregon State University Extension Service. Established in the 1940s, the FNR Extension Program is the largest of its type in the U.S., and is often regarded as the nation's marquee FNR program.

FNR Extension currently employs 12 field agents covering 28 of Oregon's 36 counties. In addition, 10 statewide extension specialists cover the following subjects: water resources and watershed management, silviculture, forest health, human dimensions in natural resources, collaborative natural resource management, forest management and forest economics, timber harvesting and forest operations, Christmas tree production marketing, forest products processing, forest products marketing and green building.

In FY 2017 and FY 2018, the FNR Extension Program conducted more than 240 educational events across Oregon, the Western United States and nationally. These events provided more than 600 hours of instruction and reached 12,700 individuals. The FNR Extension Program worked with many partner organizations in the past two years, and generated more than $300,000 in program revenues.

Current FNR Extension programs

ASK AN EXPERT
'Ask an Expert' has fielded more than 10,000 questions from across the state, the nation and world since its debut. Answers to a number of forestry, natural resources and gardening topics come within two working days from OSU researchers and 20 master gardeners. **One of the busiest programs of its kind, more than 330 questions were answered in FY 2017 and FY 2018.**

OREGON NATURAL RESOURCES EDUCATION PROGRAM (ONREP)
ONREP prepares K-12 educators to actively engage students in the study of Oregon's diverse natural resources and ecosystems through relevant, meaningful and place-based experiential learning. **In 2017-2018, 1,534 educators from 26 different Oregon counties attended one of 102 workshops, institutes, school programming or courses held in 17 of Oregon's 36 counties.** These educators reach a potential of more than 60,000 students each year.

OREGON WOOD INNOVATION CENTER (OWIC)
OWIC, a collaborative Oregon Forest Research Laboratory and FNR Extension initiative, fostered the competitiveness of Oregon's wood-products industry through testing, technical assistance and market assessment projects for Oregon businesses. **In FY 2017 and FY 2018, 13 workshops were conducted, including long-standing courses**

on wood basics for wholesalers, lumber drying, wood adhesion, quality control and management development. In addition, 30 undergraduate renewable materials students have been directly involved in OWIC's research and development activities which have included assisting Oregon firms develop new products from agricultural residues and testing of the properties of hybrid poplar, Willamette Valley ponderosa pine and sugar palm.

CONTINUING AND PROFESSIONAL EDUCATION PROGRAM (CPE)

The CPE program was established in 2014 in order to create a more conducive environment for the college to provide continuing education to the professionals in forestry and natural resources. **In FY 2017 and FY 2018, the program helped to coordinate 15 events that totaled 220 hours of instruction and reached more than 1,100 participants.**

OREGON WOMEN OWNING WOODLANDS NETWORK (WOWNet)

WOWNet continues to provide relevant, peer-learning opportunities for women in forestry roles, an emerging landowner group, to help inform land management decisions. **There are more than 220 members of the WOWNet program who participate in activities such as full-day retreats, evening trainings and focus groups.**

NORTHWEST FIRE SCIENCE CONSORTIUM (NWFSC)

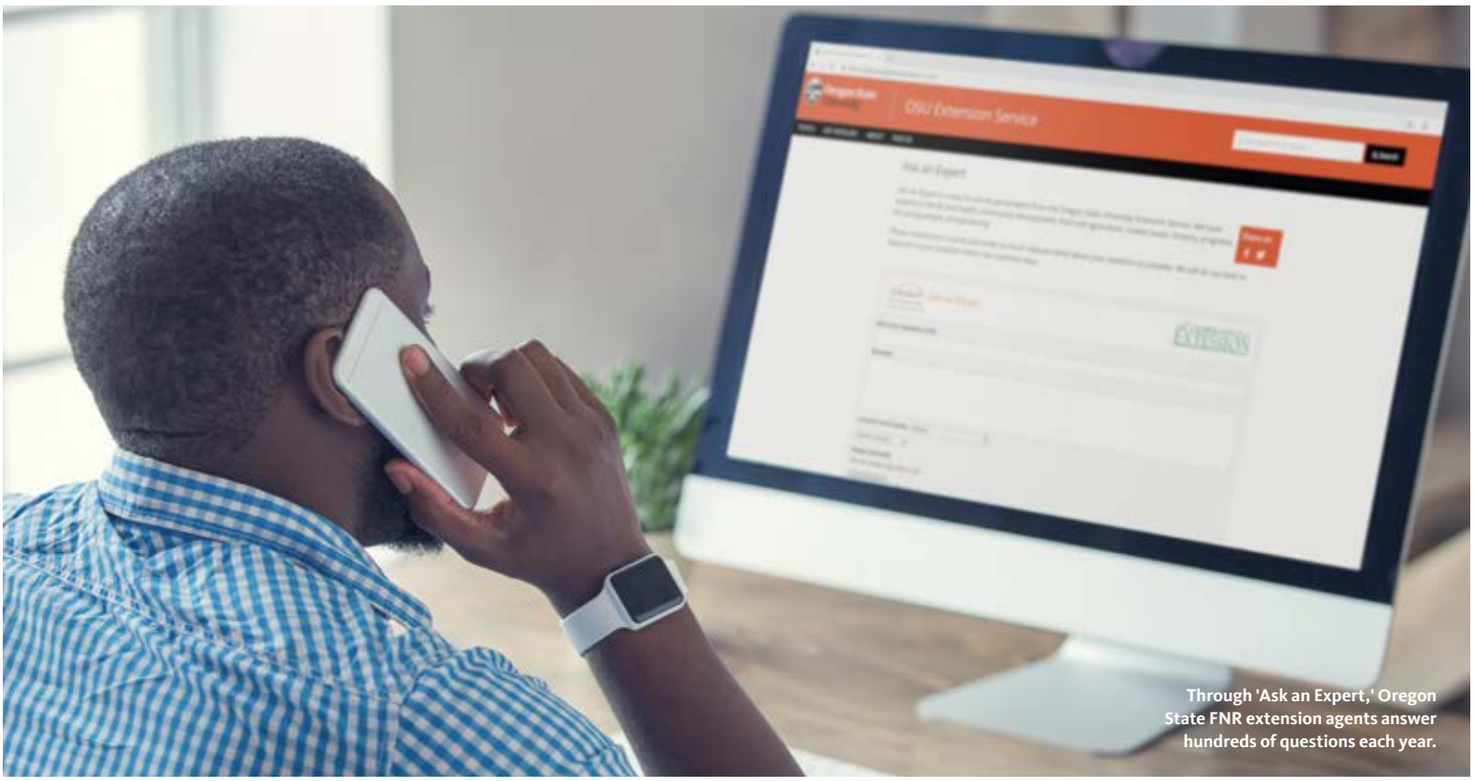
The NWFSC continues to expand its reach throughout Washington and Oregon, accelerating the awareness, understanding and adoption of wildland fire science. **During FY 2017 and FY 2018, significant activities and products included**: 14 webinars focused on issues such as communication strategies during a fire event, a smoke photographic guide, creating fire adapted communities, understanding stakeholder perceptions of fire, rangeland fire protection associations and a summary of previous fire seasons.

MASTER WOODLAND MANAGER PROGRAM

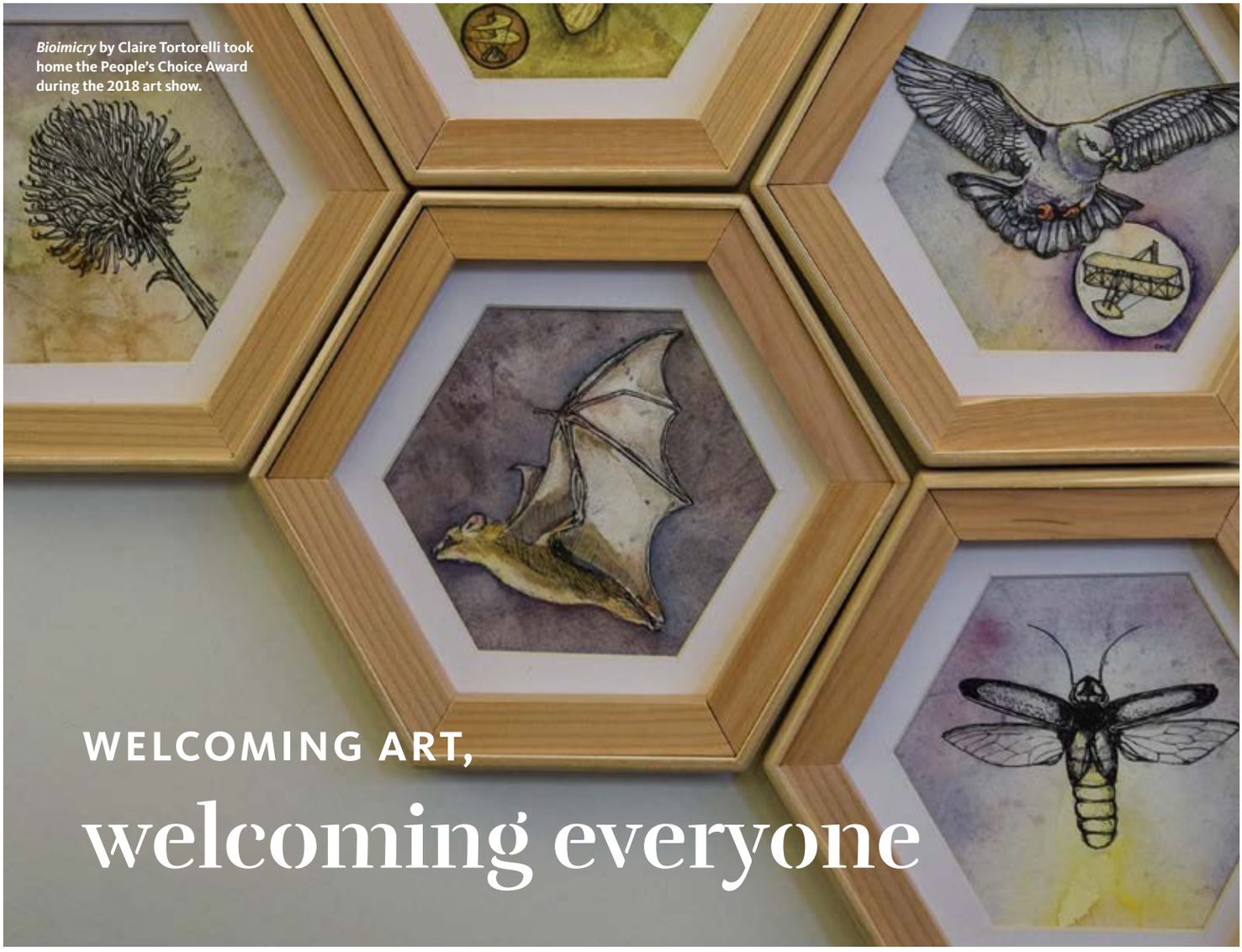
The training program is a master's-level course for landowners who are interested in an intensive forest management training and sharing the knowledge gained through this training with people in their local communities. **In FY 2017 and FY 2018, 61 volunteers reported more than 18,000 contacts through 7,000 hours of unique activities** with the public, family forestland owners, youth, watershed councils and various other organizations. Volunteers reported being able to better manage their 18,000 collective acres of forestland due to their program training.

MASTER NATURALIST PROGRAM (OMN)

The Oregon State University Extension Master Naturalist Program is designed for people interested in Oregon's natural history and natural resources management, who want to dedicate their time as volunteers. Participants volunteer for natural resources programs, agencies and organizations in their communities. **In FY 2017 and FY 2018, 58 volunteers achieved Oregon Master Naturalist certification.** This brings the total certified to 155 since 2012. To date, program volunteers have contributed to 321 local, state and federal agency and non-profit volunteer groups, with more than 36,000 volunteer hours submitted, reaching 360,000 persons through their activities. This represents $912,542.00 worth of volunteer service in six years of recording volunteer data.



Through 'Ask an Expert,' Oregon State FNR extension agents answer hundreds of questions each year.



Bioimicry by Claire Tortorelli took home the People's Choice Award during the 2018 art show.

WELCOMING ART, welcoming everyone

Blank walls in the Richardson Hall knuckle inspired the first College of Forestry art contest in 2017. Temporary walls replaced the connection point to old Peavy Hall, as construction began on the new Oregon Forest Science Complex.

The college's faculty and staff found themselves scattered throughout other campus buildings including Richardson, Snell and Strand Hall and needed a reason to come together.

The first art contest and show with the theme, 'The Other Side,' was held February 17, 2017, and diversity was key to organizers and participants.

All faculty, staff and students were invited to participate, and art mediums chosen were as diverse as the people creating them. The contest saw paintings, sculptures, wood working, photography and more. The pieces were judged by representatives throughout the college and campus.

With the College of Forestry's commitment to equity, inclusivity and diversity, 2017 also saw the formation of the college's Diversity, Equity and Inclusion Committee. The college and committee are devoted to addressing DEI issues in the realm of forestry and natural resource management - through education, research and public engagement. The committee will draw fully and inclusively on the power and force of human imagination, experience and creativity to meet the needs of today's world.

With this in mind, the art show continued in 2018 with the theme of 'Innovation.'

Assistant Professor **Seri Robinson** requires students in the art and design option within the renewable materials program to participate in the art show each year.

"It gives the students a chance at expression using media they are familiar with," Robinson says. "Because they all have a deep science background in wood and forests, they can apply deeper meaning to art created with the art show's theme in mind."

Robinson thinks the art shows have been a great success.

"We've had some really great work submitted," Robinson says. "And it's been a great opportunity for students to talk about their feelings about the college climate, especially in terms of diversity, in a more public forum."

DEI THEMES AND GOALS
DEI STRATEGIC PLAN

THEME	Building awareness
Goal 1	Cultivate a community of faculty, staff, students and external partners that is competent in knowing and exemplifying DEI values within COF and beyond.
Goal 2	Increase exposure to other cultures and ways of thinking and learning.
THEME	Welcoming climate
Goal 1	COF, through its words and actions, genuinely welcomes, values and includes all of its members, who have diverse backgrounds and perspectives. The college presents itself as a welcoming and inclusive community that values the contributions of all its members and serves as a beacon for others.
Goal 2	All COF members and guests will have access to the college's physical spaces and intellectual community. COF is a home for learning & personal development.
THEME	Enhancing DEI
Goal 1	Understand barriers to DEI in general and specific to forestry and natural resource management. Use findings to guide plans for improving DEI.
Goal 2	Improve the representation and inclusion of diverse and underrepresented groups in COF via recruitment and retention.
Goal 3	Increase our national and international reputation as an inclusive center of academic excellence.
THEME	Institutional longevity
Goal 1	Develop appropriate policies and structures for continued dialogue and practice around issues of DEI.
Goal 2	Ensure that perspectives around issues of DEI are included in planning and decision making in all units of the college.
Goal 3	Coordinate actives and reporting across all COF DEI themes to keep issues salient.

The entire DEI Strategic Plan can be found online at: forestry.oregonstate.edu/diversity

Diversity, Equity + Inclusion (DEI) Committee

In 2018, more than 100 faculty, staff and students worked together to develop a college-wide strategic plan that ties to the university's vision and principles and builds on prior college efforts, adapting a vision and mission from the 2008 Diversity Action Plan, which was adopted in order to intentionally engage with issues surrounding diversity, equity and inclusivity.

COF DEI VISION

The College of Forestry aspires to create an environment in which all members of the community feel safe, respected and free at all times to participate in various undertakings of the college, including learning, teaching, administration and research.

COF DEI MISSION

The College of Forestry will embrace the distinctive qualities of all members of the community. We recognize that equity, inclusion and diversity are foundational values of OSU as an institution and pillars of excellence, enhancing all of the College of Forestry's missions.

The College of Forestry is committed to addressing those challenges in the realm of forestry and natural resource management – whether it be through education, research, or public engagement. We intend to draw fully and inclusively on the power and force of the human imagination, experience, and creativity to meet the needs of today's world.

Diversifying our college community is one of five strategic priorities to build the vision of the College of Forestry as a world-class education, research, and outreach center for healthy landscapes, communities and businesses. Priority five directs efforts to "drive toward a more diversified, pluralistic college community founded on collegiality and respect."

The strategic plan sets the college on a path toward accomplishing this priority by describing actions we will take to build awareness of the need for equity and inclusivity including: creating a welcoming climate and culture in the college; diversifying the faculty, staff, and student body through improved recruitment and retention; and fostering and rewarding actions that promote a pluralistic community culture that will help ensure the institutional longevity of our commitment. This plan provides concrete actions designed to seize opportunities and overcome challenges to enhancing diversity, equity and inclusion in the college.

Implementation of the DEI Strategic Plan is led by the college's DEI Coordinator, **Heather Roberts**, and a 12-member committee of faculty, staff and students. Members work with others within the college to implement specific actions. The dean, associate deans and department heads provide support and accountability for DEI efforts.

Students at Oregon State have the opportunity to study abroad on every continent except Antarctica. (Photo by Jessica O'Loughlin)

EXPLORING ECOTOURISM

in Chile

One important task of the College of Forestry's Office of International Programs is connecting Oregon State students with hands-on learning experiences abroad. This includes internships that provide educational opportunities and practical experience for students.

Shelby Knight, a natural resources student at Oregon State University-Cascades in Bend, gained all of this and more during an internship experience in Chile.

"From a professional-development perspective, I learned how to better navigate language and cultural barriers. I improved my understanding and use of the Spanish language and learned about the Chilean culture."

Growing up in Central Oregon, Knight fell in love with natural resources, but was never sure exactly what she wanted to pursue as a field of study or career.

"I love that the natural resources major is broad, diverse and offers opportunities to explore different aspects of the natural sciences," she says. "Since coming to OSU Cascades, I've become interested in the interface between humans, human development and ecosystems."

Through her involvement in the Natural Sciences Club at OSU Cascades, Knight met other students who participated in study abroad opportunities.

"I had no idea that this was even a possibility for me as a Cascades student, and I began to look for opportunities to go abroad through OSU," Knight says.

She found and applied for a short-term, faculty-led study abroad opportunity in Chile. During the application process, she learned about the option to stay behind after the experience to complete an internship.

"I loved the idea of staying in Chile for a longer period of time," she says. "I chose to intern with Huilo Huilo Biological Reserve because they had a relationship with OSU, and their eco-tourism and conservation model really

Knight (left) enjoys the cultural aspects of studying abroad in Chile.

interested me. Plus, it looked like the most beautiful place to spend two months – and it was."

Knight worked in the excursions department of the biological reserve where she helped deliver environmental, cultural and outdoor education to guests. She also tracked and mapped 'illegal' trails within the reserve, assisting Huilo Huilo with their trail interpretation plan, which will help the organization develop replanting and recovery strategies for illegal trails.

Knight also helped develop a nature-driven children's program for the Reserve's called Los Pequeños Exploradores or The Tiny Explorers.

This experience inspired Knight to pursue research abroad after graduation.

"I learned a lot about myself by entering an unfamiliar situation," she says. "I can't wait to keep learning and exploring."

Alpine Europe

International Programs

As a globally top-ranked institution, the College of Forestry's impact is felt worldwide. The International Programs team supports faculty as they build research collaborations. The office also brings students and scholars from across the world to learn and work in Oregon.

Ensuring student access to international experiences remains a signature focus of the college. Through study abroad and international internships, students are able to explore diverse cultures and ecosystems around the world, gain global insights in their academic fields, and expand their professional skills and networks.

GROWTH IN STUDENT INTERNATIONAL EXPERIENCE

• **During FY 2017 and FY 2018, more than 170 students went abroad.** The college's three faculty-led programs in Alpine Europe, Chile and Malaysian Borneo were filled to capacity.

• Internship opportunities are also growing, most notably in forest industry placements in New Zealand and ecosystem services in Chile and Malaysia.

• Over the last two years, **the Dean's Fund for International Engagement helped make international experiences accessible to more than 50 undergraduate and graduate students**. Several students were successful in obtaining prestigious awards for international study.

• Graduate students crave international experiences like research and conferences. **In 2017, the first graduate student program was offered in Tuscany, Italy**.

ENGAGING WITH PARTNERS

• The Chile Initiative continues to thrive with steady collaboration between researchers, industry partners and students. **OSU and Universidad Austral de Chile students focused together on forest ecosystems and sustainable management through reciprocal field courses in Chile and Oregon**.

• **Faculty obtained grants to support research and student education** including $25,000 from the 100,000 Strong In the Americas innovation fund to start the Chile Mountains to the Sea field program and more than $20,000 from the U.S. Embassy in Kuala Lumpur to support the Oil Palms to Orangutans program.

• In spring 2017, a group of **Oregon timber industry experts visited Italy, Switzerland and Austria to tour wood manufacturing facilities.** Anthony S. Davis, Judith Sheine of the University of Oregon College of Design and Allyn Ford of Roseburg Forest Products led the trip. In fall 2018 a similar group traveled to New Zealand to learn about the green bioeconomy, international export markets and timber production and policy.

OSU AS A DESTINATION

• During FY 2017 and 2018, **the college welcomed more than 150 exchange students, visiting interns and scholars.** Scholars worked with faculty to conduct ground-breaking research, and their presence enabled students to hear first-hand about natural resource challenges and innovations across the world. Many visiting student interns return to their home countries to pursue graduate degrees.

• **In 2017, International Programs co-hosted a nursery and seedling development study tour for the Moroccan High Commission on Water, Forests and Combating Desertification** in conjunction with U.S. Forest Service International Programs. Groups from France, South Korea, Chile and New Zealand also visited OSU to learn our role in advancing forest practices and innovative wood products.

NEW, COLLABORATIVE EFFORTS

• Oregon State partners with the Oregon Zoo, the World Forestry Center and Portland-based nonprofits in a **Borneo Working Group**, which connects Oregon and the Malaysian state of Sabah to promote sustainable development and conservation of the flora and fauna of this biodiverse region.

• Matthew Betts **formed the Forest Biodiversity Research Network** to further the college's mission to build a global forum for biodiversity and conservation in forest ecosystems.

FACULTY-LED PROGRAMS
OFFERED DURING FY 2017 – FY 2018

Program title	Term(s)
Costa Rica: An Immersion in Culture and Nature Country: Costa Rica • Region: Latin America	fall 2018
Managing Complex Adaptive Systems: Graduate Field Course in Tuscany, Italy Country: Italy • Region: Europe	fall 2017
Mountains to the Sea: Ecosystems of Chile Country: Chile • Region: South America	spring 2017, spring 2018
Oil Palms and Orangutans: Forest Conservation in Malaysian Borneo Country: Malaysia • Region: Asia	summer 2017, summer 2018
The Forest Sector's Contribution to Sustainability of the Built Environment in Alpine Europe Countries: Italy, Switzerland, Slovenia, Austria Region: Europe	summer 2017


Malaysian Borneo

Oregon State wood scientists believe cross-laminated timber could be the future of the construction industry in North America. (Photo by Erik Jepsen)

TALLWOOD DESIGN INSTITUTE: building the future

TallWood Design Institute reaches out

Based at the College of Forestry at Oregon State University, the TallWood Design Institute (TDI) is the nation's leading research collaborative focused on the advancement of structural wood products and mass timber design. The institute represents a unique interdisciplinary partnership between OSU's Colleges of Forestry and Engineering and the University of Oregon's College of Design.

The institute is at the forefront of mass timber research and real-world relevance. Its core tenets are the importance of industry collaboration, through outreach, education and feedback from professionals.

"Our goal is to conduct meaningful research and engage with the building community to help validate and highlight how these products and building systems work," says Outreach Coordinator **Evan Schmidt**.

During FY 2017 and 2018, TDI focused on outreach by developing avenues of collaboration with community partners including product development, testing with manufacturers, educational seminars for students and designers and applied research projects with engineering firms.

Connecting with industry

TDI worked with the Freres Lumber Company in Lyons to test and develop an entirely new engineered wood product, mass plywood panels (MPP), in 2017 and 2018. TDI funded the second-phase of Freres's testing, and continuing work with Freres includes optimizing MPP's layup through modeling, structural testing, life cycle analysis, acoustics and architectural design applications.

MPP, like CLT, can be used as a substitute for conventional building materials. Now certified by the APA for structural use, MPP was installed for the first time in the U.S. as sheathing on Oregon State's new A.A. "Red" Emmerson Advanced Wood Products Laboratory in Corvallis.

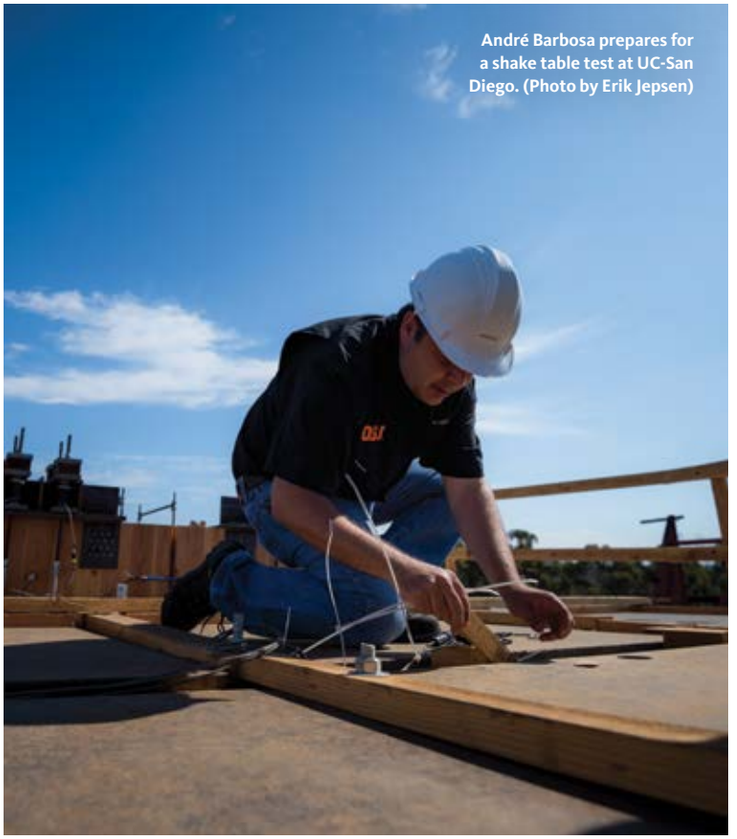
"We are a good example of a family business working within our rural community to come up with something new and innovative," **Tyler Freres** says. "It's also been great to have the experts and the researchers at OSU and the TallWood Design Institute working with us on this project. We have a very close relationship, and appreciate all the extra hands involved in producing MPP."

Advanced wood products for the next generation

Judith Sheine, TDI's director of design and professor of architecture at the University of Oregon, focuses on another application for MPP. MPP-based modular construction was the focus of her most recent undergraduate architecture and engineering design studio. Focusing on mass timber applications allowed Sheine to partner with Modular Building Systems and Clackamas County to discuss a partnership project using MPP for Oregon highway rest stops.

The modular MPP project isn't the first time Sheine's mass timber design studio has resulted in a public-private partnership. SRG Architecture and KPFF Engineering worked intimately with TDI and the City of Springfield on a CLT

Albina Yard in Portland. (Photo by Jeremy Bittermann)



André Barbosa prepares for a shake table test at UC-San Diego. (Photo by Erik Jepsen)

parking garage after it was the focus on of Sheine's studio classes in 2016.

Architects and engineers across the United States have expressed interest in creating similar structures. Lane County has also participated in the design studio process, and hopes to build its new court house from mass timber based on one of the award-winning designs that came out of the classroom.

Schmidt says he's excited about continuing to engage with TDI's industry partners.

"Research advancing mass timber is a time sensitive effort," he says. "The private sector moves at a different pace and under different logistics than academia, so it's essential that we continue to engage the design community. That's what keeps us relevant, while our research is what lends credence to mass timber as a solution."

New facilities will aid industry tests

TDI's access to state-of-the-art testing facilities helps it accomplish its innovative research. The new A.A. "Red" Emmerson Advanced Wood Products Laboratory builds on the strengths of existing facilities. The lab is scheduled for completion in summer 2019, and will have both a three-story structural testing bay, as well as an advanced manufacturing lab. In addition to research applications, the manufacturing lab will contain a hands-on educational space for students, skilled workers and design professionals looking to learn more about mass timber applications.

Another research space in the design and development phase is a full-scale acoustic-testing facility that will be built in the Willamette Valley. The lab will be one of only a few certified acoustics testing facilities along the West Coast, and will offer TDI's industry partners the opportunity to rapidly test and prototype mass timber assemblies based on their acoustic properties. The lack of a facility like this is often a limiting factor when it comes to utilizing mass timber, and TDI is excited to fill that gap for its industry partners.

Portland meetups a success

Part of TDI's outreach approach includes holding educational and networking events geared toward bringing various stakeholders together to learn, collaborate and problem solve all things mass timber. To accomplish this, TDI hosts a monthly event in Portland called 'Mass Timber Meetups.' These are casual, network-focused events that are designed to stimulate discussion on a specific subject within the world of mass timber.

"We discuss topics like acoustics, fire, building information modeling (BIM) and more," Schmidt says. "It's a place where people who have worked with mass timber, or are just curious, can discuss their experience or ask questions."

These conversations help to build a community around mass timber construction and educate construction professionals from a variety of areas. About 15-30 people from various backgrounds typically attend. These events are free and open to the public and will continue in 2019.

People

Senior leadership team

DAVIS

Anthony S. Davis

Interim Dean

Native plant regeneration, nursery production, landscape restoration, international forestry

BS: University of New Brunswick, 2001
MS: Purdue University, 2003
PhD: Purdue University, 2006

JOHNSON

James E. Johnson

Interim Department Head (FERM), Senior Associate Dean, Professor, Program Leader (Outreach + Engagement)

Forest management, international forestry, forest administration, forestry extension

BS: Colorado State University, 1974
MA: University of Maine, 1976
PhD: Virginia Tech University, 1981

COLLINS

Michael Collins

Director of Marketing and Communications

BA: Drake University, 1999

KAVANAGH

Katy Kavanagh

Associate Dean of Research

Forest ecosystem science and management

BS: SUNY College of Environmental Science & Forestry, 1977
MS: SUNY College of Environmental Science & Forestry, 1987
PhD: Oregon State University, 1993

HALL

Troy Hall

Department Head (FES)

Wilderness management, environmental interpretation, communication theory, public understanding of science, research methods

BA: Pomona College, 1985
MA: Duke University, 1990
PhD: Oregon State University, 1996

ROSENBERGER

Randall Rosenberger

Associate Dean for Student Success, Professor

Environmental economics, benefit transfer

BA: Slippery Rock University, 1988
MA: Colorado State University, 1992
PhD: Colorado State University, 1996

HANSEN

Eric Hansen

Department Head (WSE), Professor

Organizational innovation, environmental marketing, corporate responsibility, forest products marketing

BS: University of Idaho, 1990
PhD: Virginia Tech University, 1994

WONHOF

Adrienne Wonhof

Special Assistant to the Dean

BS: Southern Oregon University, 1999
BS: University of Oregon, 2001

HUNTINGTON

Geoffrey Huntington

Director of Strategic Initiatives, Senior Instructor

Forest policy, natural resource law

BS: Michigan State University, 1982
JD: University of Oregon, 1986

Endowed faculty


BAILEY

John Bailey
Maybelle Clark Macdonald Professor of Teaching Excellence in Forestry, Professor
Silviculture, forest health, wildland fire
BS: Virginia Tech University, 1983
MF: Virginia Tech University, 1985
PhD: Oregon State University, 1996


LYONS

Kevin Lyons
Wes Lematta Professor in Forest Engineering
Forest harvesting and process engineering, forest road management
PhD: Oregon State University, 2001


ROBINSON

Seri Robinson
Gene D. Knudson Chair in Forestry, Assistant Professor
Wood anatomy, spalting, wood aesthetics, applied wood mycology
BS: Northern Michigan University, 2003
MS: Michigan Tech University, 2005
PhD: Michigan Tech University, 2010


CHUNG

Woodam Chung
Faye and Lucille Stewart Professorship in Forest Engineering, Professor
Improving forest operations and management systems to better address environmental, economic and social needs
BS: Seoul National University, 1993
MS: Seoul National University, 1995
PhD: Oregon State University, 2002


MAGUIRE

Doug Maguire
N.B. and Jacqueline Giustina Professor of Forest Management, Director (Center for Intensive Planted-Forest Silviculture)
Silviculture, biometrics, modeling
BS: University of Maine, 1976
MS: Rutgers University, 1979
MS: Oregon State University, 1986
PhD: Oregon State University, 1986


SESSIONS

John Sessions
Richard Strachan Chair in Forest Operations Management, University Distinguished Professor, Professional Engineer
Forest and transportation planning, biomass collection and transport
BS: University of California-Los Angeles, 1966
MS: California State University, 1968
MS: University of Washington, 1971
PhD: Oregon State University, 1979


CUSHING

Tamara Cushing
Starker Chair in Private and Family Forestry, Assistant Professor, Extension Specialist
Forest economics, management and policy
BS: University of Florida, 1996
MTX: Mississippi State University, 1999
MS: Mississippi State University, 1999
PhD: University of Georgia, 2006


NAIRN

John Nairn
Richardson Chair in Wood Science and Forest Products, Professor
Composites, nanocomposites, deformation and fracture of wood materials
BA: Dartmouth College, 1977
PhD: University of California-Berkeley, 1981


WIMER

Jeffrey Wimer
Richard Strachan Scholar in Logging Technology, Manager (Student Logging Training Program)
Harvesting, worker safety
BS: Oregon State University, 1983


KAMKE

Fred Kamke
JELD-WEN Chair in Wood-based Composites Science, Professor
Wood-based composite science, wood/water relationships, heat and mass transfer
BS: University of Minnesota, 1979
PhD: Oregon State University, 1983


NELSON

Michael Nelson
Ruth H. Spaniol Chair of Renewable Resources, Professor, Lead Principal Investigator (HJ Andrews Experimental Forest), Senior Fellow (Spring Creek Project)
Environmental ethics and philosophy
BA: University of Wisconsin, 1988
MA: Michigan State University, 1990
PhD: Lancaster University, 1998


KISER

Jim Kiser
Richard Strachan Scholar in Fire and Silviculture, Senior Instructor
Surveying, photogrammetry, residual stand damage
BS: Humboldt State University, 1982
MS: Oregon State University, 1992
PhD: Oregon State University, 2009

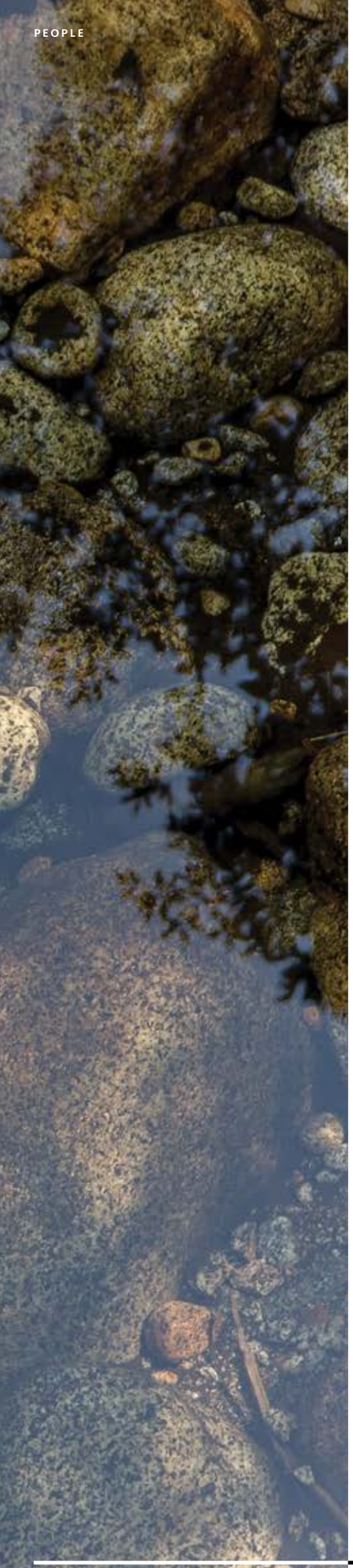

PUETTMANN

Klaus Puettmann
Edmund Hayes Professor in Silviculture Alternatives
Silviculture, forest ecology
Diploma: Albert-Ludwigs Universität, 1986
PhD: Oregon State University, 1990

Endowed positions

Endowed positions honor and support faculty who are nationally known as scholars, educators, researchers and leaders in their fields.

To learn more about endowing a position, contact **Zak Hansen** at the OSU Foundation at zak.hansen@osufoundation.org or visit www.osufoundation.org.



Faculty

AHRENS

Glenn Ahrens

Assistant Professor, Extension Agent (Clackamas, Marion and Hood River Counties)

Forest ecology and silviculture, ecology and management of western hardwoods, riparian ecology and silviculture

BS: Humboldt State University, 1982
MS: Oregon State University, 1990

CREIGHTON

Janean Creighton

Associate Professor, Extension Specialist, Natural Resources Administrative Director (Northwest Fire Science Consortium

Human dimensions and natural resources, technology transfer, adult education

BA: Cornish Institute of the Arts, 1983
MS: Washington State University, 1996
PhD: Washington State University, 2005

BELART

Francisca Belart

Assistant Professor, Extension Specialist

Forest planning, optimization, forest economics, forest reside moisture management

BS: Universidad Austral de Chile, 2006
MS: Oregon State University, 2008
PhD: Oregon State University, 2016

D'ANTONIO

Ashley D'Antonio

Assistant Professor

Sustainable recreation and tourism, social science, policy, natural resources

BS: Pennsylvania State University, 2006
MS: Utah State University, 2010
PhD: Utah State University, 2015

BENNETT

Max Bennett

Associate Professor, Extension Agent (Jackson and Josephine Counties)

Wilderness management, environmental interpretation, communication theory, public understanding of science, research methods

BS: University of Oregon, 1987
MS: Oregon State University, 1993

DAVIS

Emily Jane Davis

Assistant Professor, Extension Specialist (Collaborative Natural Resource Management)

Process design and facilitation, rural community resilience and economic development, science access and delivery

BA: McGill University, 2005
MA: University of British Columbia, 2007
PhD: University of British Columbia, 2011

BETTS

Matthew Betts

Associate Professor

Forest wildlife landscape ecology

BA: Queen's University, 1992
BS: University of New Brunswick, 1999
MS: University of Waterloo, 1995
PhD: University of New Brunswick, 2005

FITZGERALD

Stephen Fitzgerald

Professor, Extension Specialist (Silviculture), Director (College Research Forests)

Silviculture, forest health, wildland fire

AAS: Holyoke Community College, 1976
BS: SUNY College of Environmental Science & Forestry, 1979
MS: University of Idaho, 1983

BLADON

Kevin Bladon

Assistant Professor

Watershed hydrology and management, disturbance effects of water quantity and quality, aquatic ecology, hillslope runoff and biogeochemical processes, microclimate change and tree-water relationships

BS: University of Alberta, 2002
PhD: University of Alberta, 2006

GRAND

Lauren Grand

Assistant Professor, Extension Agent (Lane County)

Small woodland management, woodland management plans, fire ecology, amphibian conservation management

BS: University of California-Berkeley, 2007
MS: University of Washington, 2013

CHRISTIANSEN

Alicia Christiansen

Assistant Professor, Extension Agent (Douglas County)

Forest management, forest mensuration, human dimensions of forestry

BS: California Polytechnic State University, 2001
MS: Humboldt State University, 2016

GONZALEZ-BENECKE

Carlos Gonzalez-Benecke

Assistant Professor, Director (Vegetation Management Research Cooperative)

Intensive silviculture vegetation management, forest ecophysiology, process-based modeling

BS: Universidad de Chile, 1993
MS: Universidad de Concepción, 1997
PhD: University of Florida, 2009


GROTTA

Amy Grotta
Professor, Extension Agent (Columbia, Washington and Yamhill Counties)
Environmental economics, benefit transfer
BS: University of California-Berkeley, 1992
MS: Oregon State University, 2002


KRAWCHUK

Meg Krawchuk
Assistant Professor
Forest, wildlife and landscape ecology; science of conservation, restoration and sustainable management
BS: University of Guelph, 1995
MS: Acadia University, 2001
PhD: University of Alberta, 2007


LESHCHINSKY

Ben Leshchinsky
Assistant Professor
Geotechnical engineering
BS: University of Delaware, 2007
MS: Columbia University, 2008
Mphil: Columbia University, 2010
PhD: Columbia University, 2012


GUPTA

Rakesh Gupta
Professor
Timber mechanics, structural wood engineering, mechanical behavior and properties of wood
BT: G.B. Pant University of Agriculture and Technology, 1982
MS: University of Manitoba, 1984
PhD: Cornell University, 1990


KUUSELA

Olli-Pekka Kuusela
Assistant Professor
Forest economics, natural resource and environmental economics, international forestry, developmental economics
BS: University of Helsinki, 2008
MA: Virginia Tech University, 2010
PhD: Virginia Tech University, 2013


LINDBERG

Kreg Lindberg
Associate Professor
Socio-economic aspects of natural resource, recreation and tourism
BA: Dartmouth College, 1986
MA: John Hopkins University, 1989
PhD: Oregon State University, 1995


HAJJAR

Reem Hajjar
Assistant Professor
Integrated social and ecological systems, social science, policy, natural resources
BS: McGill University, 2000
MA: Columbia University, 2004
PhD: University of British Columbia, 2011


LANDGREN

Chal Landgren
Professor, Extension Specialist
Christmas trees
BS: University of California-Berkeley, 1975
MS: Utah State University, 1977
MBA: Portland State University, 1989


LUOMA

Daniel Luoma
Assistant Professor, Senior Researcher
Plant community and mycorrhizal ecology
BS: University of Oregon, 1978
MS: Oregon State University, 1987
PhD: Oregon State University, 1988


HATTEN

Jeff Hatten
Associate Professor
Forest soils and nutrition
BS: Western Washington University, 1999
PhD: University of Washington, 2007


LAW

Beverly Law
Professor
Global change biology, terrestrial systems science
BS: University of Florida, 1980
PhD: Oregon State University, 1993


MUNANURA

Ian Munanura
Assistant Professor
Integrated social and ecological systems, sustainable recreation and tourism
BS: Universite Nationale du Rwanda, 2001
MS: University of Kent, 2005
PhD: Clemson University, 2013


HOWE

Glenn Howe
Associate Professor
Forest genetics
BS: Pennsylvania State University, 1977
MS: Michigan State University, 1981
PhD: Oregon State University, 1991


LEBOLDUS

Jared LeBoldus
Assistant Professor
Forest pathology
BS: University of British Columbia, 2003
MS: University of Alberta, 2006
PhD: University of Alberta, 2010


MUSZYŃSKI

Lech Muszyński
Professor
Bio-based composites, micromechanics, structure-properties relations in renewable materials, optical measurement techniques, advanced imaging, x-ray icrotomography
MS: Agricultural University of Poznan, 1987
PhD: Agricultural University of Poznan, 1997


KLINE

Norma Kline
Assistant Professor, Extension Agent (Coos and Curry Counties)
Forest management, silviculture, forest health
BS: University of California-Berkeley, 1989
MS: Northern Arizona University, 1996


LEAVELL

Daniel Leavell
Assistant Professor, Extension Agent (Klamath County)
Silviculture, botany, forest ecology, distrubance ecology, landscape ecology, community ecology, fire ecology, fire management (structure and wildland)
BS: Oregon State University, 1977
MS: Oregon State University, 1991
PhD: University of Montana, 2000


NEEDHAM

Mark D. Needham
Associate Professor, Director (Natural Resources, Tourism and Recreation Studies Lab), Editor (*Human Dimensions of Wildlife*)
Recreation, tourism and wildlife
BA: University of Victoria, 1999
MA: University of Victoria, 2002
PhD: Colorado State University, 2006


KNOWLES

Chris Knowles
Associate Professor, Extension Specialist, Assistant Director (Oregon Wood Innovation Center)
Wood products business, Oregon forest products industry, product certification and tracking
BSF: Stephen F. Austin State University, 2000
MSF: Stephen F. Austin State University, 2003
PhD: Oregon State University, 2007


LEAVENGOOD

Scott Leavengood
Associate Professor, Extension Specialist, Director (Oregon Wood Innovation Center)
Research, and education of Oregon wood products industry; assisting entrepreneurs
BS: Colorado State University, 1992
MS: Oregon State University, 1995
PhD: Portland State University, 2011


OLSEN

Michael J. Olsen
Associate Professor
Terrestrial laser scanning, remote sensing, GIS, earthquake engineering, hazard mapping, 3D visualization
BS: University of Utah, 2004
MS: University of Utah, 2005
PhD: University of California-San Diego, 2009

Faculty continued


POWERS

Matthew Powers
Assistant Professor
Silviculture, fire and forest health
BS: Ball State University, 2002
MS: Michigan Tech University, 2005
PhD: Michigan Tech University, 2008


RIVERS

Jim Rivers
Assistant Professor, Senior Researcher
Forest, wildlife and landscape ecology
BS: University of Massachusetts, 1997
MS: Kansas State University, 1999
PhD: University of California, 2008


PUNCHES

John Punches
Associate Professor, Extension Regional Administrator (Douglas, Jackson, Josephine and Lane Counties)
Silviculture, forest management, conifer physiology
BS: Michigan Tech University, 1990
MS: Virginia Tech University, 1993


ROSENBERG

Stacy Rosenberg
Visiting Assistant Professor
Natural resource policy and management, collaborative watershed management, public lands policy and management
BA: San Diego State University, 1983
MS: University of Michigan, 1987
PhD: University of Oregon, 2005


REED

A. Scott Reed
Professor, Vice Provost (Outreach and Engagement), Director (Extension Services)
Forest policy, economics, administration
BS: Michigan State University, 1975
MS: Michigan State University, 1977
PhD: University of Minnesota, 1987


ROSS

Darrell W. Ross
Professor
Forest entomology
BS: Pennsylvania State University, 1981
MS: Oregon State University, 1985
PhD: University of Georgia, 1990


REUTER

Ron Reuter
Associate Professor
Restoration ecology, pedology, wetland soils, landscape ecology
BS: Pennsylvania State University, 1992
MS: University of Idaho, 1995
PhD: University of Minnesota-Duluth, 1999


SCHIMLECK

Laurence Schimleck
Professor
Wood anatomy, wood quality, native testing
BS: University of Melbourne, 1993
PhD: University of Melbourne, 1997


RIGGIO

Mariapaola Riggio
Assistant Professor
Advanced wood products in architecture, monitoring, post-occupancy evaluation, renewable materials, structural health assessment
MS: University of Florence, 1997
PhD: University of Trento, 2010


SCHULZE

Mark Schulze
Director (HJ Andrews Experimental Forest), Assistant Professor, Senior Researcher
Tropical forest ecology and management, forest ecosystem and species response to climate variability and disturbance, phenology and trophic interactions
BS: Evergreen State College, 1992
PhD: Pennsylvania State University, 2003


RIPPLE

William Ripple
University Distinguished Professor, Director (Trophic Cascades Program)
Wildlife habitat analysis, landscape ecology
BS: South Dakota State University, 1974
MS: University of Idaho, 1978
PhD: Oregon State University, 1984


SEGURA

Catalina Segura
Assistant Professor
Hydrology, stream ecology, water resources, fluvial geomorphology
BS: Universidad Distrital-Bogota, 1997
MS: University of Washington, 2003
PhD: University of Colorado, 2008


SHAW

David Shaw
Professor, Extension Specialist, Director (Swiss Needle Cast Cooperative)
Forest health
BS: Northern Arizona University, 1977
MS: Western Washington University, 1982
PhD: University of Washington, 1991


STILL

Chris Still
Associate Professor
Biogeography, ecophysiology, ecosystem ecology
BS: Colorado State University, 1993
PhD: Stanford University, 2000


TEMESGEN

Hailemariam Temesgen
Professor
Forest biometrics and measurements
BS: Alemaya University of Agriculture, 1986
MS: Lakehead University, 1992
PhD: University of British Columbia, 1999


SIMONSEN

John Simonsen
Professor
Nanocellulose, biopolymers, composites
BS: University of Missouri, 1969
PhD: University of Colorado, 1975


STRAUSS

Steven Strauss
University Distinguished Professor, Leopold Fellow
Forest genetics, biotechnology
BS: Cornell University, 1978
MFS: Yale University, 1980
PhD: University of California-Berkeley, 1985


WARREN

Dana Warren
Assistant Professor
Aquatic ecosystems, fish ecology
BA: Skidmore College, 1998
MA: Cornell University, 2002
PhD: Cornell University, 2008


SINHA

Arijit Sinha
Associate Professor
Green building materials, sustainable built environment, product development for efficient use of renewable materials, life cycle analysis
BE: Delhi College of Engineering, 2003
MS: Oregon State University, 2007
PhD: Oregon State University, 2010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Strategic forest planning
BS: Transilvania University, 1992
MS: University of British Columbia, 2003
MS: Louisiana Tech University, 2011
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Unmanned aerial systems (UAS), remote sensing, GIS
BS: University of Oregon, 1988
MS: University of Oregon, 1991
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SOUDER

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Watershed restoration, riparian silviculture, salmon life cycle analysis, sediment effects fro forest roads
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Forestry, natural resources
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Woodland management, conservation and restoration, succession planning for forest landowners
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Senior instructors and cooperative directors

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Forest sector market modeling, forest policy
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BS: University of Vermont, 1975
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PhD: University of Michigan, 1980

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PhD: University of California-Davis, 1974

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MS: Utah State University, 1967
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Private forest policy, forest-based rural development
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Forest tree physiology
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Forest soils
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MF: Yale School of Forestry, 1963
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BS: University of Utah, 1971
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MS: University of Tennessee, 1980
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Natural products chemistry of polyphenols and sesquiterpenes, wood chemistry
BS: University of Washington, 1968
MS: University of Victoria, 1970
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Harvesting, forest health, young stand management, biomass collection/transport
BS: Humboldt State University, 1974
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Forest products
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Ecophysiology, structure/function relationships in woody plants
BA: Swarthmore College, 1979
MS: University of Alaska-Fairbanks, 1982
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Forest products chemistry
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BS: University of Idaho, 1984
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Fire, regeneration
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Refereed publications 2016

College of Forestry faculty continue to be recognized as active leaders in forestry-related research. During calendar years 2016 and 2017 (the last two years where data is completely available), faculty produced more than 400 refereed publications.

Agne, M. C., **Fitzgerald, S. A.**, Woolley, T. (2016). Fire severity and cumulative disturbance effects in the post-mountain pine beetle lodgepole pine forests of the Pole Creek Fire. *Forest Ecology and Management*, *366*, 73-86.

Akay, A., **Wing, M. G.**, Zengin, M., Kose, O. (2016). Determination of fire access zones along road networks in fire sensitive forests. *Journal of Forestry Research*, 8.

Aubrecht, D. M., Helliker, B. R., Goulden, M. L., Roberts, D. A., **Still, C. J.**, Richardson, A. D. (2016). Continuous, long-term, high-frequency thermal imaging of vegetation: Uncertainties and recommended best practices. *Agricultural and Forest Meteorology, 228*, 315-326.

Baguskas, S. A., **Still, C. J.**, Fischer, D. T., D'Antonio, C. M., King, J. Y. (2016). Coastal fog during summer drought improves the water status of sapling trees more than adult trees in a California pine forest. *Oecologia*, *181*(1), 137-148.

Batavia, C., **Nelson, M. P.** (2016). Conceptual ambiguities and practical challenges of ecological forestry: a critical review. *Journal of Forestry, 114*(5), 572-581.

Bennett, N., Roth, R., Wyborn, C., Thomas, R., Teel, T., **Nelson, M. P.**, Stedman, R., Epstein, G., Cullman, G., Clark, D., Klein, S., Greenberg, A., Sandlos, J., Verissimo, D., Curran, D., Chan, K. (2016). Mainstreaming the Social Sciences in Conservation. *Conservation Biology.*

Berner, L. T., **Law, B. E.** (2016). Plant traits, productivity, biomass and soil properties from forest sites in the Pacific Northwest, 1999–2014. *Nature Scientific data, 3.*

Beschta, R. L., Painter, L. E., Levi, T., **Ripple, W. J.** (2016). Long-term aspen dynamics, trophic cascades, and climate in northern Yellowstone National Park. *Canadian Journal of Forest Research*, *46*(4), 548-556.

Beschta, R. L., **Ripple, W. J.** (2016). Riparian vegetation recovery in Yellowstone: The first two decades after wolf reintroduction. *Biological Conservation*, *198*, 93-103.

Boer, M., Bowman, D., Murphy, B., Cary, G., Cochrane, M., Fensham, R., **Krawchuk, M.**, Price, O., Resco De Dios, V., Williams, R., Bradstock, R. (2016). Future changes in climatic water balance determine potential for transformational shifts in Australian fire regimes. *Environmental Research Letters*, *11*(6), 14.

Brookes, H. B., **Ross, D. W.**, Strand, T. M., Thistle, H. W., Ragenovich, I. R., Lowery, L. (2016). Evaluating high release rate MCH (3-methylcyclohex-2-en-1-one) treatments for preventing Dendroctonus pseudotsugae (Coleoptera: Curculionidae) infestations. *Journal of Economic entomology, 109*(6), 2424-2427.

Contreras, M. A., Parrott, D. L., **Chung, W.** (2016). Designing Skid-Trail Networks to Reduce Skidding Cost and Soil Disturbance for Ground-Based Timber Harvesting Operations. *Forest Science, 62*(1), 48-58.

Cowan, A. D., Smith, J. E., **Fitzgerald, S. A.** (2016). Recovering lost ground: Effects of soil burn intensity on nutrients and ectomycorrhiza communities of ponderosa pine seedlings. *Forest Ecology and Management, 378*, 160-172.

Creighton, J., Blatner, K. A., Carroll, M. C. (2016). For the love of the land: generational land transfer and the future of family forests in western Washington state, USA. *Small-scale Forestry/ Springer, 15*(1), 1-15.

D'Antonio, A., Monz, C. (2016). The influence of visitor use levels on visitor spatial behavior in off-trail areas of dispersed recreation use. *Journal of environmental management*, *170*, 79–87.

D'Antonio, A., Monz, C., Larson, N., Rohman, A. (2016). An application of recreation resource assessment techniques to inform management action in an urban-proximate natural area. *Journal of Outdoor Recreation and Tourism*, *14*, 12-21.

Dixion, P., Semple, K. E., Kutnar, A., **Kamke, F.**, Smith, G. D., Gibson, L. J. (2016). Comparison of the flexural behavior of natural and thermo-hydro-mechanically densified Moso bamboo. *European Journal of Wood and Wood Products*, *74*(5), 633-642.

Dunnell, K. L., Berguson, B., McMahon, B., **LeBoldus, J. M.** (2016). Variation in Resistance of Populus nigra to Sphaerulina musiva in the North-Central United States. *Plant Disease, 100*, 287-291.

Engebretson, J., **Hall, T. E.**, Blades, J., Olsen, C. S., Toman, E., Frederick, S. (2016). Understanding public tolerance of smoke from wildland fires across the United States. *Journal of Forestry, 114*(6), 601-609.

Everatt, K. T., Andresen, L., **Ripple, W. J.**, Kerley, G. I. (2016). Rhino poaching may cause atypical trophic cascades. *Frontiers in Ecology and the Environment*, *14*(2), 65-67.

Falk, J. H., **Needham, M. D.** (2016). Utilizing indicator-based methods: Measuring the impact of a science center on its community. *Journal of Research in Science Teaching, 53*(1), 65-69.

Feldbacher, E., Paun, M., Reckendorfer, W., Sidoroff, M., Stanica, A., **Strimbu, B. M.**, Tusa, I., Vulturescu, V., Heina, T. (2016). Twenty years of research on water management issues in the DanubeMacro-region - past developments and future directions. *SCIENCE OF THE TOTAL ENVIRONMENT, 572*, 1297-1306.

Fischer, D. T., **Still, C. J.**, Ebert, C. M., Baguskas, S. A., Park Williams, A. (2016). Fog drip maintains dry season ecological function in a California coastal pine forest. *Ecosphere, 7*(6).

Fischer, P., Spies, T., Steelman, T., Moseley, C., Johnson, B. R., **Bailey, J. D.**, Ager, A., Bourgeron, P., Charnley, S., Collins, B. M., Kline, J., Leahy, J., Littell, J., Millington, J. D.A., Nielsen-Pincus, M., Olsen, C. S., Paveglio, T., Roos, C. I., Steen-Adams, M., Stevens, F. R., Vukomanovic, J., White, E., Bowman, D. M.J.S. (2016). Wildfire risk as a socio-ecological pathology. *Frontiers in Ecology and the Environment, 14*(5), 276-284.

Galleguillos, F., Hernández, V. A., Hernández, V., Palfner, G., Figueroa, F., **Robinson, S. C.** (2016). Potential Use of Native Fungi for Value-Added Spalting in Chile. *Forest Products Journal*, *66*(3-4), 250-256.

Gao, Y., Yang, S., Zhang, F., **Leshchinsky, B. A.** (2016). Three-dimensional reinforced slopes: Evaluation of required reinforcement strength and embedment length using limit analysis. *Geotextiles and Geomembranes*, *44*(2), 133-142.

Garcia, M. O., Jane, S. E., Jones, M. D., **Luoma, D. L.** (2016). Ectomycorrhizal communities of ponderosa pine and lodgepole pine in the south-central Oregon pumice zone. *Mycorrhiza, 26*(4), 275-86.

Greer, B. T., **Still, C. J.**, **Howe, G. T.**, Tague, C., Roberts, D. A. (2016). Populations of aspen (Populus tremuloides Michx.) with different evolutionary histories differ in their climate occupancy. *Ecology and evolution*, *6*(9), 3032-3039.

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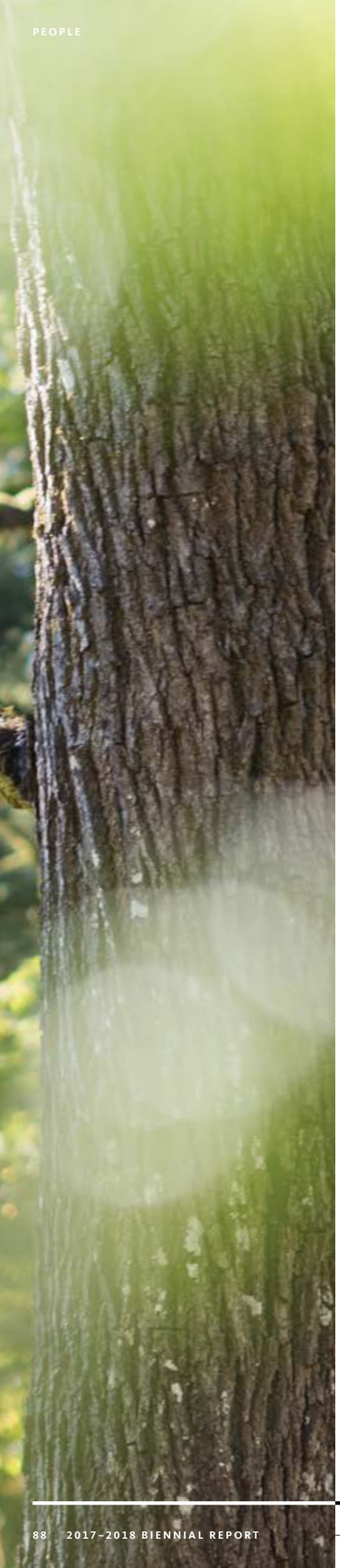

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