

Forestry: A Legacy of Excellence—A Future of Possibilities

2006 Annual Report for the College of Forestry and the Oregon Forest Research Laboratory

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OUR VISION:

We aspire to be the world's premier forest resources education, research, and service institution.

OUR MISSION:

To educate and engage the next generation of scholars, practitioners, and users of the world's forest resources

To conduct distinctive problem-solving and fundamental research on the nature and use of forests and related resources

To share our discoveries and knowledge with others

OUR VALUES:

We commit to sustaining forests and the functions, products, and values they provide for current and future generation. **We value forests.**

We share a passion for learning through teaching, research, and extended education. **We value learning.**

We address complex forest resource challenges through collaboration across disciplines, institutions, and perspectives. **We value collaboration.**

We recognize strength in diverse faculty, staff, students, and ideas. We nurture the College community through communication and mutual respect. **We value people.**

We serve the people of Oregon, the nation, and the world. **We value service.**

We aspire to excellence, innovation, and relevance in all that we do. **We value excellence.**

OUR PRODUCTS:

Graduates: Well-educated, lifelong learners who reflect the diverse communities they will serve—globally savvy, adaptable, and capable of solving complex problems

Science: Research-based knowledge, technologies, and tools to solve problems and shape the future

Public Service: Extended education, technical assistance, policy advice, and training

Information: sound, and scientifically based information for a well-informed citizenry

From the Dean

I look at 2006 as a pivotal year for the College of Forestry and Forest Research Laboratory. In 1906, Forestry was introduced as a degree program at the Oregon Agricultural College. Before this, our timberlands were subjected to logging and lumber milling without much concern for the environment or the future. Forestry and forest products processing in America have evolved and changed dramatically over the past 100 years, providing the solutions to deforestation, resource waste, and land abuse.

Over the years, the faculty, scientists, and graduates of this institution have contributed new knowledge and technologies, policy guidelines, and management insights to provide continual improvements and constant innovation. As a result of what we do at OSU, Oregon's forests are among the best in the world for supporting multiple and sustainable values to the citizenry in all areas of the state. These forestlands provide an economic base for much of the state—\$13 billion in direct economic impact and employment. These same lands provide recreational and social value to Oregonians. Forests are also a key component in a complex ecological system that is crucial to our water, air, and climate. I view the outstanding efforts of our faculty and scientists as crucial to sustaining the multiple values of forests. This annual report highlights the most recent installment to a Legacy of Excellence.

Forest products manufacturing has also seen marked advances in the past 100 years. Wood products are vital to the quality of every Oregonian's life. They are in our houses, our toothpaste, some of our clothes, and countless products we would never suspect of having cellulosic components. Innovations in milling, manufacturing, and new products have greatly improved utilization efficiency while innovations in use of wood products have increased durability and life span. Many of these innovations came from OSU researchers. Collectively, they mean that people get a lot more value from each tree harvested than they did 50 years ago.

Educating future scientists, natural resource managers, policy makers, and industry leaders is a key assignment for our faculty. With 634 students enrolled, we are continuing a 6-year growth trend that has us hitting our highest student numbers in 25 years. These students represent most states in the Union and countries from all corners of the world. Natural resources enrollment around the nation is declining, so our growth reflects the strength of our instructors and programs. Locking away our natural resources won't satisfy the diverse demands of our populace—trained professionals are necessary to help protect, manage, and optimize the uses for forest lands and forest products. We are producing skilled graduates who are in demand by private and public employers. The ever-rising cost of education challenges many of these students and their families, but the generosity of Forestry's supporters helped to provide over \$600,000 in scholarships and fellowships in 2006. This helps attract and retain excellent students who might otherwise forego an education.

The second key assignment for our faculty is conducting research, developing new knowledge, and transferring what we've learned to other scientists, the public, industry, and governmental leaders. The breadth of research conducted by our scientists is amazing and goes far beyond the stereotypical concepts of forestry. They utilize leading-edge techniques and knowledge to study watershed and water quality issues, fiber-based composite engineering, tree genetics and growth, carbon sequestration and climate, fish and wildlife habitat, maximization of economic value of logs and lumber production, forest health, and fire prevention and restoration. Declining support in appropriated funding has left us with faculty vacancies in essential areas such as soils chemistry and nutrition, wildlife protection, and structural engineering. Our hard-working

faculty did achieve a record \$13.3 million in outside grants and contracts for the year. This is a tremendous testament to their productivity. It means that for every dollar of state appropriation provided to support the basic salary and infrastructure for FRL research, the faculty bring in over five dollars worth of additional research productivity. This is a direct return on investment that adds to Oregon's economy and multiplies the amount of natural resources-related research and knowledge available to Oregonians.

I'm truly proud to say that the efforts of our scientists and students recently earned OSU a number 1 ranking for forestry research in North America. This annual report provides some highlights of those efforts. I must add that we did not earn a number 1 by ourselves. We did it through extensive collaboration with colleagues across campus, in the Forest Service, EPA, and USGS labs in Corvallis, and in state and federal agencies, other universities, conservation groups, and forest industry across the state, nation, and world. I must also add that earning number 1 does not happen overnight. It takes a continuous commitment by all stakeholders, both inside and outside OSU. We've had this commitment to provide Oregonians with multi-use, multi-benefit forest lands and a vibrant forest products sector for 100 years. I look at this as a foundation for supporting a dynamic Future of Possibilities.

[signature]

Return on Investment

In 2006 and 2007, the College of Forestry (CoF) is celebrating its first 100 years, proud of its legacy of excellence, anticipating its future of possibilities. As part of a Land Grant University, the CoF is committed to educating tomorrow's leaders and providing Oregonians with timely and pertinent research, extended education and training, technical assistance, and policy advice. Examples of this commitment include the following.

Contributing to Oregon's Economy

- The College received 169 grants, agreements, and contracts totaling a record \$13.3 million, up approximately \$800,000 from last year. These dollars support the Oregon economy through salaries and benefits paid and materials purchased, as well as the scientific information obtained from the sponsored research.
- A recent analysis by Loren Kellogg and Chad Davis (Forest Engineering, FE) projected that treating all forests at high risk of wildfire in southern and eastern Oregon over 20 years would produce biomass sufficient to generate 164 megawatts of renewable energy, or 2.9% of Oregon's 2004 total installed electrical generation capacity. The forest operations could also generate \$3.2–\$6.5 million in new forest worker wages and reduce costs of fighting wildfires by up to \$118 million yearly.
- Glen Murphy and graduate students (FE) demonstrated that mechanized harvesters with innovative smart sensor systems can measure external log and internal wood properties and track logs from forest to mill. The gain in log value recovery is conservatively estimated at \$150 million yearly if these sensors are used throughout the sector.
- The new adhesive for interior wood products developed by Kaichang Li (Wood Science and Engineering, WSE), which uses soy protein as a key ingredient, has been expanded beyond plywood to other composite materials. The technology has been commercialized with assistance of the Hercules Corporation and Columbia Forest Products, an Oregon corporation. Columbia FP has committed over \$5 million in capital expansion to utilize the OSU technology in 100% of their North American plywood production by the end of 2006. Over 30 million pounds of soy flour was used in 2006 to produce this new adhesive.
- A study by the Nursery Technology Cooperative (Forest Science, FS) has found that adding controlled-release fertilizer to container media significantly improves growth of Douglas-fir seedlings for several years and has great promise for the shortening the time needed for trees to reach the "free-to-grow" state in plantations.
- John Sessions and graduate students (FE) developed a mathematical model to predict the loss of recoverable timber value after wildfire as a function of time since fire, logging system, and distance from road. This research benefits consumers of woods products, federal owners of fire-killed timber, and county governments that rely on revenue sharing from timber harvests on federal lands.
- Kevin Boston and graduate students (FE) developed a forecasting tool for logging production and a model to apply the production estimates to allocation of harvest units and crews. Both can enhance supply chain management decision support systems, which have been shown to increase sales revenue by 3–7%. A 5% improvement in sales could yield Oregon companies an additional US\$ 55 million.
- Rakesh Gupta's (WSE) research on the seismic response of structural wood frame wall systems in houses has directly changed the standard methods by which those systems

are tested for safety using American Society for Testing and Materials Standards. These wall systems are a principal market for much of Oregon's lumber.

- The Center for Wood Utilization Research received additional federal funding in 2006. The OSU center is one of 12 national centers of excellence funded by a USDA Cooperative State Research, Education, and Extension Service Special Grant. These funds support research in WSE and FE and are used to leverage over \$2.50 of other research funding for every dollar of special grant funding. These grant funds have produced millions of dollars in saving by Oregonians and Oregon industry, created new business opportunities, and helped to ensure rational, science-based policy and regulatory decisions.
- Kevin Boston and graduate students (FE) evaluated use of additional geotechnical information to develop aggregate compaction standards for forest road construction and found that improved subgrade compaction could reduce road rock cost by at least 19%. Recycling of rock also showed a potential savings of \$13,000–19,000 per mile.

Encouraging Innovation

- Doug Maguire (Forest Science, FS) has been chosen to lead the Oregon Plantation Productivity and Value Enhancement Program. The mission of this program is to increase the productivity and value of planted forests in the Pacific Northwest through innovations based on integrated silvicultural and operational practices. The target is to improve the competitiveness of the Pacific Northwest in the global wood market. A draft prospectus is being circulated and discussed with potential participants. A meeting is planned in January 2007 to further develop the organizational and funding structure for the program and for launch later in the year.
- Scott Leavengood (WSE) has been named the first Director of the Oregon Wood Innovation Center (OWIC). The goal of OWIC is to increase the global competitiveness of Oregon manufacturers by enhancing innovation in the broad wood products industry and providing easy access to targeted research, technical and business assistance, and extension education relating to new product/market development, technology and process innovation, business and market planning, and economics. The center was supported by *Oregon Business Magazine* and is one of the forest sector initiatives in the *Oregon Business Plan*.
- College faculty have prominent roles in four of the successful Provost's Initiatives at OSU: Water and Watersheds, Subsurface Biosphere, Ecosystem Informatics and Sustainable Rural Communities.
- The log value recovery initiative, led by Glen Murphy (FE), is in the early stages of establishment. Discussions with potential industry collaborators are underway. Two pilot projects have been initiated with Center for Wood Utilization funding and departmental fellowships to support graduate students. One project is a collaborative effort with Roseburg Forest Products. Two study areas are located on the College's McDonald-Dunn Forests.
- Michael Wing, Loren Kellogg, and graduate students (FE) evaluated rapidly improving precision forestry tools and found that relatively inexpensive GPS receivers worked acceptably well under forest canopies for many harvest planning applications. Results indicated use of GPS receivers can enable field measurements to be completed in approximately 3/4 the time required by typical survey methods. For the current harvest

level in Oregon, they estimate approximately \$750,000 could be saved in harvest planning field work

Strengthening the Scientific Foundations of Forestry

- The College has been building a program in Wildland Fire Science and related aspects of forest health. Work is underway to strengthen research and outreach efforts in Wildland Fire Science and Ecosystem Health. Two programs have been endowed and two new faculty members and a post-doctoral research associate have been hired to run the programs.
- Under the leadership of Arne Skaugset, the Watershed Research Cooperative (WRC) continued its contributions to the scientific foundation of the impact of contemporary forest practices on water quality and aquatic habitat. In addition to the ongoing Hinkle Creek study, two new projects were added to the WRC: a second major study in the Trask River Watershed on Oregon Department of Forestry, Weyerhaeuser, and Bureau of Land Management property, and a smaller study that is revisiting the historic Alsea Watershed Study more than 30 years after the initial study.
- Dave Turner (FS) has developed a new approach to estimating carbon dioxide emissions from forest fires that employs remote (satellite) sensing for monitoring areas burned and a simulation model for carbon accounting. Application of this model will help clarify the role of fire in the overall carbon balance of Oregon's forests and its contribution to atmospheric carbon dioxide concentrations and related climate change.
- Two large-scale management experiments are being used to investigate whether thinning of young plantations can be used to accelerate the development of late-successional features. Results indicate that responses to thinning are complex and may actually have an opposite effect, at least in the short term. Creation of spatial diversity, such as leave islands and gaps, appears to be a more promising approach to accelerating the development of stand structure complexity.
- Nearly 20,000 genes have been identified as part of the Douglas-fir genome project. These genes are being used to explore the genetic control of wood quality and cold hardiness in this species and will be useful for improving these traits in Douglas-fir tree improvement programs.
- Sustainable harvesting methods are essential to the viability of commercial mushroom picking in forests of the Pacific Northwest. A 10-year investigation has shown that gentle hand pulling of Matsutake mushrooms from the soil maintains normal levels of mushroom production, whereas raking soil for mushrooms can significantly lower their production.

Becoming a Global Leader and Contributor

- The International Forest Engineering Institute was launched in July 2005 with an international participant study tour in conjunction with the Council on Forest Engineering meeting in Arcata, California. A second study tour in July-August 2006 had over 20 participants, largely from Asia.
- More than 500 international scientists and engineers attended the International Timber Engineering Conference organized by WSE faculty and held in Portland, Oregon, in August 2006.
- WSE faculty were successful with a proposal to USAID that will bring up to 10 Mexican

graduate students to OSU in the next five years.

- Bev Law (FS) is lead scientist for AmeriFlux, a network of 100 research sites (involving 150 investigators) in North and South America. AmeriFlux is monitoring the impact of land use change on atmospheric CO₂ levels. Bev is also a member of several national and international committees and steering groups developing science policy related to carbon cycling and climate change.
- Barb Lachenbruch (formerly Gartner) (WSE) described the Wood Magic Program to Chilean undergraduates in the Honors Program at Valdivia University. The students are developing a curriculum on the environmental effects of humans on the ocean and the coast for schoolchildren in coastal fishing villages.

Enhancing Instruction

- A year-long review of student success and student services in the College was completed in July 2005. Nearly 30 suggestions for improvements were developed and are being implemented.
- The new Bachelor of Science degree in forest operations management, developed by the Departments of Forest Engineering and Forest Resources (FR), was approved by the State Board of Higher Education. The curriculum blends elements of forest engineering and forest management with business management and entrepreneurship.
- The Wildland Fire Science initiative was completed, leading to a new option within the Forest Management degree program and establishment of an outdoor laboratory within the B&B Fire Complex near Sisters, OR.
- A new M.S./Ph.D. graduate degree concentration in Forestry/Wildlife was instituted.
- The graduate certificate program in Sustainable Natural Resources Management received a \$65,000 grant from OSU Extended Campus to develop online delivery. The program is to be offered through ECampus in winter term, 2007.
- The CoF continued to engage with Eastern Oregon University personnel to extend the Natural Resources degree program to that campus.
- The Departments of Forest Engineering and Forest Science supported the implementation of the new OSU graduate program in Water Resources, which offers five new degree options. Initial students were accepted for advising by CoF faculty.
- New partnerships with Tripod Data Systems (TDS) and PPI (formerly Portland Precision Instrument & Repair Co) have resulted in donation and reduced cost purchase of about \$80,000 of new high order surveying and mapping equipment and software that will benefit surveying instruction for CoF students. As part of the partnership, TDS and PPI staff will assist in student training and classroom instruction.
- The partnership with Weyerhaeuser and Chemeketa Community College for the Latinos in Forestry program was strengthened.
- The management plan for the McDonald Dunn Research Forest was revised to enhance the value of the forest as a field laboratory for teaching, research, and demonstration.
- Over 600 graduate and undergraduate students benefit from the biological, social, technological, engineering, and environmental research carried out by FRL scientists.

Cooperating with Stakeholders

- James E. Johnson, silviculturist, expert in ecological restoration, and award-winning Extension specialist, was appointed Associate Dean for Extended Education and Extension Program Leader in the CoF.
- The Northwest Tree Improvement Cooperative (NWTIC, FS) began 40 years ago as a joint venture of the Industrial Forestry Association and the USFS, Pacific Northwest Research Station. Now led by Keith Jayawickrama, the NWTIC is the largest cooperative in the Forest Science Department (26 members) and has just begun work on the third generation of Douglas fir breeding and testing.
- Scott Leavengood (WSE) and Jim Reeb (WSE) cotaught several courses at the Clackamas County Tree School in March 2006. Attendance had to be capped at over 40 participants for a milling and drying workshop and hands-on mill demonstration.
- John Simonsen (WSE) has been collaborating with a firm in Arizona to develop a nanocrystalline cellulose-based barrier film for military fabrics to protect against chemical warfare agents. A joint patent application is in the works with a promising potential for commercialization.
- The Wood Utility Pole Research Cooperative expanded its membership to 17 members. This Cooperative is uniquely focused on the science and technology of protecting and managing the wood pole resource, while ensuring a healthy market for Oregon pole timber.
- WSE faculty successfully conducted the OREGON WOOD MAGIC™ program in Richardson Hall for over 1400 3rd and 4th grade students, teachers and chaperones in October 2005. This program, which exposes students to the wonders of wood and its roles in their lives, is supported by the Oregon Forest Resources Institute and by over 90 volunteers.
- A new OREGON WOOD MAGIC ROADSHOW conducted 187 in-class programs around the state to over 5700 elementary school students in the 2006 academic year. A full-time educator has been hired with support from the Oregon Forest Resources Institute to deliver this program. The ROAD SHOW will visit over 300 classes next year.
- WSE faculty developed and managed a 3-day “Wood Fest” at the World Forestry Center in Portland in April. This new event included a public Wood Fair with educational and art displays, a continuing education program for architects, and a version of Wood Magic designed for Portland-area 3rd and 4th grade students. Eric Hansen and graduate student Chris Knowles led the program, which was funded by the Oregon Forest Resources Institute and supported by multiple industry and other stakeholders.
- Steve Bowers (FE) developed the *Treeman Value Tables* and *The Log Buyers Directory* to help woodland owners obtain the best possible value for their timber sales.

Providing Public Service

- Numerous faculty serve in professional and scientific organizations, their contributions ranging from elected leadership posts to serving as technical editors of scholarly journals.
- Paul Adams (FE) is a member of the Executive Committee, Oregon Society of American Foresters (SAF) and of the national SAF Committee on Forest Policy.
- Steve Hobbs, Executive Associate Dean, continues as chair of the Oregon Board of Forestry.

- Steve Bowers (FE) expanded distribution of the “Tips from the Treeman” column, a creative communication and education tool widely distributed in newspapers and magazines.
- Loren Kellogg (FE) serves as Coordinator, IUFRO Research Group 3.01.00, and on the Executive Committee of the Council on Forest Engineering (COFE). He was Co-chair for the COFE 2005 Annual Meeting.
- Jeff McDonnell (FE) serves as the Chair of the Science Steering Group of International Association of Hydrological Sciences devoted to improving Prediction of Ungauged Basins (PUB) and of the Working Group on Watershed Instrumentation, UC Berkeley National Hydrological Synthesis Center. He is also the USA Representative, UNESCO HELP Program and network of hydrological observatories, and a member of the UNESCO PUB-HELP-FRIEND Technical Working Group
- Jeff Morrell (WSE) aided in the post-fire reconstruction of Fort Clatsop, the replica of the Lewis and Clark Expedition Headquarters near Astoria. His plans for treating wood used in reconstruction formed the basis of the Park plans and should allow the rebuilt fort to last at least as long as the previous reconstruction.
- Klaus Puettmann (FS) is the science liaison to the Oregon Department of Forestry, Northwest Forest Plan, State Advisory Committee.
- John Sessions (FE) is a Senior Advisor, International Selection Committee for the Wallenberg Prize, and Deputy Leader, Research Group 3.06, Forest Operations in Mountainous Terrain, IUFRO.
- John Sessions and Kevin Boston (FE) serve as faculty advisers for OSU Student Chapter of Engineers without Borders, Mike Wing (FE) advises the OSU Student Chapter of the American Society for Photogrammetry and Remote Sensing, and Jim Kiser (FE) serves as faculty co-adviser for the Forestry Club.
- Steve Strauss (FS) is a member of the State of Oregon committee charged with formulating recommendations to the Governor on regulation of “biopharm” crops (genetically engineered for pharmaceutical production) in Oregon.
- Mike Wing (FE) is Chair-elect for SAF’s Land Use Planning, Organization & Management working group during 2005-2006. He also participated in planning for the 2006 National SAF meeting.

Addressing Regulatory and Environmental Concerns

- WSE faculty have made the department the acknowledged leader in developing new technology using ionic liquids to measure and control undesirable emissions from wood drying and are now taking new technology ideas to the pilot plant scale.
- Removing forestland from the timber base to protect root systems, under the hypothesis that living tree roots are critical to slope stability, could cost the private timber industry in western Oregon \$250–500 million yearly. Arne Skaugset and Richard Keim (FE) showed that reduced canopy density and an associated increase in rainfall intensity on the forest floor is an alternative slope failure mechanism with different mitigation measures.
- Marvin Pyles and graduate students (FE) examined mechanisms of slope failure associated with reinforcement of shallow forest soils by plant roots and the potential for static soil liquefaction that could make reinforcement ineffective. They found that static liquefaction was not possible under the laboratory conditions tested and provided valuable guidance for further research.

College Finances

FRL Finances (NOTE: Roger to provide--will appear in laid-out version)

Features

Pretty but Perilous: Protecting Forests and Meadows from Weedy Interlopers

O thou weed! Who art so lovely fair and smell'st so sweet that the sense aches at thee, would thou hadst ne'er been born.
—William Shakespeare, *Othello*

To the casual observer, a patch of sulfur cinquefoil is a beautiful meadow sunlit with flowers. But to a weed specialist like Steve Radosevich, Professor of Forest Science, it's a field overrun by a pernicious weed that threatens native plants and forage.

The cinquefoil, known more formally as *Potentilla recta*, is one of 109 invasive nonnative species in the Pacific Northwest. Cinquefoil thrives in forest meadows, old pastures, and other sunny disturbed areas; it also grows on rangelands and in open forest stands. It spreads easily, but its principal threat is its competitive ability. As it gobbles up space and nutrients, it threatens native plant communities, diminishes plant diversity, and decreases food supplies for wildlife.

Invasive plants were formerly known as weeds, and their relationship to forest regeneration and sustainability has captured Radosevich's attention for some 30 years. When he started out, weeds were controlled primarily by herbicide spraying and burning. His experience has convinced him that new, more lasting approaches to control are needed. "Over the years, good biological and ecological studies pay off more than herbicide spraying trials," says Radosevich. "Herbicides are like medicine; if you need them short-term, use them; but long-term, get healthy, and you won't need them." Herbicides are like medicine in another respect: repeated applications are expensive. Finding ways to avoid them would save land managers money.

For Radosevich, his Research Associate Bryan Endress, and their collaborators, control of the sulfur cinquefoil and other invasive species presents a continuing challenge and requires innovative approaches. Their research program is centered in the Blue Mountain Ecoregion, the primary habitat of the cinquefoil in Oregon. Their many-pronged study assesses habitat risk, projects spread of the species, and examines its biology, competitive ability, and strategies for containment. In one approach to control, the group is setting up experiments to determine the ability of native cinquefoils and grasses to compete against the invasive species. In other studies, they are examining the dependence of *P. recta* and native cinquefoils on insect pollinators and whether grazing by cattle, deer, or elk affects cinquefoil success.

Although the cinquefoil is their test species, the models and control methods that Radosevich, Endress, and their collaborators develop from the data will provide the basis and framework for a regional research program that will enhance understanding of the basic biology and demography of many invasive plants. Shared with managers and other researchers, this understanding will lead in turn to development of effective strategies for adaptive management and habitat restoration.

"We need multiple strategies of control and intervention," Radosevich points out. "We've been looking at separate pieces; now we're able to look at the problem holistically." A holistic approach requires many collaborators. Their primary collaborators include Catherine Parks and other USDA Forest Service scientists, as well as scientists from the Oregon Department of Forestry and Department of Fish and Wildlife, the Umatilla and Wallowa-Whitman National Forests, and the Nature Conservancy.

Meticulous Measurements Yield Meaningful Models

Inchworm, inchworm, measuring the marigolds, you and your arithmetic will probably go far.

—Frank Loesser, *Hans Christian Andersen*

Douglas-firs are a lot bigger than marigolds, and the math involved is far more than arithmetic, but David Hann has indeed gone far with measuring and modeling forest stands. “My mandate when I arrived at Oregon State was to create growth-and-yield models,” says Hann, forest biometrician and Professor of Forest Resources. So, for some 29 years, he has.

Biometricians create mathematical models to depict virtual forest stands and then test which models are best at predicting stand behavior under different conditions. Biometric models are built using statistics applied to data obtained from actual forest stands, and obtaining data sets adequate for the task has presented a continuing challenge. One of Hann’s major contributions has been developing rigorous sampling methodologies and data quality procedures that produce valid, broadly applicable models while reflecting actual operational practices.

Such models require years of painstaking work to put together and validate. The model that is perhaps best known to Oregon forestland managers is ORGANON (OREgon Growth ANALYSIS and ProjectiON), an individual-tree growth model developed for Southwest Oregon, Northwest Oregon, and the lands of the Stand Management Cooperative in Oregon and Washington. Developing the first two versions of ORGANON required about a decade. Hann and his collaborators had to collect the data, develop the software, the database and the model, and make sure the individual equations worked well together (“not a trivial process”, as Hann observes). The model for Southwest Oregon is based on data Hann collected as part of the FIR (Forestry Intensive Research) and northern spotted owl habitat projects; the model for Northwest Oregon is based on data from the inventory he set up for the College Forests. Hann is constantly refining the model and revising it for application to different species mixes, stand structures, and management activities, including forest health and maintaining threatened species.

“Two things distinguish ORGANON from other regional growth and yield models,” Hann points out. “The quality of data is much higher than in any other models, and each variant has seen extensive and exhaustive verification through peer reviewed publication—no other model can say that!”

When Hann started out as an undergraduate student, his first decision was how much to spend for a slide rule. Over the decades, he has ridden the cusp of the computer revolution, from a small mainframe with a 32K central memory to personal computers with nearly unlimited capacity. Hann was among the first in the College to adopt personal computers for both research and teaching and was probably one of the first in the region to use them for statistical analysis.

When Hann arrived at OSU, most forestland managers were using little books of normal yield tables. The one whole-stand model available required a mainframe computer. Now, managers use electronic growth-and-yield models that can be run on laptop computers. Much has changed, but usable, precise growth-and-yield models that cover diverse situations remain invaluable to forestland managers.

Mixing It Up: The Might of the Matrix

Tiny crystals confer astounding strength

Dwarfs in mythology were often considered to have magical powers, and so it seems with the tiny particles known as nanoparticles. Named from the Greek word for dwarf, these particles are beyond small, on the scale of a billionth of a meter. (Imagine splitting the width of a human hair into 100,000 pieces to get some idea of their size.) Mixed in a matrix of another material, however, they confer great strength and other desirable properties

“Naturally renewable materials have a legitimate role in nanotechnology,” says John Simonsen, materials scientist, Associate Professor of Wood Science and Engineering, and “card-carrying member” of the Oregon Nanoscience and Microtechnologies Institute. “Cellulose nanocrystals in particular are truly remarkable—they’re stronger than steel and stiffer than aluminum; they’re organic, biodegradable, biocompatible, and nontoxic. Furthermore, the chemistry of cellulose is well known, and we can do lots of chemistry on cellulose fibers that is straightforward, easy, and relatively ‘green’.”

Simonsen is interested in nanocrystals as part of a whole biorefinery concept—taking biological materials, such as trees, agricultural waste, and straw; putting them into a factory; separating the biomass into its various components; doing some chemical engineering; and getting dozens to hundreds of products. “It’s just like taking a barrel of crude oil and refining it into jet fuel, gasoline, and heating and motor oil,” explains Simonsen. “If we can do that, cellulose nanocrystals should be cost-effective and useful for many applications.”

In line with the biorefinery idea, he has been collaborating with Jeff Morrell (University Distinguished Professor, WSE) and Hong Liu (Assistant Professor, Biological & Ecological Engineering) on renewable energy recovery using microbial fuel cells that would directly convert organic matter from waste biomass to electricity.

Simonsen also has been exploring the properties afforded to materials by inclusion of cellulose nanocrystals in diverse other applications. In one project, he used cellulose nanocrystals to create films that bar toxic agents but allow moisture to pass through a fabric. Such a film could be applied to protective clothing in industrial uses. He also has been investigating the use of cellulose nanocrystals in hemodialysis tubing for use in a home dialysis unit being developed in the OSU Department of Chemical Engineering. “Such a unit would make dialysis much more efficient, and patients could use it overnight at home instead of spending hours every week at a dialysis center,” says Simonsen. “It would be easier on the body, cut drug use, and greatly improve the quality of life for these patients.”

Not leaving behind his long-standing interests in wood preservation and the properties of wood-polymer composites, Simonsen has been collaborating with Morrell and Lech Muszyński, Assistant Professor of Wood Science and Engineering, to determine the properties of wood-plastic composites and the mechanisms and effects of biological degradation.

“When I came here 16 years ago, what I wanted to do was something useful. I’m still working on it!” says Simonsen. It sounds like he’s on the right track.

There's a Fungus Among Us!

Outsmarting Swiss needle cast in coastal forests

Flying over the Oregon Coast Range in the spring can be frightening, even if you like flying low in a small plane. It's the landscape below that can be distressing—thousands of acres of Douglas-fir, stripped of many of their needles by Swiss needle cast.

“Swiss needle cast is present just about everywhere without being a problem,” says Dave Shaw, Director of the Swiss Needle Cast Cooperative (SNCC). “The fungus that causes it requires optimal conditions for spores to germinate and grow, and apparently conditions are *really* optimal in the Coast Range.”

SNCC scientists are pursuing four research tracks: epidemiology, silviculture, soil characteristics, and tree improvement. The first two are best developed, with Jeff Stone (Botany and Plant Pathology) taking the lead in epidemiology and Doug Maguire, Hayes Professor of Silviculture, heading up the silvicultural efforts.

Every April, Oregon Dept of Forestry and USFS aerial survey specialists fly over the Coast Range before budbreak to map the range of the disease. Their flights have shown that the severity of SNC ebbs and flows markedly over time and varies within a geographical zone. Even in a high severity area, there may be relatively healthy trees or plantations.

Collaborating with other scientists, Stone and Len Coop (with the OSU Integrated Plant Protection Center) have been developing a spatially explicit epidemiological model that takes into account effects of topography, elevation, aspect, and location on local weather and, hence, on the observed spatial and temporal variation in SNC severity, says Shaw. Warm winter temperatures and cool moist springs followed by wet summers are key drivers that increase SNC. Topography, convergence and divergence of incoming weather systems, winds, and fog and drizzle are also important factors.

Maguire has been working with SNCC since it was organized in 1997. His silvicultural studies over the years have included the impact of SNC on growth and yield and, conversely, the effect of silvicultural activities on SNC severity. The permanent plots that he established nearly a decade ago allow diverse and thorough measurements to be taken over time, and his data have provided a robust quantitative understanding of the effects of SNC on growth and yield of Douglas-fir and of the effects of silvicultural treatments on pathogenicity of SNC. He has found, for example, that commercial thinning can be carried out on SNC-affected plots without negatively affecting the stands, so structure-based management on state lands can be continued without making the disease worse.

Maguire has been collaborating with David Hann, Professor of Forest Resources, and Sean Garber, research assistant in Forest Science, to develop a new module for the ORGANON growth-and-yield model to estimate growth impacts of SNC. “This is very important work that really helps landowners determine growth, allowable cut, and harvest schedules,” says Shaw.

In the long term, Shaw, Maguire, Stone, and their collaborators hope to meld the epidemiological and silvicultural models. Managers would then be able to predict SNC severity at the plantation level based on historical weather regimes or future climate scenarios.

More information about SNCC is available at <http://www.cof.orst.edu/coops/sncc/>.

We All Live Downstream

The connection between forests and rivers is like that between father and son.

—Gifford Pinchot, *The Fight for Conservation*

Oregon's forests are threaded with streams flowing from headwaters, joining to form larger branches and, finally, rivers. The connections are indeed close, but there is much to learn about what they are, how they function, and how stream-dependent organisms respond to water conditions, especially in intensively managed forests and headwater (nonfishbearing) streams.

Scientists in the Watersheds Research Cooperative (WRC) have set up three long-term projects—the Hinkle Creek, the Alsea, and the Trask Paired Watershed Studies—to determine how to maintain healthy streams under contemporary forest management. “We have common aims in all three studies,” explains Arne Skaugset, Director of the WRC and associate professor of Forest Engineering. “We already know a lot about managing fishbearing reaches and have used that knowledge to formulate forest practice rules. Now, we need to determine the environmental consequences of managing headwater streams—onsite, and also offsite, in the fishbearing channels into which they flow. We also are generating contemporary data sets with current equipment, stand types, and forest practice rules.”

The most mature is the Hinkle Creek study, situated on 5000 acres of Roseburg Forest lands near Sutherlin. “Hinkle Creek is really a forestry and stream biology project,” observes Skaugset. “Three-quarters of the budget supports biological studies of aquatic indicator organisms. Those organisms live in water, so there's also a water quality component.” Calibration has been completed and harvest treatments have been installed, providing 3,900 loads of logs for local mills. Post-treatment data collection has begun and will continue for five years. The Hinkle Creek study also serves as a demonstration area that is frequently visited by the public, policymakers, and scientists to learn about the interactions of modern intensive forest management with watershed health.

The Alsea study, set up almost entirely on Plum Creek Timber land, has a historical component. The scientists are repeating part of a study that ran from 1966 to 1973; the historical data will allow comparison of results under earlier and current practices and conditions. Lead scientists on this study are George Ice (National Council for Air and Stream Improvement) and Jeff Light (Plum Creek). One year of calibration data has been gathered, and harvest will occur after another one or two years of calibration.

The Trask study, northwest of McMinnville, is a joint venture with Oregon Department of Forestry (ODF) and the Weyerhaeuser Company. Lead scientists are Bob Bilby (Weyerhaeuser), Liz Dent (ODF), and Sherri Johnson (USDA Forest Service). “This is the most ambitious and the largest, of the projects,” Skaugset notes. “It's a very unusual opportunity to compare industrial forest practices with the ODF structure-based management.” The Trask scientists are now describing the watershed—determining such things as where to put gauging stations, what fish are there and how many, and what the harvest plans will be.

“The scientific information and technology developed by the WRC will help policymakers formulate practice rules that will protect the streams and their inhabitants, especially fish,” says Skaugset. “At the same time, we can avoid making unnecessary forest rules that could have high economic costs.”

For more information about the WRC, visit <http://watershedsresearch.org/>.

Making Tracks in Oregon's Forests: Planning the Possibilities

Two roads diverged in a wood, and I—I took the one less traveled by...

—Robert Frost, *The Road not Taken*

If two roads diverge in a wood in Oregon, John Sessions may well have planned it that way. Sessions, OSU Distinguished Professor and Stewart Professor of Forest Engineering, has been modeling and planning forest transportation systems and harvest operations ever since he came to OSU as a doctoral student. That was more than 30 years ago, while he was a USDA Forest Service employee. For a few years after earning his doctorate, he continued to work for the Forest Service; later, he worked for the forest industry in Brazil. In 1983, he returned to OSU.

The svelte laptop on his desk today is a far cry from the portable computer he lugged to the Amazon in 1980. The work accomplished on the machines, however, has a common goal. As Sessions puts it, “The main thread throughout my research and teaching has been helping managers plan activities that move forests to a desired condition, while providing economic and environmental benefits.”

Although he has consulted on forest planning on five continents, his projects are most often close to home. Currently, Sessions is supporting the planning efforts for some 730,000 acres of forests administered by the Oregon Department of Forestry (ODF). These forests include the Tillamook, Clatsop, and Elliot State Forests, and several smaller state forests, primarily in western Oregon. The timber harvested from them provides millions of dollars to counties, schools, and local taxing districts.

“The mandate for most of ODF’s lands,” Sessions points out, “is to manage state-owned forests for ‘the greatest permanent value’ for the citizens of Oregon.” That value includes social, environmental, and economic benefits, and the mandate is challenging. To help meet it, he has developed models that allow simultaneous choices about cash flows, timber harvests, harvesting and transportation systems, stand structure condition, criteria for forest sustainability, and forest practice rules. They combine many technologies, including geographic information systems, transportation planning, and tree growth-and-yield models. The models project for 150 years in the future, but they are adjusted periodically to reflect actual inventory, as well as changing needs and goals.

During the last seven years of modeling support, the state forest plans have been approved and are currently undergoing analysis for implementation. According to Sessions, the forest planning by ODF is the “most sophisticated in the United States.” Sessions is now working to support the Bureau of Land Management Western Oregon Plan. In keeping with his first forest-related job, as a Hot Shot firefighter, he also lends his expertise to the national federal Interagency Science Team. This group is evaluating the progress of a multi-agency effort to develop a decision support system to more efficiently allocate the more than \$2 billion per year expended on fuel treatments, preparedness and wildland fire suppression across five federal agencies. Sessions is one of the two academic members of the 14-person science team.

Sessions shares his expertise generously with students, teaching five to seven courses a year and off-campus workshops for professionals. He is a faculty advisor to Engineers without Borders and is active in Phi Kappa Phi, the nation’s largest honor society. His dedication to both research and teaching has been recognized by multiple Dean’s Award for Service and Audferheide Awards for teaching. He also was named OSU Top Prof by Mortarboard.

From the Mountains, to the Prairies, to the Ocean...

An Extension forester covers it all

From the Cascade Mountains, to the Willamette Valley prairies, to the Pacific Ocean—that's the stretch of Lane County, and that's the territory served by The Treeman: Steve Bowers, Extension Forester and Associate Professor of Forest Engineering. On occasion, he's shouldered Extension duties in other counties as well, so foresters and woodland owners outside of Lane County may well have benefited from his assistance.

As an Extension forester, Bowers must be versatile, as well as well-traveled. Lane County includes 4,620 square miles, 90 percent of which is forestland. The other 10 percent includes the state's second-largest urban area, and the county is home to nearly 10 percent of the state's population. A typical day for Bowers might involve leading a workshop for small woodland owners, coordinating a tree farm tour, answering a question about urban forestry in Eugene, and coming up with a solution for a harvesting problem in Oakridge.

A big part of Bowers' job is bringing forestry to many diverse audiences. As an Extension forester, he has organized nearly 70 conferences and workshops for those interested in forest issues, especially those having to do with his specialties: harvesting, marketing, and timber measurements. "I focus on hands-on approaches that promote group interaction and that participants can relate to their own experience," he says. "I encourage participants to learn from each other."

As a complement to his workshops, Bowers codeveloped *Varplot: Stand Measurement Software*, which he characterizes as a user-friendly timber-cruising program for woodland owners. He also developed and maintains the *Log Buyers Directory*, which lists primary log manufacturers (lumber, veneer, and fiber operations), timberland procurement companies, log home (log) buyers, and sort yards in southwest Washington and northern California. Woodland owners can use this resource, which is available online and in hard copy, to find the best price for their timber.

In his spare time, Bowers writes. The "Tips from the Treeman" column has an estimated readership of 100,000. The "Dear Abby"-type column fields questions ranging from a schoolgirl's concern—"Trees make sugar, so do they get diabetes?"—to more conventional queries—"What's killing all my grand fir trees?" "Do you know of any organic solutions for household pests?"—and more traditional forest-related issues. He's a regular contributor to the *Master Woodland Managers Gazette*. Recently he published *Managing Woodland Roads: a Field Handbook*. This pocket-size, color illustrated manual synthesizes a variety of materials about and experience with design, inspection, maintenance, and repair of such roads

His work has been recognized by several awards. Most recently, he received a Newer Faculty Award from OSU Extension for developing educational workshops for small woodland owners. He also received the Bronze Educational Award from the National Association of Natural Resource Extension Professionals twice for the *Backyard Woodland Resource Notebook* and the *Lane Woodland News*.

Understanding Fish and Wildlife Habitat in Actively Managed Forests

Scientist-stakeholder collaboration is key

When the spotted owl became an icon for old growth forest habitat in the early 1990s, interest also increased in the habitat provided by Oregon's second-growth forests. Information was limited, triggering the FRL to allocate a portion of its Harvest Tax receipts to establish the Fish and Wildlife Habitat in Managed Forests (F&W) Research Program in 1994.

"A goal is to improve our understanding of the habitat provided by younger managed stands, especially those that result from contemporary approaches to forest practices," explains Steve Tesch, program manager and head of the Department of Forest Engineering. "Priority is given to projects that can enhance the scientific basis for regulating forestry on state and private forest lands, as well on actively managed federal lands."

The 44 projects undertaken so far have included research, technology transfer, and service activities. Initially, projects focused on terrestrial habitat associated with snags, down wood, and forest structure. Some studies explored innovative ways to create snags and tracked initial use by cavity-nesting birds. In addition, a unique study on McDonald-Dunn Forests has documented wildlife responses to different silvicultural strategies and resulting habitat conditions over 14 years.

The Oregon Plan for Salmon and Watersheds stimulated a shift toward evaluating impacts of modern forestry on aquatic habitat for resident insects, amphibians, trout, and salmon. Five of the eight active projects in FY 2007 are focused on the collaborative Hinkle Creek Watershed study near Roseburg, where state-of-the-art technology is enabling unprecedented tracking of cutthroat trout responses to recent harvests.

Another multi-disciplinary study has examined aquatic habitat in the Calapooia River drainage. Results documented more favorable nitrogen and water temperature levels in actively managed forest reaches than in those downstream characterized by agriculture and rural residential land uses.

Forest road managers are also benefiting from long-term research examining linkages between hillslope hydrology and road drainage. Results help them prioritize investments in design and maintenance practices to reduce sediment that can potentially reach streams.

The FY2006 budget was \$370,000. An advisory committee with members from state and federal agencies, the forest industry, and small woodland owners recommends funding allocations. "This partnership between land managers and scientists has been very effective in recent years," says advisory committee chair Gary Springer, who works for Starker Forests, "and the current focus on strengthening the scientific basis for the Forest Practices Act should make this program even more valuable in the future."

Scientists participating in the program are based primarily in the Departments of Forest Engineering, Forest Resources, and Forest Science, with collaboration from scientists in other OSU units and federal agencies.

The F&W funds often serve as seed money to help faculty leverage other sources of support and build collaborative efforts. "Supplementing F&W Program allocations with funds from other sources has expanded the size and scale of many projects," notes Tesch. "Encouraging more collaboration is one of the goals for the coming years."

Innovative to the Core: Oregon Wood Innovation Center

There is a growing urgency to innovation these days...One has to innovate faster and faster just to stay in place

—Gifford Pinchot III and Ron Pellman, *Intrapreneuring in Action: a Handbook for Business Innovation*

In recent years, the forest products industry in Oregon has faced many challenges stemming from reductions in raw material supply and increasing globalization of markets. To help the industry meet those challenges and move ahead, the College of Forestry and the OSU Extension service have created the Oregon Wood Innovation Center (OWIC), with its home in the Department of Wood Science and Engineering. The center was established to improve the competitiveness of the state's wood products industry by fostering innovation in products, processes, and business systems.

"We're here to help industry develop new ideas and potential," explains Scott Leavengood, Director of OWIC. "And projects where we are working one-on-one will be the source of most of our success stories." The Center aims to fill the need for a one-stop shop assisting with product testing, business plans, and market information. It also serves as a hub where industry, especially small and medium-sized concerns, and landowners can find out who's who, what they're doing and where they're going, and get linked up with each other when appropriate. The Center also serves as the primary link between university research and the needs and opportunities of the forest industry.

"The best thing an Extension person can do is point you to the right resource," says Leavengood. "Our main function is to be a tool for making connections." To this end, Leavengood and program assistant Chris Knowles are building a database of Oregon firms and what they do, what raw materials they use, who might have residues available for others to use, and the like. Firms that have new product ideas can come to OWIC for help in asking the right questions, comparing their idea to existing products, understanding potential markets, and dealing with considerations that might not have occurred to them. Once prototypes have been developed, the center can coordinate prototype testing with faculty members in Wood Science and Engineering.

As part of its goal of facilitating connections and making information accessible, Leavengood and Knowles are setting up a variety of outreach activities, many of which are Web-based. A monthly newsletter appears on their Web site with information about the Center, its services, research in the College, and such features as the popular "Ask the Expert". "Ask the Expert" is also available in an easy-to-use form on the Center Web site. "You don't need to know who you have to find," points out Leavengood. "We can route your question to the appropriate WSE faculty member and get the answer right to you." Knowles is also exploring different ways to use the Web for discussion forums, video presentations and distance education. Many other useful links are accessible from the OWIC Web site.

Although OWIC is less than a year old, it is rapidly succeeding in its function as a 'clearinghouse' to facilitate networking among manufacturers, organizations that provide assistance to businesses, and the research community.

For more information, visit owic.oregonstate.edu

Tuning into Timber Trends: Fast Toward to the Future

No sensible decision can be made any longer without taking into account not only the world as it is, but the world as it will be. —Isaac Asimov, in *The Encyclopedia of Science Fiction*

Housing starts in California, the pine beetle outbreak in interior British Columbia, harvest and markets for Oregon timber—how are these related? Where will the wood come from in 10 years—or 50—to provide lumber, paper, and other forest products? How can thinning to improve forest health be made economically attractive? How can the US forest industry continue to compete globally? Darius Adams, Professor of Forest Resources and economist, has spent more than 30 years engrossed in such questions. His answers have provided vital information to woodland owners, forest products producers, and government agencies, statewide and nationally.

Adams and his students use complex models to establish market and harvest trends and patterns. They range from small scale (a single Oregon county) to large (national and global) and flow from one scale to the other. The local models incorporate many diverse factors affecting timber harvest and manufacture of wood products. The larger models include national and international wood products markets, including products from other regions that move to larger markets and therefore affect Oregon. For example, the US currently imports nearly 40% of the lumber it consumes yearly, primarily from Canada. Salvage logging of beetle-killed trees in British Columbia over the next decade is likely to increase supplies from Canada. At the same time, housing starts in the US likely will decrease (reducing demand) and accelerating urbanization will absorb more forested lands (reducing timber supply). All these factors and more must be considered in the models. Similar complexities arise in dealing with other forest products, such as paper.

Economic modeling has recently become important in forest health initiatives. Adams and his research assistant Greg Latta recently completed a study of costs and regional impacts of restoration thinning on national forests in eastern Oregon. Their model responded to a need to forecast market response to and economic implications of thinning programs proposed to reduce fire and pests in overstocked forests. The scenarios they treated included the extent of public subsidies, the types of costs that could be subsidized, the form of subsidy payment, and effects on log consumers and producers.

Over the years, Adams has noticed many changes in his field. Chief among them is the shift in proportion of harvest from public land ownerships to private. “In the late 1970s, timber supply and market issues were radically different,” he notes. “More than half of the harvest in Oregon was from public lands. Now, public lands are of limited consequence, and the focus is on private lands.” In addition, industrial owners in particular have been moving from integrated ownership, in which they own timberlands and processing facilities, to divesting land to TIMOs (Timber Investment Management Organizations) and REITs (Real Estate Investment Trusts). So far, timber management strategies have remained the same, so this trend has not required changes in models.

“Processors need to know where wood can be obtained now, where they can obtain it in the future, and what price structures are likely to be,” Adams points out. “Our models help them find out.”

Capturing Volatiles: a Highly Charged Process

Every American expects and deserves to breathe clean air...—George H. W. Bush, *Remarks Announcing Proposed Legislation To Amend the Clean Air Act*, June 12, 1989.

Ah, the smell of baking gingerbread! Those delightful aromas arise from volatile compounds filling the air. Like baking gingerbread, lumber heated during drying gives off volatile organic compounds (VOCs), but the VOCs from lumber can cause smog and lead to formation of ozone in the lower atmosphere. Ozone is an irritant to humans and other living things and decreases crop production and forest growth.

“Drying lumber is responsible for as much as 85% of the energy required to process logs into lumber and is also responsible for most of the airborne emissions,” says Mike Milota, Professor of Wood Science and Engineering. For nearly two decades, he’s been working to improve lumber quality by improving drying procedures. Lately, he’s added emission control to his list of concerns.

Milota has developed and validated a small-scale method for estimating how VOC, methanol, and formaldehyde emissions vary with initial wood moisture content and drying schedule for the most commonly dried species in the western US. Many mills use these values, and they are included in the Oregon DEQ’s Standard Air Contaminate Discharge Permit. This information is useful for mills in complying with federal and state regulations and maintaining a clean environment.

“Establishing this small-scale test method that accurately simulates results from a large kiln has been a major accomplishment of our program,” says Milota. “Testing emissions from a large kiln is difficult and expensive.” Milota’s research is credited with helping Oregon manufacturers avoid \$15 to \$20 million in unnecessary regulations.

Some of the VOCs from wood, such as methanol and formaldehyde, are listed by the EPA as hazardous air pollutants and subject to control under the 1990 Clean Air Act Amendments. Milota and colleague Kaichang Li, Associate Professor of Wood Science and Engineering, have been testing the ability of a dozen ionic liquids—organic salts that are liquid and don’t evaporate—to capture undesirable emissions from dryers and presses. Having identified the best performer, they have scaled up from small vials in the laboratory to a 2-meter column into which a sample of dryer or press emissions can be directed. The ionic liquid is regenerated in a second column and reused. Such a device would use much less energy than alternative emission control devices, such as thermal oxidizers. Milota and Research Assistant Paul Moser spent much of fall quarter at a veneer dryer and a particleboard press testing the column under different conditions and obtaining 80 to 99% recovery of the pollutants.

Carrying on a tradition that started in 1948, Milota shares his knowledge of drying technology through an annual workshop, “How to Dry Lumber for Quality and Profit.” Some 40 industry workers benefit from the workshop each year.

H. J. Andrews Experimental Forest: Learning in the Present, Building on the Past, Looking to the Future

[The Andrews]... is the most studied primal forest ecosystem on this continent, and perhaps the planet. ...Here, in the shadows of this woods, in its rivulets and streams, under its soil, and high overhead, they have discovered a hidden forest. —Jon Luoma, *The Hidden Forest*

Tucked away in the Cascade Mountains near Blue River, the HJ Andrews Experimental Forest has been yielding its secrets to scientists for nearly 60 years. “The Andrews”, as it is known to its many friends, was founded in 1948. In 1980, it became a charter member of the National Science Foundation Long-Term Ecological Research Program, which now comprises 26 sites. Over the decades, scientists from all over the world have found their way to the narrow mountain road leading to the Forest and its 16,000 acres of forests and streams. Its reputation for excellence in research and education in the ecology and management of forests and streams has grown and spread accordingly.

Dominant research themes have changed over time. In the 1950s and 1960s, the focus was on road engineering, logging methods for old-growth forests, rapid forest regeneration, and effects of logging on small watersheds. Current researchers, building on long-term field experiments and measurements, are developing concepts and tools to predict effects of natural disturbance, land use, and climate change on ecosystem structure, function, and species composition. Applied forest management studies continue today as part of a long-term partnership with the Willamette National Forest.

“We have a wealth of long-term datasets on Pacific Northwest forests and streams, which is important for such long-lived forests,” notes Kari O’Connell, Director of the Forest. “These datasets can be used in novel and unpredicted ways over the years.” Permanent study areas make it possible to examine natural and management-induced changes over time and to examine effects of catastrophic events. A 200-year experiment on log decomposition is helping scientists understand the roles of logs on the forest floor as habitat and in soil productivity. Climate variation is being tracked over decades. Watershed hydrological research is building on treatments established 50 years ago, and the same watersheds are now being used as “airsheds” to develop new techniques of studying carbon dynamics in mountainous areas. The many long-term databases are updated continually. They are available on-line to researchers and students from all over the world to compare with other ecosystems, use as learning tools, and assess environmental and ecological changes.

Although basic and applied forest science is central to the mission of the Andrews, students and teachers from elementary school to graduate school all have found something to learn there. From time to time, too, creative writers and philosophers join ecosystem scientists at the Andrews and other natural places as participants in the Long-Term Ecological Reflections program to explore human/nature relationships.

The Andrews is administered cooperatively by Oregon State University and the USDA Forest Service’s Willamette National Forest and Pacific Northwest Research Station. The research and educational programs are also funded by the National Science Foundation, NASA, the USGS, and diverse other sources.

“One aspect of the Andrews has stayed the same over the decades,” O’Connell observes. “Studies here continue to provide critical information about forest and stream ecology and management to scientists, policymakers, and everyone else concerned with sustaining Oregon’s forests.”

More information about the Andrews is available at www.fsl.orst.edu/lter/.

Faculty and Staff Awards, 2005-2006

John Bailey, Associate Professor, FR, selected as an Arizona Teaching Fellow

Badege Bishaw, Director of International Programs for the CoF and Research Associate, Forest Science, Dean's Award for Outstanding Achievement in international relations

Kevin Boston, Assistant Professor, FE, inducted into Phi Kappa Phi honor society

Steve Bowers, Associate Professor and Extension Agent, FE, OSU Extension Association Newer Faculty award

Bill Emmingham, Professor Emeritus, FS; **Paul Oester**, Professor, FS; **Greg Filip**, affiliate faculty, FS; **Steve Fitzgerald**, Professor and Extension Agent, FR: and others, gold award, long publication category, Association of Natural Resource Extension Professionals, for the book *Ecology and Management of Eastern Oregon Forests*

Bill Galligan, affiliate faculty, WSE, Award of Merit for Lifetime Contributions to the Lumber Industry, West Coast Lumber Inspection Bureau

John Garland, Professor Emeritus, FE, special award for dedication and service, Associated Oregon Loggers

Eric Hansen, 2006 Mid-Career Alumni Achievement Award, University of Idaho College of Natural Resources, Julie Kliewer Mentoring Award (Xi Sigma Pi)

Mark Harmon, Bullard Fellowship from Harvard University for sabbatical leave support at the Harvard forest

Phil Humphrey, affiliate faculty, and former student MJA Chowdhury, WSE, the George Marra Award (Hon. Mention), Society of Wood Science and Technology

Ed Jensen, Associate Dean for Academic Affairs and Elizabeth P. Ritchie Distinguished Professor in FR, a bronze and two silver awards for *Trees To Know in Oregon*, Association for Communication Excellence

K Norman Johnson, Aufderheide Award for excellence in teaching

Fred Kamke, Professor and JELD-WEN Chair of Wood-based Composites Science, International Academy of Wood Science lecturer, the highest honor bestowed by the International Association of Wood Anatomists

Jim Kiser, Instructor and Head Undergraduate Advisor, FE, Dean's Award for Outstanding Achievement in service to the College

Barbara Lachenbruch, Professor, WSE, Fulbright Fellowship for research and teaching in Chile; "Woman of Achievement, 2006", OSU Women's Center

Doug Mainwaring, Faculty Research Assistant, Forest Science, Dean's Award for Outstanding Achievement as an FRA

Jeff McDonnell, Professor of FE and Richardson Chair in Watershed Science, STINT Fellow, Swedish National Science Foundation, University of Stockholm; elected to the International Water Academy, Oslo, Norway

Tom McLain, Professor and Head, WSE, elected Fellow of the Society of Wood Science and Technology

Mark Needham, Assistant Professor, FR, Marion Miller Award for "Best Paper" at the 11th Canadian Congress on Leisure Research

Marv Pyles, Professor, FE, Dennis Marker Professor of the Year Award, OSU student chapter of the Associated General Contractors

OSU College of Forestry (Debbie Bird McCubbin, Director of Student Services, **Jeff Hino**, Forestry Media Center Director, and the production team), a Silver Telly Award for

nonbroadcast recruitment film/video for the DVD *OSU College of Forestry: Getting the Big Picture*

Susan Sahnaw, Program Coordinator, Oregon Forestry Education Program, Dean's Award for Outstanding Achievement in extended and continuing education

Bo Shelby, Professor, FR, Service Award from the Clackamas River Relicensing Settlement Working Group

Bruce Shindler, Professor, FR, Dean's Award for Outstanding Achievement in research and scholarship

Viviane Simon-Brown, Associate Professor, FR, elected President of the Association of Natural Resource Extension Professionals

George Swanson, Program Support Coordinator, WSE, Dean's Award for Outstanding Achievement in service and undergraduate and graduate instruction

Jeff Wimer, Instructor and Director of Student Logging Program, FE, Dean's Award for Outstanding Achievement in advising and mentoring

Penny Wright, Office Manager, FS, Dean's Award for Outstanding Achievement as support staff

David Zahler, Senior Instructor, FR and Forestry Media Center, Dean's Award for Outstanding Achievement for service to the College; Education Package Team Award, Oregon State University 4-H Agents Association, for the study card series "Exploring Habitats of the Willamette Valley, Oregon".

Departments

Forest Engineering

Name	Education	Rank
Paul W. Adams	Ph.D., University of Michigan, 1980	Professor; Extension Forest Watershed Specialist
Robert L. Beschta	Ph.D., University of Arizona, 1974	Professor Emeritus
Kevin Boston	Ph.D., Oregon State University, 1996	Assistant Professor
Steve Bowers	M.F., Oregon State University, 1993	Associate Professor; Extension Forester, Lane County
George W. Brown	Ph.D., Oregon State University, 1967	Professor Emeritus; former Dean
Tom Edwards*	B.S., Oregon State University, 1984	Project Engineer/Operations Forester, College Forests
John J. Garland	Ph.D., Oregon State University, 1990	Professor Emeritus
Loren D. Kellogg	Ph.D., Oregon State University, 1986	Lematta Professor of Forest Engineering
Jim Kiser	M.S., Oregon State University, 1992	Instructor
Dave Lysne*	M.F., Oregon State University, 1980	Director, OSU Research Forests
Jeffrey J. McDonnell	Ph.D., University of Canterbury, New Zealand, 1989	Professor; Richardson Chair in Watershed Sciences
Glen Murphy	Ph.D., Oregon State University, 1987	Professor
Bob Parker	M.S., Oregon State University, 2000	Assistant Professor; Extension Forester, Baker County
Marvin R. Pyles	Ph.D., University of California, Berkeley, 1981	Associate Professor
John Sessions	Ph.D., Oregon State University, 1979	University Distinguished Professor; Stewart Professor of Forest Engineering
Arne Skaugset	Ph.D., Oregon State University, 1997	Associate Professor
Steven Tesch	Ph.D., University of Montana, 1981	Professor; Department Head
Jeffrey Wimer	B.S., Oregon State University, 1983	Instructor; Director, Student Logging Program
Michael Wing	Ph.D., Oregon State University, 1998	Assistant Professor, Sr. Research

*College Forests faculty with appointments in Forest Engineering

The **Forest Engineering Department** (<http://www.cof.orst.edu/cof/fe/programs.htm>) is recognized for excellence in student education, creative problem-solving research, and innovative extended education. Faculty engineers, hydrologists, and forest scientists apply engineering and forestry principles to solve complex forestry problems and support sustainable forests. Faculty and graduates provide knowledge, methods, and skills to design and carry out safe, economically viable, environmentally responsible, and socially acceptable forest resource operations. The mission of the Forest Engineering Department is to develop scientific, engineering, and technical solutions that promote sustainable management of forest, land, and water resources to meet society's economic, environmental, and social needs.

goals:

- For undergraduates: *provide (1) engineering and operations management education programs with a forestry context, (2) a broad education that supports professional growth, (3) the practical skills to add immediate value to employers, and (4) a pathway to professional licensing as engineers and land surveyors*
- For graduate students: *provide education concentrations in forest engineering, forest operations, forest soils, and forest hydrology to educate future generations of scholars, scientists, and professionals. Graduate students serve as a foundation for the department's research program.*
- *Promote a research program that is mission-oriented and seeks to help solve land management problems by discovering new scientific knowledge, applying scientific principles to solve problems, and developing innovative decision support tools*
- *Provide outreach activities that serve society through Extension and continuing education programs*
- *Serve diverse clientele and provide lifelong learning opportunities for professionals, landowners, the public, and policy makers*

accomplishments

- The Forest Engineering and Forest Engineering/Civil Engineering curricula were revised for better alignment with other engineering programs and to improve preparation for the workplace.
- The department received a pledge for more than \$3.5 million from Richard Strachan to establish a new endowed chair in Forest Operations Management.
- Undergraduate enrollment increased to 82 students in AY 2006. Seven graduates completed undergraduate degrees in June 2006 and found abundant job opportunities. The department met its goal of 5% enrollment for underrepresented students.
- Graduate enrollment increased by almost 30% in AY 2006, to 30. Six graduate students completed programs. Students who sought jobs were employed by consulting firms, state and federal agencies, and, for PhDs, in academia.
- Led by Marv Pyles, a collective effort by the FE faculty maintained the publication of the International Journal of Forest Engineering. The Forest Products Society recently agreed to add the IJFE to their portfolio of journals.
- The county-based FE Extension faculty supported stakeholders by preparing a variety of publications and educational aids and by delivering a host of diverse educational programs. On-campus faculty also supported the OR-OSHA safety committee, the Associated Oregon Loggers, and OFRI, and they provided service to professional organizations such as SAF and IUFRO. Faculty led and participated in more than 28 workshops, conferences and short courses, as well as a host of field tours and presentations.

- Jeff McDonnell developed innovative techniques for distance delivery of his hillslope hydrology course, including virtual labs.
- Kevin Boston developed a new FE-focused statistics recitation course to complement STAT 314 and improve student learning.
- In fall 2005, Forest Engineering Department awarded \$148,971 in departmental donor-supported fellowships to nine graduate students, as well as \$56,032 in CoF Richardson endowment fellowships to three more graduate students, for a total of \$205,003 in donor-funded graduate fellowships. This was the largest amount of private departmental fellowships awarded in the university. These are in addition to the College of Forestry fellowships.
- Funding from the Stewart Foundation and the Konnie family was used to award departmental scholarships to recruit and retain 29 undergraduate FE students in AY2006. These are in addition to the scholarships awarded by the College.
- The department allocated \$6,000 from donor funds to support graduate student travel to participate in professional meetings.
- The department provided staff support for the OSU Phi Kappa Phi National Honor Society. John Sessions serves as chair of the membership and awards committees.
- Results from the 2006 CoF advising survey and FE senior exit interviews documented that FE students are very pleased with the advising they are receiving.
- John Garland and Jeff Wimer led programs and developed training materials, some translated into Spanish, which assisted in the implementation of the new forest activities safety code recently released last year by OR-OSHA.
- Gift funds were allocated to host a second FE Department “building community” field trip in May 2006 for faculty, staff, and undergraduate and graduate students to central Oregon. In addition to learning about forest engineering, the goal was to promote community, strengthen linkages between graduate students and undergraduate students, and improve retention.
- The department continued its traditions of hosting a booth and alumni breakfast at the Oregon Logging Conference in Eugene and distributed an annual issue of *The Cable*, the FE Department newsletter.

Steve Tesch
Department Head

Forest Resources

Name	Education	Rank
Darius M. Adams	Ph.D., University of California, Berkeley, 1972	Professor
Heidi Albers	Ph.D., University of California, Berkeley, 1993	Associate Professor
Dawn Anzinger	M.S., Oregon State University, 2002	Instructor
John Bailey	Ph.D., Oregon State University, 1996	Associate Professor
John F. Bell	Ph.D., University of Michigan, 1970	Professor Emeritus
Max Bennett	M.S., Oregon State University, 1993	Associate Professor; Extension Agent, Jackson-Josephine Counties
John C. Bliss	Ph.D., University of Wisconsin-Madison, 1988	Professor; Starker Chair in Private and Family Forestry; Associate Department Head
James R. Boyle	Ph.D., Yale University, 1967	Professor Emeritus
Paul S. Doescher	Ph.D., Oregon State University, 1983	Professor
Norman E. Elwood	Ph.D., University of Minnesota, 1984	Associate Professor Emeritus; Forest Management Extension Specialist
William K. Ferrell	Ph.D., Duke University, 1948	Professor Emeritus
Stephen A. Fitzgerald	M.S., University of Idaho, 1983	Professor; Staff Chair, Extension Agent, Deschutes, Jefferson, Crook, Grant Counties
Richard A. Fletcher	M.B.A., Oregon State University, 1977	Professor; Staff Chair, Benton County Extension Service
Temesgen Hailemariam	Ph.D., University of British Columbia, 1999	Assistant Professor
David W. Hann	Ph.D., University of Washington, 1978	Professor
Richard K. Hermann	Ph.D., Oregon State University, 1960	Professor Emeritus
Jeffrey C. Hino	M.S., University of Oregon, 1979	Senior Instructor
Geoffrey M. Huntington	J.D., University of Oregon, 1986	Senior Instructor

Royal G. Jackson	Ph.D., University of New Mexico, 1971	Associate Professor Emeritus
Edward C. Jensen	Ph.D., Oregon State University, 1989	Professor; Associate Dean for Academic Affairs
K. Norman Johnson	Ph.D., Oregon State University, 1973	University Distinguished Professor
Chal G. Landgren	M.S., Utah State, 1975, M.B.A., Portland State University, 1989	Professor; Staff Chair, Extension Agent, Columbia and Washington Counties; Staff Chair, Washington County Extension faculty
Kreg Lindberg**	Ph.D., Oregon State University, 1995	Associate Professor
Claire A. Montgomery	Ph.D., University of Washington, 1990	Professor
Mark Needham	Ph. D., Colorado State University, 2005	Assistant Professor
David P. Paine	Ph.D., University of Washington, 1965	Professor Emeritus
Mark D. Reed	M.A., California State University, Long Beach, 1987	Senior Instructor
Ron Reuter**	Ph.D., University of Minnesota 1999	Assistant Professor
William J. Ripple	Ph.D., Oregon State University, 1984	Professor
Randall Rosenberger	Ph.D., Colorado State University, 1996	Assistant Professor
Hal Salwasser*	Ph.D., University of California, Berkeley, 1979	Dean, Professor
Bo Shelby	Ph.D., University of Colorado, 1976	Professor
Bruce A. Shindler	Ph.D., Oregon State University, 1993	Professor
Viviane Simon-Brown	M.P.A., Lewis & Clark College, 1991	Associate Professor
John C. Tappeiner II	Ph.D., University of California, Berkeley, 1966	Professor Emeritus
Joanne F. Tynon	Ph.D., University of Idaho, 1994	Assistant Professor
John D. Walstad	Ph.D., Cornell University, 1971	Professor, Department Head
David Zahler	M.S., Oregon State University, 1996	Senior Instructor

*Joint appointment in Forest Resources and Forest Science

**Cascades Campus

Contemporary natural resource management requires broad knowledge and a multifaceted perspective. The **Forest Resources Department** (www.cof.orst.edu/cof/fr) places great importance on providing students, natural resource managers, and the general public with an understanding of how society's actions can change our forested landscapes and what they provide—both now and in the future. Our programs of instruction, research, outreach, and service reflect this breadth of knowledge and strategic vision. Furthermore, we place a premium on developing both technical and integrative skills among our faculty and students that will enable successful long-term management of forests and related natural resources. We believe that a rigorous, diverse education helps develop responsible citizens and professionals capable of making sound decisions that will sustain forests and the benefits derived from them. Our vision, goals, and objectives help realize this belief and support the overarching mission of the College.

expectations:

The Forest Resources Department will continue to build on the recommendations from recent reviews of our courses and curricula, research activities, and administrative performance. Staffing in the Department will command considerable attention as we deal with impending retirements and other changes in personnel. We've begun a major overhaul of our curricula at both undergraduate and graduate levels to make them more efficient. We'll further strengthen our ties with departments on the Corvallis campus, as well as with the new Cascades campus at Bend. It promises to be another stimulating and dynamic year as we maintain the integrity of our time-tested programs while venturing into new and innovative areas and partnerships.

accomplishments:

- Growth in contracts and grants continued. The department received more than \$1.8 million from external sources, more than double the previous year and near the all-time high.
- Student numbers continued to increase at both the undergraduate and graduate levels.
- Scholarship and fellowship support for FR students totaled more than \$180,000.
- Growth in our Ecampus course offerings netted the University more than \$150,000 and provided \$56,500 for departmental operations.
- FR faculty hosted five international visitors from two countries.
- The department completed implementation of recommendations stemming from the earlier comprehensive departmental and programmatic reviews.
- We continued to streamline courses, curricula, and approaches to teaching, advising, and mentoring students. Surveys and teaching reviews indicate a high level of satisfaction among both undergraduate and graduate students.
- The Forest Recreation Resources curriculum was revised and the name changed to Recreation Resource Management.
- Two new tenure-track faculty were recruited: John Bailey (Silviculture/Wildland Fire) and Mark Needham (Natural-resource-based Recreation Management).
- Six new courses were developed and offered.
- In May 2006, the Variability Probability Workshop, led by John Bell, was given for the 57th time. The first workshop was offered in 1957.

Jack Walstad
Department Head

Forest Science

Name	Education	Rank
W. Thomas Adams	Ph.D., University of California, Davis, 1974	Professor; Department Head
Glenn Ahrens	M.S., Oregon State University, 1990	Associate Professor; County Chair, Clatsop County; Extension Agent, Clatsop and Tillamook Counties
Barbara Bond	Ph.D., Oregon State University, 1992	Professor; Spaniol Chair in Renewable Natural Resources
Michael Bondi	M.S., University of Canterbury, 1977	Professor; County Chair and Extension Agent, Clackamas County
Efren Cazares-Gonzales	Ph.D., Oregon State University, 1992	Assistant Professor, Sr. Research
Kermit Cromack, Jr.	Ph.D., University of Georgia, Athens, 1973	Professor Emeritus
William H. Emmingham	Ph.D., Oregon State University, 1974	Professor Emeritus
Lisa Ganio	Ph.D., Oregon State University, 1989	Associate Professor; Coadvisor, Graduate Program
Mark E. Harmon	Ph.D., Oregon State University, 1986	Professor; Richardson Chair in Forest Science
David E. Hibbs	Ph.D., University of Massachusetts, Amherst, 1978	Professor; Associate Department Head
Stephen D. Hobbs	Ph.D., University of Idaho, 1977	Professor; Executive Associate Dean
Glenn T. Howe	Ph.D., Oregon State University, 1991	Assistant Professor
Olga Krankina	Ph.D., St. Petersburg Forest Academy, St. Petersburg, Russia, 1986	Assistant Professor, Sr. Research
Beverly Law	Ph.D., Oregon State University, 1990	Professor
Dan Luoma	Ph.D., Oregon State University, 1998	Assistant Professor, Sr. Research
Douglas A. Maguire	Ph.D., Oregon State University, 1986	Associate Professor; Edmund Hayes Professor in Silvicultural Alternatives
Michael Newton	Ph.D., Oregon State University, 1964	Professor Emeritus
Tara Nierenberg	M.S., Oregon State University, 1996	Senior Instructor
Paul Oester	M.S., Oregon State University, 1977	Professor; Extension Agent, Union County
Klaus Puettmann	Ph.D., Oregon State University, 1990	Associate Professor
Steven R. Radosevich	Ph.D., Oregon State University, 1972	Professor
Robert (Robin) W. Rose	Ph.D., North Carolina State University, 1980	Professor
Darrell W. Ross	Ph.D., University of Georgia, Athens, 1990	Associate Professor
Dave Shaw	Ph.D., University of Washington, 1992	Assistant Professor. Extension Specialist

Phillip Sollins	Ph.D., University of Tennessee, 1972	Professor Emeritus
Steven H. Strauss	Ph.D., University of California, Berkeley, 1985	Professor
David P. Turner	Ph.D., Washington State University, 1984	Associate Professor, Sr. Research
Richard H. Waring	Ph.D., University of California, Berkeley, 1963	University Distinguished Professor Emeritus
Brad Withrow-Robinson	Ph.D., Oregon State University, 2000	Associate Professor; Extension Agent, Yamhill County

The **Forest Science Department** (www.cof.orst.edu/cof/fs) provides strong programs in graduate education, research, and outreach in a broad range of disciplines pertaining to the processes, culture, and productivity of forest landscapes and resources. The Department's research spans a range from fundamental, including projects investigating the impacts of environmental change on ecosystem function, to applied, including projects aimed at enhancing forest productivity through tree breeding, improved reforestation practices, hardwood silviculture, and tolerance to Swiss needle cast disease. Applied research is conducted primarily by the Department's seven research cooperatives.

goals:

- *Add to the body of knowledge* of the physical and biological processes of unmanaged and managed forest ecosystems
- *Educate* future scientists, teachers, and forest practitioners
- *Inform discussions of public policy* related to natural resources to help society cope with the pressing issues of forest health, productivity, conservation, and sustainability

accomplishments:

- The Department underwent an intensive review of its programs conducted by the Graduate School at OSU and the USDA, Cooperative State Research Education and Extension Service. Reports by the two review committees praised the Department's record in graduate training, research, outreach, and service and provided useful recommendations for improving programs in the future.
- The strong research program in the Department is supported by two key statistics in 2005: 70 new competitive grant awards totaling \$8.2 million and 68 articles published in scientific journals by the Department's 18 professorial research faculty.
- Darrell Ross has been named Director of the Richardson Hall Quarantine Facility. This is the only facility of its kind in Oregon and will be used initially to study the effectiveness of exotic insects for biological control of invasive plants in the Pacific Northwest.
- FS faculty currently serve on the editorial boards of 12 scientific journals.
- Three FS faculty were keynote or plenary speakers at international symposia in 2005: Steve Strauss (Joint Meeting of American and Canadian Societies of Plant Physiology); Klaus Puettmann (5th North American Forest Ecology Workshop); and Dan Luoma (Conservation Ecology of Cryptogams, Bispgarden, Sweden).
- FS faculty hosted nine international scientists from eight countries.

- Robin Rose and Diane Haase have revised and updated “Guide to Reforestation in Oregon,” a popular handbook useful to anyone interested in successful tree regeneration.
- Olga Krankina received a \$900,000 grant from NASA to study the impacts of land use change on carbon stored in forests of northern Eurasia. Given that northern Eurasia is the largest landmass outside of the tropics, significant deforestation in this region could have major impact on CO₂ levels in the atmosphere.
- Barbara Bond has become the lead scientist for the Long Term Ecological Research Program at the H.J. Andrews Experimental Forest. She replaces Mark Harmon who led this program for many years.
- Dave Shaw was hired as Extension Forest Health Specialist and Director of the Swiss Needle Cast Cooperative.
- Glenn Howe was the senior author of a major synthesis of Douglas-fir breeding efforts, published in “Plant Breeding Reviews.”
- Barbara Bond is the lead principal investigator on an \$11.1 million grant from NSF that supporting engineers at OSU to develop battery-free sensors for atmosphere-biosphere studies in mountainous forest terrain.

Tom Adams
Department Head

Wood Science and Engineering

Name	Education	Rank
Terry Brown	Ph.D., Colorado State University, 1975	Professor Emeritus; Extension Specialist
Charles Brunner	Ph.D., Virginia Tech, 1984	Associate Professor
Jim Funck	Ph.D., Iowa State University, 1979	Associate Professor
Rakesh Gupta	Ph.D., Cornell University, 1990	Associate Professor
Eric Hansen	Ph.D., Virginia Tech, 1994	Professor; Extension Specialist
Fred Kamke	Ph.D., Oregon State University, 1983	Professor; Jeld-Wen Chair of Wood-based Composites Science
Joe Karchesy	Ph.D., Oregon State University, 1974	Associate Professor
Barbara Lachenbruch	Ph.D., Stanford University, 1990	Professor
Scott Leavengood	M.S., Oregon State University, 1994	Associate Professor; Director, Oregon Wood Innovation Center
Kaichang Li	Ph.D., Virginia Tech, 1996	Associate Professor
Thomas McLain	Ph.D., Colorado State University, 1975	Professor; Department Head
Mike Milota	Ph.D., Oregon State University, 1984	Professor
Jeff Morrell	Ph.D., SUNY College of Environmental Science & Forestry, 1986	University Distinguished Professor
Lech Muszynski	Ph.D., Agricultural University of Poznan, Poland, 1997	Assistant Professor
John Nairn	Ph.D, University of California, Berkeley, 1981	Professor and Richardson Chair in Wood Science and Forest Products
John Punches	M.S., Virginia Tech, 1993	Associate Professor; Extension Agent, Douglas & Lane Counties
Jim Reeb	Ph.D., Texas A & M University, 1991	Associate Professor; Extension Specialist
John Simonsen	Ph.D., University of Colorado, 1975	Associate Professor
Jim Wilson	Ph.D., SUNY College of Environmental Science & Forestry, 1971	Professor Emeritus

The **Department of Wood Science & Engineering** (<http://woodscience.oregonstate.edu>) is a multidisciplinary program with teaching, research and outreach activities that advance intelligent and sustainable use of renewable wood-based materials. Through an emphasis on science, engineering, business, and technology, we seek to help the Oregon forest sector be competitive in the global marketplace. WS&E offers undergraduate and graduate degrees, conducts research, and has an active outreach education program.

Goals:

- *Expand and strengthen undergraduate and graduate programs* to better meet the needs of students and Oregon employers
- *Improve the competitiveness of Oregon's forest products industry* through innovation in new products, new manufacturing processes, and new business strategies
- *Focus our research programs* on a) investigating wood-based composite materials science and applications, b) promoting manufacture and safe, long-term use of wood products, especially for building applications, c) expanding understanding of the chemistry, biology, and physical properties of wood, and d) identifying innovative business strategies and management practices
- *Be proactive in helping technical and general publics* understand the essential role that wood plays in the 21st century, and the appropriate use of wood-based products
- *Expand our outreach and technical assistance program* through a new initiative to create an Oregon Wood Innovation Center

Accomplishments:

- Two privately endowed chairs have recently been filled: Professor Fred Kamke is the first JELD-WEN Chair of Wood-based Composites Science, and Professor John Nairn is the new Richardson Chair in Wood Science and Forest Products. Drs. Nairn and Kamke form the nucleus of a major expansion of research and teaching related to wood-based composite materials. OSU is now one of the world centers for biobased composite materials.
- Through a partnership with the OSU Extension Service, the department launched the Oregon Wood Innovation Center (OWIC). The Center is designed to connect the Oregon wood industry more effectively with resources at OSU that can foster innovation and enhance Oregon's competitiveness in a global marketplace. Scott Leavengood is the new director of OWIC, and a program assistant was recently hired. The work of OWIC is featured elsewhere in this report.
- Kaichang Li was granted a patent for a new innovation with wood adhesives. His earlier discovery of a soy-flour replacement for formaldehyde-based adhesives use in plywood has been successfully commercialized by an Oregon manufacturer. New research initiatives are developing innovative composite materials from combinations of wood fibers and rubber or nylon (from virgin or recycled materials). Fred Kamke has developed a process of densifying low-value hardwoods for use in higher value products and composite materials.
- In other research initiatives, faculty are exploring the opportunities for cellulose nanocrystals in coatings, dental adhesives, and barrier films to retard moisture and chemical warfare agents.

- WS&E faculty, led by Jim Wilson, published a series of reports on life-cycle analysis of wood products in a special issue of *Wood and Fiber Science*. This seminal work established a strong science base for evaluating the environmental consequences of using wood and other construction products in housing.
- Kaichang Li and Joe Karchesy organized and held a very successful symposium on “Natural Resources Chemistry” at the June 2005, Northwest Regional meeting of the American Chemical Society in Fairbanks, AK.
- The Wood Science and Technology undergraduate curriculum was significantly revised to bring the number of credits required to graduate in line with engineering and other programs on campus. Enrollment in the BS degree program reached the highest level in over 15 years.
- Mike Milota and his research team are conducting field trials of a new technology to scrub hazardous air pollutants and volatile organic compounds from kiln and dryer exhaust vents.
- Eric Hansen initiated a Western Regional Forest Products Marketing Graduate Student Forum that attracted graduate students and faculty from four universities. This will become an annual event that will rotate among the universities.
- Campus-based WSE faculty conducted eight workshops on a variety of topics to over 250 wood products industry personnel in AY06. In addition, many educational events were conducted through the Forestry Extension program. One notable program, the Forest Products Management Development Workshop, attracted 25 industry mid-level executives, regional VP’s, and managers.
- WS&E hosted 11 international visitors and scholars who came from all around the globe to stay for 3 weeks to 18 months.
- Department faculty serve on the editorial boards of five international journals and published over 60 refereed journal articles in 2005.

Tom McLain
Department Head

Teaching

Undergraduate Education

Student Services (Debbie Bird McCubbin, Director)

The Student Services Office focuses on recruiting and retaining undergraduate students into the College of Forestry who, upon graduation, will be capable of filling the global demand for jobs in forestry and natural resources. This involves all aspects of student access, excellence, and success. Student Services responds to the unique needs of the College's students, promotes student career recruitment and professional development opportunities, and encourages a broad and diverse educational experience through the administration of the College's recruitment, orientation, and advising programs; Scholarship and Fellowship programs; International Exchange Programs; College Student Clubs; the Ambassador program; graduation audits; and community college articulation agreements. Overall, Student Services strives to respond to the needs of students and faculty to meet the college and university goals for student success, including recruitment, retention, graduation rates, and student employment.

Degree Programs

Oregon State University is one of only three universities in the United States to offer an undergraduate degree in forest engineering. The Forest Engineering Department offers three undergraduate degree programs: Forest Engineering, Forest Engineering/Civil Engineering, and Forest Operations Management. All three degrees lead to excellent employment opportunities. In addition to high-quality classrooms and laboratories on campus, an 11,500-acre college-owned forest just 20 minutes from campus provides excellent opportunities for field exercises and recreation.

Forest Engineering and Forest Engineering/Civil Engineering

Both the forest engineering and forest engineering/civil engineering dual degree programs are fully accredited in engineering (ABET EAC) and forestry (SAF). The goal for both of these degree programs is to offer an engineering education within a strong forestry context. These curricula prepare students to design and implement a wide range of engineering tasks associated with the management of forest lands, including roads, bridges, and other forest transportation structures, as well as developing innovative timber harvesting plans that meet economic and environmental resource management goals. Dual degree students spend a fifth year taking additional civil engineering courses and receive both a Forest Engineering and a Civil Engineering diploma that broadens their skills and increases their employment flexibility. Both degree programs emphasize analytical skills required for evaluating engineering systems, integrating the mechanical and economic requirements of forest operations with the biological processes of the forest, and stewardship of soil and water resources. Graduation from either degree option with appropriate elective courses provides access to careers as licensed professional engineers and professional land surveyors.

Forest Operations Management

The new Forest Operations Management degree program blends elements of forestry and engineering with a business minor to prepare graduates to plan and administer forest operations projects. Graduates will be prepared to be the "project managers" of forestry-related activities. The degree program emphasizes fundamental principles from forest and managerial sciences that enable students to develop the skill and knowledge required for managing road, harvest, or silvicultural operations to achieve a variety of forest management objectives. We will seek SAF accreditation for this program. Upon graduation from the Forest Operations Management

program, in addition to jobs in the forestry and business sectors of the forest industry, graduates will have the necessary course background for admission to many MBA programs. This degree program is designed to meet the needs of an evolving forest industry and work force.

Forest Management

The Bachelor of Science in Forest Management is a broad-based, SAF-accredited education with the goal of preparing students to be successful forest managers. Graduates must understand biological and physical processes occurring in forests; the social and economic forces that influence policies and actions affecting forests; natural resource systems; and management of forest resources for multiple use and multiple values. The Forest Management core curriculum includes basic courses in biological, physical, and social sciences, as well as professional courses designed to prepare students to manage forest resources. Strength in a related field can be obtained by selecting a listed option or minor relevant to contemporary forest management. Summer work experience in some aspect of forestry makes the graduates of this program highly competitive in the job market.

Recreation Resource Management

The B.S. in Recreation Resource Management prepares qualified students to meet the challenges of providing quality recreation opportunities while maintaining the ecological integrity of natural resources as managers, planners, and interpreters. The SAF-accredited curriculum produces students proficient in allocating, planning, and managing recreation resources on both public and private lands by studying recreation behavior, recreation planning and management, interpretation and communication, wilderness management, resource economics, resource ecology and conservation, and resource analysis and policy. Students increase their expertise by pursuing a specialty area from a wide range of disciplines, including business administration, cultural resource management, environmental interpretation, fisheries and wildlife, law enforcement, public administration, and resource planning. Students get field experience through summer jobs. Graduates have worked for all of the federal land management agencies, for state, county, and local parks, and with recreation providers in the private sector.

Natural Resources

The Natural Resources degree program provides a more broad-based approach to the study of natural resources than most traditional degree programs. The curriculum is designed to produce graduates who can understand a wide range of natural resource issues, work with experts in a variety of resource fields, and deal with social and political components of resource management. The Bachelor of Science in Natural Resources is offered jointly by the College of Forestry and three other colleges on campus: Agricultural Sciences, Liberal Arts, and Science. It is also available through ECampus as a distance education degree and at the Cascade Campus in Bend. It provides relevant exposure to topics surrounding land, water, forests, fauna, and the international aspects of these natural elements with human cultures. Natural Resources graduates are well prepared for careers in fields such as land use, water resources, environmental policy, and related endeavors. Students acquire knowledge and background in physical and biological systems, mathematics and statistics, natural resource policy, economics, and decision-making. This degree also prepares them to be well-informed citizens who are cognizant of the broad issues surrounding natural resources. Options include Agroforestry, Arid Land Ecology, Fish and Wildlife Conservation, Forest Ecosystems, Geosciences and Natural Resources, Human Dimensions in Natural Resources, Law Enforcement in Natural Resources, Native Americans and Natural Resources, Natural Resource Education, Natural Resource Policy, Soil Resources, and Watershed Management, among others.

Wood Science & Technology

The Bachelor of Science in Wood Science & Technology is accredited by the Society of Wood Science & Technology and offers students several options to tailor their program to specific interests. All students acquire a solid foundation in the anatomical, physical, chemical, and mechanical properties of wood and a good understanding of mechanical and chemical processing technologies. Marketing, communication, and problem-solving skills are a key outcome of the curriculum. Graduates continue to be in high demand, and all who seek employment find jobs. Options within the BS degree program are Bio-based Composites Manufacturing, Forest Products Marketing, Wood Engineering and Science, Wood Industry Management, and Wood Industry Production Planning and Quality Control. Students in the management and marketing options simultaneously earn a Minor in Business Administration. Students in the Wood Engineering and Science option may earn a science or technology minor.

International Studies Degree

This bachelor's degree is obtainable in conjunction with another undergraduate degree offered by the University. For example, a student could earn both a Bachelor of Science in Forest Management and a concurrent Bachelor of Arts in International Studies.

Outdoor Recreation Leadership and Tourism

The Bachelor of Science in Outdoor Recreation Leadership and Tourism (ORLT) is an interdisciplinary degree program offered by the College of Forestry and the College of Health and Human Sciences at OSU-Cascades. Three options are currently available. Commercial Recreation Management and Tourism focuses on developing and managing businesses involved in outdoor recreation or tourism. International Ecotourism focuses on the special aspects of nature-based tourism in foreign countries, as well as managing domestic recreation resources for international visitors. Outdoor and Experiential Education focuses on applying educational theory, techniques, and practice to education in and about the outdoors. A key component of the degree program is an 8-credit internship with a relevant business, nonprofit organization, or government agency.

Student Demographics (Fall 2005)

MAJOR:	FE 56	FE/CE 22	FM 103	FRR 82	NR 122	ORLT 19	WST 46	Nondegree 17
SEX:	M 333	F 134						
STATUS:	Freshman 68	Transfer 61	Returning 338					
RESIDENCE:	Oregon 396	Out of state 66	International 5					

Scholarships

The College of Forestry has a generous scholarship program, thanks to many alumni and other donors. The following scholarships were awarded to undergraduate students during the 2005–2006 academic year:

- Robert Aufderheide Memorial Scholarship: \$1,500
- Autzen Foundation Scholarship: \$5,000
- George W. Brown Scholarship: \$3,000
- Michael & Barbara K. Brown Scholarship: \$1,000 (3)
- Rex Brown Memorial Scholarship: \$1,500
- Gordon G. Carlson Scholarship: \$1,000–\$5,000 (3)
- Columbia Forest Products Wood-based Composites Scholarship: \$3,000 (3)
- George M. Cornwall Memorial Scholarship: \$1,200
- Joe Crahan Memorial Scholarship: \$6,000
- John W. DeMuth, Jr., Forestry Scholarship: \$800–\$3,000 (3)

Gordon A. & Priscilla E. Duncan Scholarship: \$750–\$3,000 (6)
 Forest Engineering Scholarship: \$2,000
 Forestry Alumni Scholarship: \$2,000–\$4000 (3)
 Forestry Legacy Scholarship: \$300–\$2,500 (11)
 Harold "Bud" Freres Scholarship: \$1,500
 Jay B. Hann, Jr. Scholarship: \$1,000
 Floyd Hart Memorial Scholarship: \$1,500
 Dorothy D. Hoener Memorial Scholarship: \$5,000 (16)
 Lance & Patricia Hollister Scholarship: \$800
 Portland Hoo Hoo Club #47 Scholarship: \$1,000
 Willamette Valley Hoo Hoo Club \$2,500
 JELD-WEN Foundation Scholarship: \$2,000
 Francis G. Jepson Memorial Scholarship: \$1,500
 Lois & Dick Kearns Scholarship \$1,250 (2)
 Robert F. and Ruth Keniston Memorial Scholarship: \$500
 Sam Konnie Family Scholarship: \$1,500
 Konnie Family Recruitment Scholarship: 500–2,500 (9)
 Billie J. Larson Scholarship: \$3,000
 G. Robert Leavengood Scholarship: \$2,000–\$5,000 (2)
 Charles Lord Memorial Scholarship: \$6,000
 Francis R. McCabe Memorial Scholarship: \$2,000
 Catherine Cox Merriam Scholarship: \$3,500
 B. D. Mitchell & H. R. Blackteter Memorial Scholarship: \$1,000 - \$3,000 (2)
 Oregon Small Woodlands Association Scholarship: \$1,000
 Oregon Society of American Foresters Scholarship: \$5,000 (2)
 Kurt Jon Peterson Memorial Scholarship: \$2,000
 Albert Powers Memorial Scholarship: \$4,500
 Randall, W. R. "Casey" Scholarship: \$500
 Richardson Wood Science & Technology Scholarship: \$1,500–3,000 (23)
 Clarence Richen Memorial Scholarship: \$1,200
 Janet K. Ayer Sachet Scholarship: \$1,000
 Alkire Scantlebury Endowed Scholarship: \$1,500
 Schutz Family Education Fund: \$2,000 (2)
 Harold Scritsmier Scholarship: \$1,500
 Vance P. & Dorothy D. Shugart Forestry Scholarship: \$2,000 (4)
 Durward "Ben" Slater Memorial Scholarship: \$1,500
 C. Wylie Smith III Memorial Scholarship: \$4,000 (2)
 John R. Snellstrom Memorial Scholarship: 1,500 (2)
 Starker Memorial Scholarship: \$800
 T.J. & Margaret O. Starker Memorial Scholarship: \$1,900
 Joseph Strehle Scholarship Award: \$500
 Eula M. Ten Eyck Memorial Scholarship: \$1,000 (4)
 Glenn & Josephine Thompson Scholarship: \$2,000–\$4,000 (4)
 Wakefield Family Scholarship: \$1,500
 Willamette Industries Legacy Scholarship: \$6,000 (3)
 Woman in Philanthropy: \$2,000
 Wood-Based Composites Center: \$3,000 (3)
 Wood Science and Engineering Book Scholarships: \$100 (9)

Degrees Awarded (2005–2006)

Forest Engineering

Bachelor of Science

Matthew Brady
Jeffrey Geist
Jacob Steensen
Matthew Wolford

Forest Engineering/Civil Engineering

Bachelor of Science

Patrick Gage
Jeff Keck
Albert Wright†

†with Geographic Information Science Certificate - Surveying (Geomatics)

Forest Management

Bachelor of Science

Chris Arnold	
Luke Bergey	
Jason Bernards	Cum laude
Joseph Berry	
Jason Dorn	Cum laude
Timothy Drake	
Christina Edwards	
Amanda Lindsay	Summa cum laude
James Mahaffy	
Daniel Norlander	Cum laude
Corey Parks	
Jeremy Sapp	Summa cum laude
Brittannia Shackelford	
Jared Simmons	

Forest Recreation Resources

Bachelor of Science

Daniel Benson	
Christopher Bishop	Cum laude
Milo Booth	
Thomas Elzy	
Erika Hoppe	Magna cum laude
Amanda Hudgik	Cum laude
Laura Magedanz	
Christopher Murray	
Richard Osborne	
Emily Pearson	
Julius Sandmann	
Kelly Sheaffer	
Kyle Tegner	
Ryan Warren	
Nicholas Wood	

Natural Resources*Honors Bachelor of Science*

Michelle Delepine Magna cum laude

Bachelor of Science

Gabriel Barbee

Lisa Brittain

Craig Brown

Nicolette Burnett Cum laude

Abigail Cossin Magna cum laude

James Dutson

Rachel Eder

Ian Farquhar

Marissa Fleming

Kathleen Franklin

Jaime Greydanus

Sarah Hippenstiel

Amy Hoffman Magna cum laude

Samuel Jarrett

Crystal Johnson

Michael Johnson

Tamara Kerr Cum laude

Jeffrey Mc Craw

Jacquelyn Nutt

Lisa Padilla Cum laude

John Pearce

Thomas Roberts

Miranda Schmitz

Anthony Sharp

Rachel Snook Cum laude

Lisa Soo

Stacy Strickland Magna cum laude

Katherine Sweeney

Genine Wright

Ian-Huei Yau Summa cum laude

Outdoor Recreation Leadership & Tourism*Bachelor of Science*

Carlos Cummings

Scott Hackett Magna cum laude

Lindsay Smith

Recreation Resource Management*Bachelor of Science*

Stevon Culver

Laura Fabrey Cum laude

Sara Hurlburt

Wood Science and Technology*Bachelor of Science*

Christopher Coleman
Craig Di Nitto
John Henricks
Richard Mosier
Matthew Peterson Cum laude
Cheney Vidrine
Nicholas Watkins

Graduate Education

Degree Programs

Master of Science, Master of Forestry, Doctor of Philosophy

Forest Engineering

The Department of Forest Engineering offers graduate programs leading to Master of Forestry (M.F.), Master of Science (M.S.), and Doctor of Philosophy (Ph.D.) degrees. The MF degree is either a first professional degree or an opportunity to update professional skills for students who anticipate managerial, administrative, or staff positions within private or public forestry organizations. The MF is often a final graduate degree. MS students develop a stronger research specialization. The PhD emphasizes research specialization while maintaining an awareness of relevant engineering and resource use problems.

Since Oregon passed the nation's first Forest Practices Act in 1971, the Department's forest hydrologists, forest scientists, and engineers have worked together to solve complex problems in forested watersheds and to improve the scientific basis for protecting water and soil resources during forestry and timber harvesting activities. Graduate students commonly customize programs of study that integrate across several areas. Students with broad interests in water resources may consider the degree programs available through the OSU Water Resources Graduate Program. Forest Engineering faculty may serve as major professors for these students.

Areas of concentration: Forest Engineering (M.F., M.S.), Forest Hydrology (M.F., M.S., Ph.D.), Forest Operations (M.F.), Forest Soil Science (M.F., M.S., Ph.D.), Harvesting (Ph.D.), Harvesting/Silviculture (Ph.D. jointly with Forest Science)

Forest Resources

Degree programs in the Department of Forest Resources lead to the Master of Forestry (M.F.), Master of Science (M.S.), and Doctor of Philosophy (Ph.D.) degrees. The doctoral program in Forest Resources is intended for persons seeking careers in teaching and research. The program emphasizes a strong research specialization while maintaining an understanding and appreciation of broader management and resource use issues.

Areas of concentration: Economics, Forest Biometrics/Modeling, Forest Economics, Forest Management, Forest Management Science/Operations Research, Forest Measurements, Forest Social Science, Forestry/Wildlife, Natural Resource Education and Extension, Natural Resource Policy and Law, Remote Sensing/GIS/Landscape Ecology, Silviculture

Forest Science

The Department of Forest Science offers graduate programs leading to the Master of Forestry (M.F.), Master of Science (M.S.), and Doctor of Philosophy (Ph.D.) degrees. Graduate study is structured for students interested in research and teaching careers or in specialized areas of forest practice. The emphasis is on defining and solving problems related to forest ecosystems

and management. Our students come from varied backgrounds. Some have undergraduate degrees in forestry, while others are trained in related biological fields. All students are required to achieve competency in specific areas of forest science and related subjects through undergraduate or graduate courses, independent study, or other means determined by each student's graduate committee. All graduates must be versed in broad aspects of forest science as well as in their own area of specialization.

Areas of concentration: Agroforestry/Sustainable Forestry, Forest Biology, Forest Ecology, Forest Genetics, Forest Tree Physiology, Integrated Forest Protection, Silviculture, Silviculture/Harvesting Systems

Wood Science & Engineering

The graduate programs in Wood Science prepare a new generation of scientists, engineers, business persons, and practitioners to meet the global challenges of sustaining societies, natural resources, and human well-being. Our programs are diverse and multidisciplinary, supported by a broad spectrum of faculty skills and key partnerships with science, engineering, and business faculty on campus. Many graduate students pursue dual-major degrees in those programs. Career opportunities for graduates have never been better, especially in an industry that is transforming itself within an expanding global economy. A coming generational transition in industry, government service, and academic personnel also creates new opportunities for well-educated professionals to inspire and guide future change.

Areas of concentration: Biodeterioration and Wood Preservation, Forest Products Marketing, Materials Science, Process Modeling and Analysis, Scanning Technology/Computer-Aided Processing, Timber Engineering and Structural Design, Transport Processes in Wood, Wood Anatomy and Quality, Wood and Adhesives Chemistry, Wood Drying and Moisture Relations

Student Demographics (Fall 2005)

DEPARTMENT:	FE 30	FR 38	FS 59	WS&E 30
SEX:	M 94	F 63		
STATUS:	New 35	Returning 122		
RESIDENCE:	Oregon 57	Out of State 65	International 35	

Fellowships

The College of Forestry has a generous fellowship program, thanks to many alumni and other donors. The following fellowships were awarded to graduate students during the 2005-2006 academic year:

Lou Alexander Fellowship: \$2,500–\$5,000 (3)
Catherine G. Bacon Fellowship: \$2,000
John Lind Ching Memorial Fellowship: \$3,000
J.R.Dilworth Memorial Fund: \$1,000–\$2,175 (4)
James H. Dukes Jr. Fellowship: \$3,000
Henry Fang Scholarship: \$1,100
Forestry Graduate Fellowship: \$750–\$4,000 (8)
Forest Science Department Award: \$500 (2)
Harry & Mildred Fowells Fellowship: \$3,000 (3)
Walt A. Gruetter Fellowship: \$900
Gibbet Hill Graduate Fellowship: \$5,504–\$22,284 (6)

Hayes Fellowship: \$3,500
Dorothy D. Hoener Memorial Fellowship: \$5,000 (5)
Wes & Nancy Lematta Graduate Fellowship: \$21,492
Mary J. L. McDonald Memorial Fellowships: \$500–\$5,000 (3)
Arnold & Vera Meier Memorial Education Fellowship: \$3,000
Minority Group Graduate Student Pipeline Fellowship: \$20,000
Alfred W. Moltke Memorial Fellowship: \$1,500–\$5,000 (6)
Newton Forest Research Fellowship: \$20,902
OFRI WoodFest Fellowship: \$1,000
Oregon Sports Lottery Scholarship: \$3,000–\$4,000 (2)
Oregon Supplemental Laurels: \$14,376 (2)
William R. Randall Memorial Fellowship: \$1,000–\$1,500 (4)
Richardson Graduate Fellowship: \$5,056–\$24,439 (10)
Jack & Lila Saubert Scholarship: \$2,000 (2)
Schutz Family Education Fund Fellowship: \$2,000–3,000 (3)
Schutz Family Fellowship: \$1,000–\$4,000
L.L. Stewart Graduate Fellowship: \$5,970–22,284 (2)
Robert Tarrant Fellowship: \$3,000 (2)
Doris and Dick Waring Travel Award: \$1,000
Wessala Fellowship: \$20,316
Yerex Graduate Fellowship: \$10,000

Degrees Awarded (2005–2006)

Forest Engineering

Doctor of Philosophy

Mauricio Acuna

Master of Forestry

Karina Bohle

Sabrina Litton

Master of Science

William Floyd

Nathan Meehan

Timothy Royer

Forest Resources

Doctor of Philosophy

Eric Toman

Master of Forestry

Bradley Eckert

Christopher Rasor

Master of Science

Isaac Daniel

Benjamin Dotson

Chantel Jimenez

Erin Kelly

Daniel Lipe
Amie Shovlain
Sara Thompson

Forest Science

Doctor of Philosophy

Brett Butler
Kenneth Carloni
Stacie Kageyama
Rebecca Kennedy
Rozi Mohamed
Andrew Yost

Master of Forestry

Michael Bolding
Jacob Groves

Master of Science

Sonya Dunham
Robert Fahey
Thomas Giesen
Stephanie Hart
Theresa Johnson
Kevin Knutson
Oralia Kolaczowski
Heidi Renninger
Carlos Sierra
Travis Woolley

Wood Science and Engineering

Doctor of Philosophy

Yu Geng
Yuan Liu

Master of Science

Erin Anderson
Craig Basta
Lori Elkins
Olivia Pinon
Heidi Renninger
Daniel Rowell
Maxence Salichon
Fujun Wang

Research

The Oregon Forest Research Laboratory

Research at the College of Forestry is conducted through its research arm, the Oregon Forest Research Laboratory (FRL). The research mission of the College of Forestry is to conduct well-coordinated, problem-solving research that provides knowledge for the integrated management of forest resources for multiple values and products that meet society's needs, with special attention to social and economic benefits. Research is conducted by the college's four departments in five general areas: forest regeneration; forest ecology, culture, and productivity; protecting forests and watersheds; evaluating forest uses and practices; and wood processing and products performance. Important research issues being addressed by forestry and forest products scientists include ensuring the sustainability of forest resources, understanding the complex structure and function of forest systems, and ensuring that forest operations and wood products manufacturing are environmentally and socially acceptable and economically feasible.

Oregon law provides that the State Board of Higher Education shall "institute and carry on research and experimentation to develop the maximum yield from the forestlands of Oregon, to obtain the fullest utilization of the forest resource, and to study air and water pollution as it relates to the forest products industries. The purpose of the research is "to aid in the economic development of the State of Oregon" (ORS 526.215, 1961). This research is to be carried out under the auspices of a Forest Research Laboratory at Oregon State University, and the Board of Higher Education is directed to "cooperate with individuals, corporations, associations and public agencies wherever and whenever advisable to further the purposes of ORS 526.215, and may enter into any necessary agreements therefore" (ORS 526.225).

Today all research by College of Forestry faculty is under the umbrella of the Oregon Forest Research Laboratory. College research brought in about \$11.7 million in grant and contract funding in FY 2004, engendering many cooperative and interdisciplinary research projects. Total research funding from all sources was \$19.1 million.

The FRL Advisory Committee (FY 2006)

Bill Arsenault

Small Woodland Owner

Elaine Brong

State Director, Bureau of Land Management

Marvin Brown

State Forester, Oregon State Department of Forestry

Bov Eav

Director, Pacific Northwest Research Station, USDA Forest Service

Linda Goodman

Regional Forester, USDA Forest Service, Region 6

Gary Hartshorn

President, World Forestry Center

Cal Joyner

Director of Natural Resources, USDA Forest Service

Russ McKinley (Chair)

Manager, Western Oregon Timberlands, Boise Cascade Corporation

Joel Nelson

Senior Resource Manager, Oregon Region, Plum Creek Timber

Jennifer Phillipi

Rough and Ready Lumber

Scott Schroeder

Mega Tech of Oregon

Barte Starker

Executive Vice President

Starker Forests, Inc.

Dallas Stovall

President & CEO, Bright Wood

Ron Stuntzner

Stuntzner Engineering & Forestry, LLC

Bettina von Hagen

Vice President Forestry, Ecotrust

Rich Wininger

Vice President of Western Timberlands, Weyerhaeuser Company

RESEARCH AGREEMENTS, CONTRACTS, AND GRANTS JULY 1, 2005–JUNE 30, 2006

Forest Engineering

Kellogg, Loren D. Study of Opportunities for Biomass Energy and Biofuels from Oregon Forests. Mason, Bruce, & Girard, Inc. \$17,000. Period: 12/16/05–9/1/06.

McDonnell, Jeffrey J. Long-Term Ecological Research at the H.J. Andrews Experimental Forest (LTER5). National Science Foundation. \$7,076. Period: 11/28/05–10/31/06. Amendment to an existing grant.

McDonnell, Jeffrey J. Processes of Water Cycling and Streamflow Generation in Semi-Arid Watersheds in Eastern Washington: Understanding Landuse Effect on Water Quantity and Quality. USDA Forest Service. \$55,000. Period: 8/23/05–4/30/08. Amendment to an existing cooperative agreement.

McDonnell, Jeffrey J. USA PUB Workshop: From PUB Implementation to Community Science Questions. National Science Foundation. \$79,671. Period: 11/15/05–4/30/07.

Pyles, Marvin R. California Coastal Watershed Responses to Timber Harvesting. California State Polytechnic University. \$11,256. Period: 9/1/05–6/30/06.

Schoenholtz, Stephen H. Effectiveness of Best Management Practices for Timber Harvesting in the Alsea Watersheds: Assessment of Pre-Treatment Streamwater Quality. National Council for Air and Stream Improvement, Inc. \$35,000. Period: 7/1/05–6/30/07.

Schoenholtz, Stephen H. Effectiveness of Best Management Practices for Timber Harvesting in the Alsea Watersheds: Assessment of Pre-Treatment Streamwater Quality. National Council for Air and Stream Improvement, Inc. \$35,000. Period: 6/13/06–6/30/07.

Schoenholtz, Stephen H. Riparian Function and Stream Temperature Study. Oregon Department of Forestry. \$25,756. Period: 11/15/05–6/30/06. Amendment to an existing cooperative agreement.

Schoenholtz, Stephen H. Soil Carbon and Nitrogen Responses to Varying Degrees of Woody Debris Removal and Competing Vegetation Control in Douglas-Fir Plantations. USDA Forest Service. \$45,000. Period: 7/18/05–6/30/08.

Schoenholtz, Stephen H. Soil Carbon and Nitrogen Responses to Varying Degrees of Woody Debris Removal and Competing Vegetation Control in Douglas-Fir Plantations. USDA Forest Service. \$50,000. Period: 5/24/06–6/30/08. Amendment to an existing cooperative agreement.

Sessions, John. Harvest Schedule Modeling for the Elliott Revision Process–Phase VII. Oregon Department of Forestry. \$30,000. Period: 1/1/06–12/31/06.

Sessions, John. Harvest Scheduling, Fire Hazard Assessment and Economic Analysis Modeling for the BLM Western Oregon Plan Revision Process. Douglas County. \$105,000. Period: 3/1/06–12/31/06.

Sessions, John. Jackson County Fire Risk Outreach Project. Jackson County. \$10,000. Period: 10/1/05–9/30/06.

Skaugset, Arne E., III. and Christopher Surfleet. Catchment Scale Assessment of Forest Road Hydrology and Sediment Sampling. National Council for Air and Stream Improvement, Inc. \$50,000. Period: 1/20/06 -3/31/07.

Skaugset, Arne E., III. The Hinkle Creek Paired Watershed Study and Demonstration Area. USDA Forest Service. \$468,400. Period: 8/23/06–6/30/06.

Skaugset, Arne E., III. Watershed Research Cooperative. Member Cooperators. \$306,000. Period: 7/1/05–6/30/06.

Tesch, Steven D. Center for Wood Utilization Research. USDA Cooperative State Research, Education, and Extension Service. \$250,933. Period: 8/15/05–8/14/07.

Forest Resources

Adams, Darius M. Timber Assessment Concluding Report. USDA Forest Service. \$88,271. Period: 9/20/05–6/30/08. Amendment to an existing cooperative agreement.

Adams, Darius M., and Gregory S. Latta. Linking the Oregon Timber Supply Modeling System and VDDT Models of Oregon's Forest Resources. Oregon Department of Forestry. \$20,000. Period: 3/15/06–6/30/07.

Albers, Heidi J. Private Land Conservation Decisions: The Role of Information and Public Lands. University of Illinois. \$15,946. Period: 4/1/05–3/31/06. Prime Funder: National Science Foundation.

Albers, Heidi J. Spatial Management of Invasive Alien Species. Resources for the Future. \$32,185. Period: 9/22/04–9/30/06. Prime Funder: USDA Economic Research Service. Award received 3/8/06.

Bailey, John D. Fuels and Fire Management Effects on Vegetation Dynamics. USDA Forest Service. \$32,980. Period: 3/1/06–12/31/06.

Bailey, John D. Southwestern Silviculture, Fuels and Fire Management. Northern Arizona University. \$30,000. Period: 1/1/06–6/30/07. Prime Funder: USDA Forest Service.

Bailey, John D. Understory Vegetation and Insect Diversity. Northern Arizona University. \$16,000. Period: 1/1/06–12/31/07. Prime Funder: USDA Forest Service.

Doescher, Paul S. Integrated Restoration Strategies Towards Weed Control on Western Rangelands. University of Nevada, Reno. Prime Funder: USDA Cooperative State Research, Education, and Extension Service. \$4,000. Period: 8/29/05–9/14/06. Amendment to an existing agreement.

Doescher, Paul S. A Regional Experiment to Evaluate Effects of Fire and Fire Surrogate Treatments in the Sagebrush Biome. USDI U.S. Geological Survey. \$32,559. Period: 6/8/05–5/22/06.

Doescher, Paul S. A Regional Experiment to Evaluate Effects of Fire and Fire Surrogate Treatments in the Sagebrush Biome. USDI U.S. Geological Survey. \$74,535. Period: 12/5/05–5/22/07. Amendment to an existing cooperative agreement.

Hann, David W. Re-Analysis of the Diameter Growth Rate and Height Growth Rate Equations in SMC-ORGANON. University of Washington. \$9,905. Period: 9/21/05–12/31/06. Amendment to an existing agreement.

Johnson, K. Norman. Assess the Scientific Basis for Standards/Practices at the Stand, Management Unit, Landscape and Regional Levels: Oregon Coast Range. USDA Forest Service. \$125,828. Period: 9/1/05 -3/1/07.

Johnson, K. Norman, and Sally Duncan. Future Range of Variability. National Commission on Science for Sustainable Forestry. \$160,000. Period: 7/1/05–9/30/06.

Lindberg, Kreg A. Lower Deschutes Limited Entry Monitoring Project. Oregon Department of Parks and Recreation. \$20,155. Period: 7/1/05–12/31/06.

Lindberg, Kreg A. Visitor Use Monitoring and Customer Service in the Olympic and Mount Baker-Snoqualmie National Forests. West Virginia University. Prime Funder: USDA Forest Service. \$4,191. Period: 7/28/05–5/31/06. Amendment to an existing agreement.

Lindberg, Kreg A., and Randall Rosenberger. Outdoor Recreation in Oregon: The Changing Face of the Future. Oregon Department of Parks and Recreation–Phase I. \$89,986. Period: 1/27/06–12/31/07.

Lindberg, Kreg A. Outdoor Recreation in Oregon: The Changing Face of the Future. Oregon Department of Parks and Recreation–Phase I. \$10,008. Period: 6/20/06–12/31/07. Amendment to an existing agreement.

Needham, Mark D. Effects of Concessions and Commercial Operations on Forest Recreation and Tourism Use. USDA Forest Service. \$20,000. Period: 5/9/06–2/29/08.

Ripple, William J. Predicting Abundance and Demographic Performance of Northern Spotted Owls from Vegetative Characteristics. USDA Forest Service. \$8,803. Period: 6/26/06–9/30/07. Grant Administrator: Robert G. Anthony. Amendment to an existing cooperative agreement.

Ripple, William J., and Robert L. Beschta. Factors Affecting Cottonwood Recruitment in Zion National Park. USDI National Park Service. \$11,969. Period: 4/25/06–6/1/07. Amendment to an existing cooperative agreement.

Rosenberger, Randall S. Evaluating Public Recreation Benefits of National Forests and Wildlife-Induced Changes in Recreation Participation and Values. USDA Forest Service. \$39,000. Period: 5/24/06–4/30/08. Amendment to an existing joint venture agreement.

Rosenberger, Randall S. Meta-Regression Analysis of Recreation Valuation and Demand Elasticities to Identify and Correct Publication Selection Bias to Improve Benefit Transfer. U.S. Environmental Protection Agency. \$409,947. Period: 10/1/05–9/30/08.

Rosenberger, Randall S. Outdoor Recreation in Oregon: The Changing Face of the Future–Phase II. Oregon Department of Parks and Recreation. \$23,710. Period: 3/6/06–6/30/07. Grant Administrator: Kreg A. Lindberg. Amendment to an existing agreement.

Rosenberger, Randall S. Prince William Sound Human Use Study. USDA Forest Service. \$23,798. Period: 8/29/05–12/31/07.

Rosenberger, Randall S. Prince William Sound Human Use Study. USDA Forest Service. \$21,937. Period: 5/24/06–12/31/07. Amendment to an existing joint venture agreement.

Shindler, Bruce A. A Regional Experiment to Evaluate Effects of Fire and Fire Surrogate Treatments in the Sagebrush Biome. USDI U.S. Geological Survey. \$50,666. Period: 6/8/05–5/22/06. Grant Administrator: Paul S. Doescher.

Shindler, Bruce A. A Regional Experiment to Evaluate Effects of Fire and Fire Surrogate Treatments in the Sagebrush Biome. USDI U.S. Geological Survey. \$47,004. Period: 12/5/05–5/22/07. Grant Administrator: Paul S. Doescher. Amendment to an existing cooperative agreement.

Shindler, Bruce A., and Eric L. Toman. Communication Strategies for Post-Fire Environments. USDA Forest Service. \$20,000. Period: 7/10/05–7/9/07.

Temesgen, Hailemariam. Examination of Sampling Alternatives to Quantify Spatial Forest Structure and Diversity in Riparian Areas. USDA Forest Service. \$93,070. Period: 8/31/05–9/30/08.

Temesgen, Hailemariam, and Tara Barrett. Imputation and Modeling Methods to Estimate Potential Productivity of Pacific Northwest Forests. USDA Forest Service. \$92,811. Period: 5/24/06–9/30/08.

Tynon, Joanne F. Successful Strategies: Coping with Crime and Violence in National Forest Communities. USDA Forest Service. \$5,000. Period: 4/28/07–6/30/07. Amendment to an existing joint venture agreement.

Forest Science

Bond, Barbara J. Long-Term Ecological Research at the H.J. Andrews Experimental Forest (LTER5). National Science Foundation. \$28,099. Period: 11/28/05–10/31/06. Grant Administrator: Mark E. Harmon. Amendment to an existing grant.

Bond, Barbara J. Long-Term Ecological Research at the H.J. Andrews Experimental Forest (LTER5)–Participant Support. National Science Foundation. \$15,000. Period: 6/2/06–10/31/06. Amendment to an existing grant.

Bond, Barbara J., Alan Mix, Elizabeth Sulzman, and Michael Unsworth. Airsheds, Isotopes and Ecosystem Metabolism in Mountainous Terrain. National Science Foundation. \$14,308. Period: 7/26/05–7/31/06. Amendment to an existing grant.

Bond, Barbara J., Huaping Liu, Michael H. Unsworth, Terri S. Fiez, and Thinh P. Nguyen. SIRG: A Wireless Network of Battery-Free Sensors for Atmosphere-Biosphere Studies in Complex Environments. National Science Foundation. \$211,235. Period: 10/1/05–9/30/07.

Bond, Barbara J., Huaping Liu, Michael H. Unsworth, Terri S. Fiez, and Thinh P. Nguyen. SIRG: A Wireless Network of Battery-Free Sensors for Atmosphere-Biosphere Studies in Complex Environments. National Science Foundation. \$13,900. Period: 3/30/06–9/30/07.

Cohen, Warren B., and Daniel J. Hayes. Mapping Regional Carbon Stocks and Monitoring Carbon Emissions from Land Cover and Land Use Change Along the Mesoamerican Biological Corridor. National Aeronautics and Space Administration. \$24,000. Period: 9/1/05–8/31/06. Amendment to an existing grant.

Cromack, Kermit, Jr. Post-Fire Microbial Interactions with Native and Invasive Non-Native Plants in the Inland Pacific Northwest. USDA Forest Service. \$6,000. Period: 6/16/06–12/31/07. Amendment to an existing cooperative agreement.

Cromack, Kermit, Jr., and Bruce A. Caldwell. Structure and Function of Mycorrhizal Mat Communities at the H.J. Andrews LTER (Long-Term Ecological Research) Microbial Observatory. National Science Foundation. \$27,253. Period: 3/29/06–7/31/07. Grant Administrator: David D. Myrold. Amendment to an existing grant.

Endress, Bryan A. Animal-Mediated Seed Dispersal and Germination of Native and Invasive Plants in Western North America. Montana State University. \$5,000. Period: 5/1/05–12/31/06.

Endress, Bryan A. Effects of Ungulate-Disturbance Interactions on Native and Non-Native Plant Communities in Northeast Oregon. USDA Forest Service. \$45,000. Period: 7/27/05–9/30/07.

Endress, Bryan A. Effects of Ungulate-Disturbance Interactions on Native and Non-Native Plant Communities in Northeast Oregon. USDA Forest Service. \$30,000. Period: 11/8/05–9/30/07. This is an amendment to an existing joint venture agreement.

Ganio, Lisa M. Modeling Relationships Among Landscape Characteristics, Salmonids, and Habitat at Multiple Spatial Scales. USDA Forest Service. \$85,918. Period: 7/27/05–9/30/06.

Ganio, Lisa M., and Matthew J. Gregory. Analysis of Regional Variability in Forest Vegetation. USDA Forest Service. \$342,422. Period: 8/31/05–3/30/09. Amendment to an existing joint venture agreement.

Ganio, Lisa M., and Matthew J. Gregory. Innovative, 3-D, Interactive, and Immersive Techniques for Visualizing, Querying, and Understanding Regional Maps of Forest Vegetation, Fuels, and Fire Risk. USDA Forest Service. \$202,636. Period: 9/7/05–9/30/10.

Ganio, Lisa M., and Matthew J. Gregory. Predictive Vegetation Mapping and Landscape Modeling in Support of Conservation, Natural Resource, and Land-Use Planning in the Pacific Northwest. USDA Forest Service. \$158,989. Period: 6/28/05–11/1/08.

Halpern, Charles B. Long-Term Ecological Research at the H.J. Andrews Experimental Forest (LTER5). National Science Foundation. \$65,363. Period: 11/28/05–10/31/06. Grant Administrator: Mark E. Harmon. Amendment to an existing grant.

Harmon, Mark E. Controls of Autotrophic and Heartrot-Related Respiration in a Western Coniferous Landscape. University of California at Davis. Prime Funder: Department of Energy. \$100,000. Period: 9/1/05–8/31/06. Amendment to an existing research agreement.

Harmon, Mark E. Long-Term Ecological Research at the H.J. Andrews Experimental Forest (LTER5). National Science Foundation. \$455,139. Period: 11/28/05–10/31/06. Amendment to an existing grant.

Harmon, Mark E. Water Quality in Small Streams at the H.J. Andrews Experimental Forest. USDA Forest Service. \$59,480. Period: 7/27/05–10/1/09. Amendment to an existing joint venture agreement.

Harmon, Mark E. Water Quality in Small Streams at the H.J. Andrews Experimental Forest. USDA Forest Service. \$38,298. Period: 6/28/06–8/26/09. Amendment to an existing joint venture agreement.

Harmon, Mark E., Hua Chen, and Steven S. Perakis. U.S.–Taiwan Cooperative Research: Decomposition of ¹⁵N-Labeled Fine Roots and Fate of N They Release in Western Oregon, USA and Taiwanese LTER Sites. National Science Foundation. \$79,415. Period: 8/11/05–2/29/08. Amendment to an existing grant.

Hayes, John P. Regional Patterns of Forest Wildlife Habitat: Scaling from Plots to Landscapes. USDA Forest Service. \$134,500. Period: 7/18/05–8/31/08.

Hayes, John P., David E. Hibbs, Klaus J. Puettmann, Judith L. Li, and W. Daniel Edge. The Cooperative Forest Ecosystem Research (CFER) Program. USDI U.S. Geological Survey. \$435,000. Period: 5/16/06–9/17/07. Amendment to an existing cooperative agreement.

Hibbs, David E., and Andrew A. Bluhm. Hardwood Silviculture Cooperative. Member Cooperators. \$64,000. Period: 7/1/05–6/30/06.

Hibbs, David E., and Jeff Shatford. Predicting Post-Fire Regeneration Needs: Spatial and Temporal Variation. USDI Bureau of Land Management. \$172,000. Period: 7/25/05–11/30/07.

Howe, Glenn T., and Marilyn Cherry. Pacific Northwest Tree Improvement Cooperative. Member Cooperators. \$106,000. Period: 7/1/05–6/30/06.

Jayawickrama, Keith. Northwest Tree Improvement Cooperative. Member Cooperators. \$361,692. Period: 7/1/05–6/30/06.

Krankina, Olga N. Comparative Studies on Carbon Dynamics in Disturbed Forest Ecosystems: Eastern Russia and Northeastern China. National Aeronautics and Space Administration. \$19,089. Period: 12/1/05–11/30/08.

Krankina, Olga N. NELDA: Monitoring and Validating the Distribution and Change in Land Cover Across the Northern Eurasia. National Aeronautics and Space Administration. \$246,270. Period: 3/15/06–3/14/09.

Law, Beverly E. Ameriflux Measurement Network: Science Team Research. Department of Energy. \$417,401. Period: 9/15/05–9/14/06. Amendment to an existing grant.

Law, Beverly E. Development of Dynamic Global Vegetation Models and Evaluation with Ameriflux Data. USDA Forest Service. \$133,809. Period: 7/27/05–8/31/06. Amendment to an existing joint venture agreement.

Law, Beverly E. Measuring the Effects of Disturbance and Climate on the CO₂ and Energy Exchange of Ponderosa Pine Forests in the Pacific Northwest: Integration of Eddy Flux, Plant and Soil Measurements. Department of Energy. \$269,864. Period: 9/15/05–9/14/06. Amendment to an existing grant.

Loescher, Henry W. Improvement in Precision and Accuracy of AmeriFlux Site Measurements. Department of Energy. \$310,154. Period: 9/13/05–9/13/07. Amendment to an existing grant.

Luoma, Daniel L. Biological Diversity and Management of Forest Fungi in the Pacific Northwest. USDA Forest Service. \$90,000. Period: 5/25/06–3/31/08.

Luoma, Daniel L. Effects of Harvest Technique on Subsequent Matsutake Production. USDA Forest Service. \$16,770. Period: 6/21/05–5/1/06.

Maguire, Douglas A. Crown Recession and Branch Diameter Models for Three Conifer Species in the Northern Rocky Mountains. USDA Forest Service. \$10,000. Period: 8/16/05–9/30/06. Amendment to an existing joint venture agreement.

Maguire, Douglas A. Development of a Hybrid Model to Predict the Number, Size, and Location of Douglas-Fir Branches for Estimating Douglas-Fir Growth, Yield, and Wood Quality Under Various Stand Growth Conditions. USDA Forest Service. \$21,126. Period: 7/27/05–9/30/07. Amendment to an existing joint venture agreement.

Maguire, Douglas A. Stand Landscape Management Strategies: Analysis of Stand Density Management Trials and Simulation of Ecosystem Management Regimes. USDA Forest Service. \$39,529. Period: 8/31/05–9/30/08. Amendment to an existing joint venture agreement.

Meinzer, Frederick C., and Barbara L. Gartner. Collaborative Research: Comparative Hydraulic Architecture: An Analysis of Transport Efficiency and Mechanical Constraints. National Science Foundation. \$420,000. Period: 3/15/06–2/28/09.

Newton, Michael, and Elizabeth C. Cole. Regeneration Options After Bark Beetle Outbreaks in Interior and South Central Alaska. USDA Forest Service. \$35,000. Period: 6/29/06–10/15/08.

Newton, Michael, Elizabeth Cole, Klaus Puettmann, and Barbara Gartner. Relation Between Overstory Density Management, Understory Planting and Long-Term Development of Stand Structure. USDI Bureau of Land Management. \$41,640. Period: 7/21/05–9/30/06. Amendment to an existing agreement.

O'Connell, Kari. Effects of Fire Management on Fuels Along Fire Regime and Forest Productivity Gradients in Oregon: Implications for Long-Term Carbon Dynamics. National Aeronautics and Space Administration. \$110,462. Period: 4/18/06–9/14/07. Amendment to an existing grant.

O'Connell, Kari. Forest Succession at Multiple Scales and Fire Risk Assessment. USDA Forest Service. \$70,000. Period: 8/16/05–8/31/10.

O'Connell, Kari. Inventory and Modeling of Changes in Subalpine Forests, Tree Line, and Alpine Plant Communities Using Permanent Plot Systems and Predictive Mapping. USDA Forest Service. \$85,000. Period: 7/27/05–8/31/08.

O'Connell, Kari. Long-Term Ecological Research at the H.J. Andrews Experimental Forest (LTER5). National Science Foundation. \$51,239. Period: 11/28/05–10/31/06. Grant Administrator: Mark E. Harmon. Amendment to an existing grant.

O'Connell, Kari. Long-Term Studies of Vegetation Dynamics in the Pacific Northwest. USDA Forest Service. \$8,500. Period: 5/25/06–6/30/09. Amendment to an existing cooperative agreement.

O'Connell, Kari, Mark Harmon, and Sherri Johnson. Planning Proposal for the H.J. Andrews Experimental Forest. National Science Foundation. \$24,730. Period: 1/15/06–12/31/07.

O'Connell, Kari. Process/Clean/Enter Data from Temperature and Wood Study and Stream Channel Study. USDA Forest Service. \$10,700. Period: 8/1/05–6/30/06.

O'Connell, Kari. Research Support for the H.J. Andrews Experimental Forest. USDA Forest Service. \$50,001. Period: 8/29/05–5/15/09. Amendment to an existing agreement.

O'Connell, Kari. Summer Institute in EcoInformation. National Science Foundation. \$14,682. Period: 6/1/06–5/31/07. Grant Administrator: Desiree D. Tullos.

Puettmann, Klaus J. Synthesizing the State of the Art: Thinning in Young Douglas-Fir Stands to Accelerate the Development of Late-Successional Features. USDA Forest Service. \$89,400. Period: 7/15/05–9/30/08.

Puettmann, Klaus J. Vegetation Dynamics and Fire Hazard in Mixed-Species Restoration Plantings in Southwest Oregon. USDA Forest Service. \$12,512. Period: 8/18/05–9/30/06. Amendment to an existing joint venture agreement.

Puettmann, Klaus J. Vegetation Dynamics and Fire Hazard in Mixed-Species Restoration Plantings in Southwest Oregon. USDA Forest Service. \$41,557. Period: 5/22/06–9/30/07. Amendment to an existing joint venture agreement.

Puettmann, Klaus J. Vegetation Response to Alternative Thinning Regimes in Douglas-Fir Stands. Georg-August University of Goettingen. \$14,007. Period: 7/26/05–12/31/06.

Puettmann, Klaus J., and Shanti D. Berryman. Density Management Study. USDI Bureau of Land Management. \$107,686. Period: 7/26/05–5/27/08. Amendment to an existing agreement.

Radosevich, Steven R. CIPM Database for Invasive Plant Species in the Western United States. Montana State University. Prime Funder: USDI Bureau of Land Management. \$25,905. Period: 1/1/06–12/31/06.

Radosevich, Steven R., Badege Bishaw, Leon Liegel, and Susan Morr . Sustainable Natural Resources Graduate Certificate Program. Development grant, Oregon State University Ecampus. \$65,353. Period: 6/1/06–6/1/08.

Rose, Robin, and Diane L. Haase. Nursery Technology Cooperative. Member Cooperators. \$98,000. Period: 7/1/05–6/30/06.

Rose, Robin, and Lee S. Rosner. Vegetation Management Research Cooperative. Member Cooperators. \$147,400. Period: 7/1/05–6/30/06.

Ross, Darrell W. Efficacy of High Release Rate MCH Dispensers to Prevent Douglas-Fir Beetle Infestation. University of California at Davis. \$12,000. Period: 5/2/06–3/31/09.

Ross, Darrell W., and Kimberly F. Wallin. Natural Enemies of Adelgids in the Western U.S. USDA Forest Service. \$35,000. Period: 2/6/06–12/31/06. Amendment to an existing cooperative agreement.

Shaw, David C. Swiss Needle Cast Cooperative. Member Cooperators. \$107,500. Period: 7/1/05–6/30/06.

Sollins, Phillip, Kate J. Lajtha, and Bruce A. Caldwell. Conference on Mechanisms of Soil Organic Matter Stabilization. USDA Cooperative State Research, Education, and Extension Service. \$9,963. Period: 7/15/05–7/14/06.

Sollins, Phillip, and Bruce A. Caldwell. Key Role of Nitrogenous Compounds in Soil Organic Matters Stabilization Via Interactions with Mineral Surfaces. USDA Cooperative State Research, Education, and Extension Service. \$303,437. Period: 8/15/05–8/14/08.

Strauss, Steven H. Activation Tagging in the Reference Nisqually-1 Poplar Genome. Consortium for Plant Biotechnology Research, Inc. \$40,000. Period: 9/1/05–8/31/06.

Strauss, Steven H. Developing Non-Invasive Nursery Crops. USDA Agricultural Research Service. \$72,214. Period: 9/19/05–8/31/08. Amendment to an existing cooperative agreement.

Strauss, Steven H. Developing Non-Invasive Nursery Crops. USDA Agricultural Research Service. \$32,093. Period: 9/30/05–8/31/08. Amendment to an existing cooperative agreement.

Strauss, Steven H. Genes for Enhancing Carbon Sequestration in Poplar. Ceres, Inc. Prime Funder: Department of Energy. \$288,616. Period: 9/1/05–8/31/06.

Strauss, Steven H. Modification of Gibberellin Metabolism to Enhance Productivity, Wood Quality and Biosafety. Arbogen, LLC. \$12,500. Period: 8/30/05–8/31/07. Amendment to an existing agreement.

Strauss, Steven H., and Amy M. Brunner. Genome Enabled Discovery of Carbon Sequestration Genes in Poplar. Department of Energy. \$390,482. Period: 6/18/05–6/14/07. Amendment to an existing grant.

Strauss, Steven H., Amy M. Brunner, and Victor B. Busov. OSU-Purdue Center for Tree Genetics. National Science Foundation. \$30,000. Period: 9/30/05 - 7/31/07. Amendment to an existing grant.

Strauss, Steven H., and Elizabeth M. Jaeger. Tree Genetic Engineering Research Cooperative. Member Cooperators. \$100,000. Period: 7/1/05–6/30/06.

Strauss, Steven H., and Palitha Dharmawardhana. Genetic Modification of Gibberellic Acid Signaling to Promote Carbon Sequestration in Tree Roots and Stems. Department of Energy. \$722,539. Period: 8/15/05–8/14/07.

Sulzman, Elizabeth W. Impacts of Post-Fire Salvage Logging and Wildfire Burn Intensity on Soil Productivity and Forest Recovery. USDA Forest Service. \$84,430. Period: 3/3/06–1/31/09.

Swanson, Frederick J. Long-Term Ecological Research at the H.J. Andrews Experimental Forest (LTER5). National Science Foundation. \$12,600. Period: 11/28/05–10/31/06. Grant Administrator: Mark E. Harmon. Amendment to an existing grant.

Turner, David P. Characterizing Disturbance and Succession in Relation to Forest Carbon Dynamics. USDA Forest Service. \$199,887. Period: 5/24/06–7/31/09. Amendment to an existing joint venture agreement.

Turner, David P. Spatially-Explicit Estimates of Forest Biomass in the Amazon Basin Using MODIS and the Geoscience Laser Altimeter System. Colorado State University. Prime Funder: National Aeronautics and Space Administration. \$53,862. Period: 3/1/06- 2/28/07.

Wallin, Kimberly F. Characterization of Genetic Variation of Resistance in Lodgepole Pine to Attack by Mountain Pine Beetle. University of Northern British Columbia. \$16,298. Period: 2/1/06–7/31/06.

Wallin, Kimberly F., and Darrell W. Ross. Rapid Screening for Western Hemlock Resistance/Tolerance to HWA Through Morphological and Anatomical Features of the Twigs. USDA Forest Service. \$37,250. Period: 8/4/05-7/30/07.

Waring, Richard H. Predicting Tree Diversity Across the Contiguous USA from Growing Season Patterns in Photosynthesis Derived with Satellite-Driven Models. National Aeronautics and Space Administration. \$111,561. Period: 9/7/05–5/14/07. Amendment to an existing grant.

Waring, Richard H. Predicting Tree Diversity Across the Contiguous USA from Growing Season Patterns in Photosynthesis Derived with Satellite-Driven Models. National Aeronautics and Space Administration. \$55,781. Period: 3/6/06–5/14/07. Amendment to an existing grant.

Yang, Zhiqiang. Determining Viable Methods to Monitor Landscape Patterns in National Park Service Units of the Northern and Southern Colorado Plateau Networks: Project to Support Monitoring Protocol Development. USDI National Park Service. \$124,945. Period: 8/1/05–3/1/09.

Wood Science and Engineering

Gartner, Barbara L. Structure-Function Relationships in Tree Water Transport. USDA Forest Service. \$45,000. Period: 7/27/05–4/30/07. Amendment to an existing joint venture agreement.

Gartner, Barbara L. Structure-Function Relationships in Tree Water Transport. USDA Forest Service. \$18,000. Period: 5/5/06–12/31/07. Amendment to an existing joint venture agreement.

Hansen, Eric N. Oregon WoodFest. Agricultural Research Foundation. \$10,000. Period: 12/12/05–2/28/07.

Hansen, Eric N. Oregon WoodFest. Agricultural Research Foundation. \$1,000. Period: 2/15/06–2/28/07.

Hansen, Eric N. Oregon WoodFest. Agricultural Research Foundation. \$5,000. Period: 5/4/06–2/28/07.

Kamke, Frederick A. Investigation of the Interaction of a Non-Woven, Resin-Impregnated Glass Mat with an OSB (Oriented Strandboard) Panel. Johns Manville. \$51,200. Period: 12/16/05–12/31/06.

Kamke, Frederick A. Sustainable Engineered Materials from Renewable Resources. Virginia Polytechnic Institute and State University. \$86,996. Period: 8/1/05–7/31/06.

Li, Kaichang. Development and Characterization of Rubber-Wood Composites and New Coupling Agents for Silica-Filled Rubber. Schill + Seilacher “Struktol” Aktiengesellschaft. \$153,439. Period: 3/29/06–3/31/07.

Li, Kaichang. Development of Commercially Viable New Wood-Plastic Composites. Sustainable Industries Group, LLC. \$112,846. Period: 4/10/06–3/31/07.

Li, Kaichang. Investigation of Soy-Based Adhesives for Making Oriented Strand Boards. SmithBucklin Corporation. Prime Funder: United Soybean Board. \$52,700. Period: 2/22/06–3/31/07.

Li, Kaichang. Investigation of Kymene-Soy Adhesives for Making Particleboard and Medium Density Fiberboard. Columbia Forest Products. \$30,000. Period: 7/1/05–12/30/05.

Li, Kaichang. Investigation of Kymene-Soy Adhesives for Making Particleboard and Medium Density Fiberboard. Columbia Forest Products. \$60,000. Period: 1/1/06–12/30/06.

Li, Kaichang. Investigation of Kymene-Soy Adhesives for Making Particleboard and Medium Density Fiberboard. Hercules, Inc. \$30,000. Period: 7/1/05–12/30/05.

Li, Kaichang. Investigation of Kymene-Soy Adhesives for Making Particleboard and Medium Density Fiberboard. Hercules, Inc. \$60,000. Period: 1/1/06–12/30/06.

McLain, Thomas E. Center for Wood Utilization Research. USDA Cooperative State Research, Education, and Extension Service. \$466,019. Period: 8/15/05–8/14/07.

Milota, Michael R. VOC (Volatile Organic Compounds) and HAP (Hazardous Air Pollutants) Recovery Using Ionic Liquids: Various Commercial Cooperators Cost Sharing Contributions. Various Commercial Cooperators. \$15,000. Period: 3/15/06–3/31/07. Amendment to an existing gift.

Milota, Michael R., and Kaichang Li. VOC and HAP Recovery Using Ionic Liquids. Department of Energy. \$53,750. Period: 1/25/06–3/31/07. Amendment to an existing cooperative agreement.

Morrell, Jeffrey J. Genetic Modification of Gibberellic Acid Signaling to Promote Carbon Sequestration in Tree Roots and Stems. Department of Energy. \$20,522. Period: 8/15/05–8/14/07. Grant Administrator: Steven H. Strauss.

Morrell, Jeffrey J. Pressure Treatment as a Tool for Mitigating the Risk of Pest Introduction on Solid Wood Packing Used in International Trade. USDA Cooperative State Research, Education, and Extension Service. \$34,977. Period: 9/15/05–6/30/07.

Morrell, Jeffrey J. Treatments to Enhance the Durability of Naturally Durable Woods. Chemical Specialties, Inc. \$118,802. Period: 10/1/05–9/30/08.

Morrell, Jeffrey J. Utility Pole Research Cooperative. Member Cooperators. \$119,700. Period: 7/01/05–6/30/06.

Forestry Extended Education

Holmberg, Joseph J. Managing for Biological Diversity and Different Disturbance Processes Workshop. USDA Forest Service. \$30,000. Period: 9/19/05–5/31/07.

Forestry Extension

Landgren, Chal G., and Brad A. Withrow-Robinson. Intergenerational Family Forest Management. Agricultural Research Foundation. \$49,000. Period: 10/25/05–1/31/07.

Reed, A. Scott. Forestry Extension Landowner Education Project. Oregon Forest Resources Institute. \$63,000. Period: 7/01/05–6/30/06.

Forestry Media Center

Hino, Jeffry C., and David A. Zahler. Forestry Learning Opportunities for Workers (FLOW) Web Site Maintenance and Management. Oregon Forest Resources Institute. \$15,000. Period: 7/1/05–6/30/06.

Hino, Jeffry C., David A. Zahler, and Mark D. Reed. Ecoregion Native Plant and Ecosystem Presentations. USDI Bureau of Land Management. \$6,712. Period: 12/29/05–3/30/06. Amendment to an existing cooperative agreement.

Forestry—Research Support

Hobbs, Stephen D. Technical and Professional Training for the Development of Survey and Other Than Survey Personnel in the Fields of Forest and Rangeland Ecology, Wildlife Biology and System Ecology. USDI U.S. Geological Survey. \$44,055. Period: 6/27/05–6/30/06. Amendment to an existing cooperative agreement.

Hobbs, Stephen D. Technical and Professional Training for the Development of Survey and Other Than Survey Personnel in the Fields of Forest and Rangeland Ecology, Wildlife Biology and System Ecology. USDI U.S. Geological Survey. \$70,864. Period: 8/15/05–9/30/06. Amendment to an existing cooperative agreement.

Hobbs, Stephen D. Technical and Professional Training for the Development of Survey and Other Than Survey Personnel in the Fields of Forest and Rangeland Ecology, Wildlife Biology and System Ecology. USDI U.S. Geological Survey. \$19,580. Period: 2/27/06–7/31/07. Amendment to an existing cooperative agreement.

Research and Service Cooperatives

HSC—Hardwood Silviculture Cooperative (Dave Hibbs)

Research and technology transfer program on the ecology, reforestation, and stand management of Northwest hardwood species, especially red alder. Members are British Columbia Ministry of Forests, Bureau of Land Management, Goodyear-Nelson Hardwood Lumber Co., Inc., Oregon Department of Forestry, Oregon State University, Siuslaw National Forest, Trillium Corporation, Washington Department of Natural Resources, USFS Olympia Forestry Sciences Laboratory, and Washington Hardwood Commission.

[\(www.cof.orst.edu/coops/hsc/\)](http://www.cof.orst.edu/coops/hsc/)

Primary accomplishments for FY 2006 include

- developing a taper equation for estimating alder log volume from managed stands
- completing measurements, thinning, and pruning on one 17-year, five 12-year, and four 9-year variable density alder plantations in Oregon, Washington, and British Columbia
- contributing over 150,000 of individual tree measurements from 26 alder plantations to the regional database used for the construction of red alder growth models

NTC—Nursery Technology Cooperative (Robin Rose, Diane Haase)

Focuses on nursery management and seedling production and performance, emphasizing reforestation planting systems. Members are Forest Capital Partners; Hood Canal Nurseries; Lava Nurseries, Inc.; Lone Rock Timber Co.; Microseed Nursery; Oregon Department of Forestry, D.L. Phipps Nursery; Pacific Reforestation Technologies; Plum Creek Timber Co.; Roseburg Forest Products; Starker Forests; Swanson Group; USDA Forest Service, Pacific Northwest Region, National Forests and the J.H. Stone Nursery; USDI Bureau of Land Management, Oregon Districts; Washington Department of Natural Resources, L.T. Mike Webster Nursery; Weyerhaeuser Co.; and the Yakama Nation.

[\(www.cof.orst.edu/coops/ntc/ntc.htm\)](http://www.cof.orst.edu/coops/ntc/ntc.htm)

Primary accomplishments in FY 2006 include

- establishing a study to examine the effect of planting date on subsequent field performance of conifer seedlings. On three western Oregon sites, ranging from a relatively wet, coastal site to a drier valley site, Douglas-fir seedlings were planted every 3 weeks from August through January. In addition, seedlings had two different dormancy induction treatments at the nursery. On two Washington sites, Douglas-fir and western larch seedlings were planted in September and October, prior to snowfall, and again in April and May, just after snowfall. Seedlings on the WA sites were planted with and without tree shelters.
- publishing a special issue of *New Forests* that focused on forest seedling root development. The papers in the journal were all from a very successful conference we hosted.
- Initiating several other new projects to evaluate seedling quality and outplanting performance. We also completed a preliminary study to examine the relationship between chilling hours and cold hardiness. Those data were used to create a study plan for a comprehensive study in FY07.

NWTIC—Northwest Tree Improvement Cooperative (Keith Jayawickrama)

Oversees and coordinates cooperative tree breeding in coastal forests in Oregon and Washington; provides data analysis and data management services for the same; provides expertise in tree breeding and genetic improvement to members. Members are Bureau of Land Management, The Campbell Group, Cascade Timber Consulting, Inc., Forest Capital Partners, Fruit Growers Supply Co., Green Crow Management Services, Green Diamond Resource Co., Giustina Land and Timber, Hampton Tree Farms, Inc., Hancock Forest Management., Longview

Fibre Co., Menasha Corp., Miami Corp., Oregon Department of Forestry, Plum Creek Timber Company, Pope Resources, Port Blakely Tree Farms L.P., Quinault Indian Nation, Rayonier Timberlands Operating Co., Roseburg Resources Co., Seneca Jones Timber Co., Sierra Pacific Industries, Silver Butte Timber Co., South Coast Lumber Co., Starker Forests, Inc., Stimson Lumber Co., Timber West Forest, Ltd., Washington Department of Natural Resources, and Weyerhaeuser Company. (www.fsl.orst.edu/nwtic/)

PNWTIRC—Pacific Northwest Tree Improvement Research Cooperative (Glenn Howe)

Carries out genetics and tree improvement research aimed at increasing the efficiency and effectiveness of operational tree improvement programs. Regular members are Boise Corp., Bureau of Land Management, Cascade Timber Consulting, Green Diamond Resource Co., Longview Fibre Co., Menasha Forest Products Corp., Oregon Department of Forestry, Oregon State University, Plum Creek Timber Co., Pope Resources/Olympic Resource Management, Port Blakely Tree Farms, Roseburg Resources, Starker Forests, Stimson Lumber Co., Washington Department of Natural Resources, and Weyerhaeuser Co. (www.fsl.orst.edu/pnwtirc/)

Primary accomplishments in FY 2006 include

- completing planning for a new multi-university, multi-cooperative “Center for Advanced Forestry Systems.” This center will link industry and universities under the prestigious NSF Industry-University Cooperative Research Center (I/UCRC) program to increase forestry competitiveness by solving problems at scales ranging from genes to ecosystems and by transcending traditional boundaries. The member universities are Oregon State University, North Carolina State University, Virginia Polytechnic Institute, and Purdue.
- initiating a large collaborative project to study the genetics of Douglas-fir wood quality. The objectives of the “Genes to Lumber Project” are to (1) test new, nondestructive acoustic tools for measuring wood stiffness and strength in standing trees and logs, (2) develop cost-effective ways to use these tools to identify trees with genetically superior wood quality, (3) compare the lumber produced from genetically superior and inferior trees, and (4) identify genes associated with strong and stiff wood.
- publishing a comprehensive review paper, “Breeding Douglas-fir,” in *Plant Breeding Reviews*. This paper reviews the science and practice tree breeding in Douglas-fir and will serve as a valuable resource for breeders of Douglas-fir and other forest trees for many years.

SNCC—Swiss Needle Cast Cooperative (Dave Shaw)

Conducts research on Swiss needle cast disease (SNC) of Douglas-fir for forestland owners in western Oregon and Washington. Members are Boise Corp., Bureau of Land Management, Forest Capital, Green Diamond Resource Co., Hampton Resources, Inc., Hancock Forest Management, Menasha Corp., Oregon Department of Forestry, Plum Creek Timber Co., Starker Forests, Stimson Lumber Co., Weyerhaeuser Corp., and USDA Forest Service (in kind). (www.cof.orst.edu/coops/sncc)

Primary achievements for FY 2006 include

- developing a Swiss Needle Cast Module for the growth-and-yield model ORGANON. This module will allow foresters and timberland owners to predict the growth and yield of Douglas-fir under variable intensities of Swiss needle cast disease.
- continuing work on an epidemiological model to understand the spatial variation in Swiss needle cast disease on the Oregon Coast Range. The model is helping explain the driving factors influencing disease severity. These include winter temperature (Dec, Jan, Feb), spring/summer leaf wetness, and geographical position in relation to aspect, elevation, and cloud impaction.

- initiating studies of mycorrhizal status of Douglas-fir affected by SNC disease. Preliminary research begun in 2006 is showing that the mycorrhizal diversity and abundance in Douglas-fir affected by SNC disease are unusually low. We are examining how to use this knowledge to improve Douglas-fir growth.

TBGRC—Tree Biosafety and Genomics Research Cooperative (Steve Strauss)

Studies tree genetics and breeding through gene-transfer-based biotechnology. Members are ArborGen LLC, Mondi, Potlatch, and Weyerhaeuser (wwwdata.forestry.oregonstate.edu/tgbb/). Primary accomplishments in FY 2006 include

- finding that gene-modified, semi-dwarf poplars have several useful characteristics: accelerated flowering, increased allocation of growth to roots, and altered root chemistry that may improve resistance to decomposition. These traits may be useful for speeding tree breeding; improving rates of carbon sequestration, stress tolerance, and bioremediation; and improving resistance to herbivory.
- showing, in collaboration with colleagues in Sweden, that *FT* is a central gene for control of flowering and budset in trees. The finding could substantially speed breeding and assessment of sterility genes in research and was published in the prestigious journal *Science*.
- receiving a planning grant from the National Science Foundation (NSF) as part of a team to investigate formation of a joint national Center. The proposed Center for Advanced Forestry Research would include North Carolina State, Virginia Polytechnic University, Purdue, and the TBGRC and PNWTIRC tree genetics cooperatives. It would promote collaborative studies that link genes to physiology to stand-level studies in hardwood and coniferous trees.

UPRC—Utility Pole Research Cooperative (Jeff Morrell)

Seeks to improve the performance of wood in electrical utility systems through improved specifications, better inspection techniques, and development of safer remedial treatments for in-service poles. Members are OSU, Arch Chemicals, Inc., Bonneville Power Administration, Dr. Wolman, Genics Inc., GMBH, Intec Services, ISK Biosciences, New York State Electric and Gas, Osmose Wood Preserving, Inc., Pacific Corp., Pacific Gas and Electric, Pole Care Inc., Pole Maintenance Co., Portland General Electric Co., Public Service of New Mexico, Puget Sound Energy, Southern Co., Utility Pole Technologies, and the Western Wood Preservers Institute. (www.cof.orst.edu/coops/utilpole/)

Primary accomplishments in FY 2006 include

- obtaining the data that support the registration of all of the fumigants currently used to control decay in utility poles. These chemicals save utilities billions yearly by prolonging pole service life and ensure that wood remains competitive in the market
- developing data that support the use of through boring for utility poles. Some utilities had questioned the strength effects of this process; our data showed no negative effects. These data helps to ensure that Douglas-fir poles will continue to provide excellent performance.
- assisting local utilities in assessing the condition of aging pole systems. These data helped the utilities make better planning decisions so that they could allocate limited capital budgets more effectively.

VMRC—Vegetation Management Research Cooperative (Robin Rose, Lee Rosner)

Research program on vegetation management, focusing on plant competition, vegetation control, and early growth of forest stands. Full members are Cascade Timber Consulting, Forest Capital Partners, Forest Systems, Green Diamond Resource Company, Hancock Forest Management, Lone Rock Timber Co., Longview Fibre, OSU, Pacific Lumber Co., Plum Creek

Timber Co., Pope Resources, Port Blakely Tree Farms, Rayonier Inc., Rosboro Lumber Co., Roseburg Resources Co., Starker Forests, Inc., The Campbell Group LLC, Washington Department of Natural Resources, and Weyerhaeuser Co. Supporting members are BASF Corporation, Dow Agro Sciences, LLC, and Dupont Chemical Co. (www.cof.orst.edu/coops/vmrc/)

WRC—Watersheds Research Cooperative (Arne Skaugset)

Studies the environmental effects of contemporary forest management on hydrology, water quality, fisheries, and aquatic habitat. The initial pilot project was the Hinkle Creek Paired Watershed Study and Demonstration Area. Currently the WRC is the administrative home for three paired watershed studies: the Trask Paired Watershed Study, the New Alsea Paired Watershed Study and Hinkle Creek. Current cooperative members include the Associated Oregon Loggers, Boise Corp. Forest Capital, Douglas County, Douglas Timber Operators, National Council for Air and Stream Improvement, Oregon Forest Industries Council, the Oregon Department of Fish and Wildlife, the Oregon Department of Forestry, Oregon Forest Resources Institute (OFRI), Oregon Bureau of Land Management (BLM), Roseburg Forest Products, and Starker Forests, Weyerhaeuser, and Plum Creek.

(<http://watershedsresearch.org/>)

Primary accomplishments for FY 2006 include

- having the first two graduate degrees conferred for research from the Hinkle Creek Paired Watershed Study.
- completing the calibration phase of the Hinkle Creek Paired Watershed Study and carrying out the harvest entry into the South Fork of Hinkle Creek. Roseburg Forest Products built approximately 1.6 miles of road and reconstructed approximately 3.5 miles of road to access the harvest units. Approximately 400 acres of forest were harvested, yielding 12 million board feet of timber and 3,900 loads of logs.
- adding two new paired watershed studies to the coop: the Trask Paired Watershed Study, a joint venture of ODF State Lands and the Weyerhaeuser Company, and the Alsea Watershed Study, a joint venture of NCASI and Plum Creek Timber Company.

Other Cooperative Research Programs

AmeriFlux Research Network:

A coordinated network of about 100 long-term research sites in the Americas for quantifying and understanding the role of the terrestrial biosphere in global climate change. The network aims to quantify variation in carbon stocks and carbon dioxide, water vapor, and energy exchange with the atmosphere and understand its causes at relevant temporal and spatial scales. The AmeriFlux Science Chair, research synthesis group, and site intercalibration group are located at Oregon State University; the data management group is at Oak Ridge National Laboratory. <http://public.ornl.gov/ameriflux/>

CFWUR—Center for Wood Utilization Research (Tom McLain, Steve Tesch)

A USDA-funded research center focused on improving wood utilization, developing new wood products, enhancing processing and harvesting systems, and other strategies to add value to the western forest resource. OSU is one of 12 universities in the US that cooperate in this program.

CFER—Cooperative Forest Ecosystem Research (David Hibbs)

An integrative research and information exchange program to address issues of young-stand management, ecology and management of riparian areas, and biodiversity on BLM and other forest land of western Oregon. The program, funded primarily through the Forest and

Rangeland Ecosystem Science Center, is jointly managed by OSU, USGS-BRD, BLM, and Oregon Department of Forestry. (www.fsl.orst.edu/cfer/)

CLAMS—Coastal Landscape Analysis and Modeling Study (Norm Johnson, Tom Spies)

A cooperative program with the USDA Forest Service Pacific Northwest Research Station. Its scientists develop tools to understand patterns and dynamics of ecosystems such as the Oregon Coast Range and to analyze the ecological, economic, and social consequences of forest policies of landowners in the region. (www.fsl.orst.edu/clams/)

ERSAL—Environmental Remote Sensing Applications Laboratory (Bill Ripple)

Develops and applies remote sensing and geographic information systems (GIS) technology for the study of forest lands and related natural resource problems. Research topics include landscape ecology, remote sensing of plant cover, forest landscape patterns, and wildlife habitat. (www.cof.orst.edu/cof/fr/research/ersal.php)

Fish and Wildlife Habitat in Managed Forests

Provides new information about fish and wildlife habitat within Oregon's actively managed forests through research, technology transfer, and service. Current priorities favor those that contribute to the scientific information base that supports the Oregon Forest Practices Act. The goals are to provide the information needed by forest managers to guide stewardship of fish and wildlife habitat resources consistent with land management objectives and by policy makers to establish and evaluate informed forest policy and regulations. (www.cof.orst.edu/coops/fishandwildlife/)

FPRL—Forest Photogrammetry Research Laboratory (Jim Kiser)

A research, development, and technology transfer facility focused on photogrammetry, digital mapping, and image processing. Its primary mission is to introduce and apply modern photogrammetric techniques to natural resource management. The facility offers an analytical plotter, image processing equipment, and a PC-based mapping system tied to digitizing tables. (www.cof.orst.edu/cof/fr/research/fprl.php)

LARSE—Laboratory for Applications of Remote Sensing in Ecology (Warren Cohen)

Conducts basic remote sensing research, translates remotely sensed data into mapped ecological information, and fills the gap between remote sensing and ecological sciences. LARSE is a cooperative program with the USDA Forest Service Pacific Northwest Research Station. (www.fsl.orst.edu/larse/)

Leopold Project (Bill Ripple)

Continues the work Aldo Leopold started on topics that intersect forestry and wildlife science and ecosystems. Leopold is a prime example of the usefulness of working across disciplines to solve complex natural resource problems. The Leopold Project is our way to put formal emphasis on the multidisciplinary approach to the study, wise use, and conservation of natural resources. (www.cof.orst.edu/leopold)

LTEP—Long-term Ecosystem Productivity Program (Bernard Bormann)

A 200-year program of research in the Pacific Northwest and Alaska with major funding from the Forest Service, the Washington Department of Natural Resources, the National Science Foundation, the Environmental Protection Agency, and Oregon State University. This research seeks understanding of processes that control the long-term productivity of the land—including timber, other commodity and noncommodity resources, and biodiversity—to support sustainable ecosystem management. (www.fsl.orst.edu/ltep/)

ILTER—Long-Term Ecological Research (Mark Harmon)

A long-term program of research at the H.J. Andrews Experimental Forest, with major funding from the National Science Foundation, the USDA Forest Service, and OSU. LTER is discovering fundamental ecological relationships in managed and natural forests and incorporating them into forest management strategies. (www.fsl.orst.edu/lter/)

SFP—Sustainable Forestry Partnership (Jim Johnson)

A program integrating social and biological aspects of forestry research into strategies for the long-term sustainable management of forests for a multiplicity of values. (www.cof.orst.edu/org/sfp/)

TERRA-PNW:

A long-term program of research throughout Oregon and California on the ecological responses of terrestrial ecosystems to natural and human-induced changes. The research is funded by multiple agencies including NASA, the U.S. Department of Energy, NOAA, and USDA. The understanding of mechanisms controlling ecosystem processes is being incorporated in process models that are applied at the landscape to regional scale using multiple scales of observations. <http://wwwdata.forestry.oregonstate.edu/terra/>

WPG—Watershed Processes Group (Gordon Grant)

An interdisciplinary research group studying linkages among physical and biological processes and human activities, with particular focus on the steep, forested landscapes of the Pacific Northwest (www.fsl.orst.edu/wpg)

International Programs Office

(Jim Johnson, Leader; Badege Bishaw, Director; Susan Morr , Assistant)

Mission

The mission of International Programs in the OSU College of Forestry is to lead and coordinate College efforts to

- increase awareness of global events, trends, and forestry issues that affect Oregonians and our forests
- develop and maintain excellence in international educational, research, and outreach activities of College faculty, students, and staff
- promote, develop, and facilitate international activities and opportunities for College faculty, students, and staff; and
- establish the Oregon State University College of Forestry as a global leader in forestry with strong external linkages with international institutions and networks

International Education Activities

Students participate in study abroad, exchange, and international internship programs available through the OSU Office of International Education and Outreach and advised by the Director of Student Services and Head Advisor in the CoF. The College International Programs staff actively promotes these opportunities, hoping to increase student participation in the coming years. The CoF offers undergraduate and graduate courses to increase student awareness of International Forestry issues:

- FE/FOR 456 International Forestry
- FOR 407/507 International Forestry Seminar
- WSE 470 Forests, Wood and Civilization
- FS 699 Global Change and Terrestrial Ecosystems
- FE 507 and FS 599 Global Forestry Issues Seminar
- FS 432/532 and SNR 532 Planning Agroforestry Projects

International Partnership for Forestry Education

The OSU CoF is a founding member of and plays a leadership role in the International Partnership for Forestry Education (IPFE; <http://www.forestry.ubc.ca/ipfe/>). IPFE members from six continents foster international cooperation in forestry education and awareness of global forestry issues through a series of coordinated activities.

Collaboration with Universities and International Institutions

The CoF is linked to 17 institutions and organizations throughout the world through formal agreements and informal collaborations:

- formal undergraduate exchange agreements involving reciprocal tuition and fees
- general agreements with universities for exchange of faculty and graduate students, research collaboration, and sharing of information and technologies
- general agreements with nonuniversity institutions for cooperative activities, including internships and traineeships for graduate and undergraduate students

International Research and Development

Students and faculty in the CoF are involved in a wide diversity of projects internationally, including studies examining influences of management practices on biodiversity, the influence of climate change on forest dynamics, global markets for forest products, biotechnology, remote sensing, and sustainable forestry to name just a few. Some of the international projects that are underway include the International Forest Engineering Institute, Strengthening Natural

Resource Education and Research in Ethiopia, Ecology of Exotic Pine plantations in Patagonia, and Wood Processing Education and Training in Mexico. Currently, CoF staff are developing a collaborative project on natural product research with the University of Botswana.

International Visitor Meetings, Tours, and Seminars

The CoF receives many international visitors from universities, organizations, industry, and non-governmental organizations around the world. The International program staff provides visitors with information about the College's teaching, research, and outreach programs and conducts tours of CoF teaching and research facilities, including the H. J. Andrews and McDonald-Dunn Forest. Over a dozen international visitors gave seminars in the CoF last year to share their research and culture with the students, faculty, and staff.

International Forestry Student Association (IFSA-OSU)

In October 2005, the International Programs sponsored establishment of a local chapter of the International Forestry Students Association, currently the only active chapter in the US. Objectives of IFSA are to enrich the formal education of forestry students through extracurricular activities that offer a more global perspective on forest policy and management issues. IFSA hosted two International Luncheons and six seminars by College students and faculty about their international research, internship, and study abroad experiences.

International Coffees

The International Programs hosted eight coffees, providing a collegial atmosphere for all members of the CoF and the OSU Office of International Education and Outreach to come together and learn about each other's international work. New international faculty, students, and guests are introduced, and a featured faculty member shares his or her international research and development projects.

International Newsletter

The CoF International Programs office periodically distributes a newsletter to faculty, students, and staff to provide an update on opportunities and communicate about international activities undertaken by members of the College.

International Programs Website

The CoF has included International Programs as one of the major educational, research, and outreach activities in the college. For more information, please visit the International Programs website: <http://www.cof.orst.edu/cof/international/>

Extended Education, Outreach, and Support

College Forests (Dave Lysne, Director)

The OSU College Forests are living laboratories where active forest management practices provide teaching, research, and demonstration opportunities for College faculty and students and others interested in forest management issues. The College Forests of Oregon State University provide society with

- improved understanding about forests, forest management options, and the social, economic, and environmental costs and benefits of those options
- revenues to support the education program of the College
- close ties to the College and University
- better appreciation for forest resources and values
- better opportunities to observe innovative solutions to forest resource management challenges
- enhanced access to objective and factual forest resource information

The College Forests are places of choice for learning and teaching about forest resources and values.

Forestry Extension Program (James Johnson, Program Leader)

No matter where you are in Oregon, Forestry Extension is here to help you. Whether you work in the forests or just visit them, we have programs for you:

- **woodland owners and managers:** Helping small woodland owners meet today's competing demands on forest resources is part of what we do. By providing the results of the latest research to landowners, we hope to empower them to meet their management objectives through sustainable and environmentally sound forestry practices.
- **timber companies and wood industry manufacturers:** Sharing knowledge with forest-based industries to make them more productive and efficient is also part of what we do. We help by providing information on new technologies, marketing ideas, taxes, and business management.
- **loggers and forest workers:** Oregon's timber industry is facing change. We help those who work in the woods adapt to a changing world.
- **general public, educators, and youth:** Oregon is a state with growing demands for all the benefits forests provide. Managing and maintaining our forests is complex. By providing information to the public, we help the decision-making process by helping people understand different points of view.

Oregon Forestry Education Program (Susan Sahnaw, Program Coordinator)

The mission of the Oregon Forestry Education Program (OFEP) is to educate Oregonians about forests and forestry and to prepare them to make informed decisions, exhibit responsible behavior, and take constructive action concerning the future of Oregon's forests. Project staff and programs focus on formal and nonformal educators interested in education and communication through a series of workshop offerings. OFEP coordinates training and delivery of introductory Project Learning Tree (PLT) workshops and advanced staff-development workshops throughout the state. The Oregon Forest Resources Institute (OFRI) is a key partner in OFEP delivery and financial support. These programs work with members of the forestry

community to coordinate the Oregon Forest Institute for Teachers, an annual weeklong event to broaden awareness of the complexities of managing diverse forests and forest industries.

Forestry Media Center (Jeff Hino, Director)

The Forestry Media Center (FMC) is a unique instructional technology center devoted to helping educators solve instructional problems in forestry through the application of innovative communication media. After more than 30 years of producing educational materials, we have developed hundreds of slide-tapes, films, videotapes, and other learning resources on a wide variety of forestry topics. These learning resources are mostly authored by faculty from OSU or research staff from the USDA Forest Service, in cooperation with education and communication specialists from the FMC. They are aimed at a wide spectrum of forestry audiences: forest researchers, managers, engineers, nonindustrial woodland owners, forestry students, and many others. These materials are available for sale or rent directly from the FMC.

Forestry Communications Group (Roger Admiral, Director)

The mission of the Forestry Communications Group is to help College of Forestry researchers communicate their work and to make the results of College research broadly available. We offer editing, graphic design, and other publishing services to help authors prepare their manuscripts for submission to scientific journals and to help them articulate the results of their research to multiple audiences. We also publish manuscripts under the Forest Research Laboratory imprint in three peer-reviewed series. Research Contributions describe recent research in more detail than journal publication usually permits. Papers in Forest Policy provide information to legislators, administrators, and other policymakers to help them make policy and management decisions. Case Studies are teaching studies that emphasize and elucidate a particular concept or principle with real-world data.

Forest Computing Group (Kathy Howell, Director)

Forestry Computing Resources (FCR) is a partnership among the Oregon State University College of Forestry (CoF), USDA Forest Service PNW Station (PNW), USGS Forest and Rangeland Ecosystem Science Center (FRESC), and Oregon Department of Fish and Wildlife (ODFW). CoF personnel are housed primarily in Peavy and Richardson Halls, which are attached to one another. The USDA Forest Service PNW Research Station Corvallis Forest Science Laboratory (CFSL), immediately adjacent to Richardson Hall, houses PNW and FRESC staff, as well as some CoF personnel. ODFW staff are housed in a separate facility approximately two miles away. FCR supports this group of educators and scientific professionals joined by proximity and common forestry research interests. FCR is dedicated to providing the quantitative tools and information technology needed by our research partners, faculty and scientists, staff, and students. To better serve the user community, FCR strives continually to find better ways to access information, package technology, and both meet and anticipate the needs of our clients for research, teaching, and extended education.

Forestry Business Office (Scott Ferris, Business Manager)

The mission of the Business Office is to help students, faculty, and principal investigators devote the majority of their efforts to direct learning, teaching, and research activities through the timely and efficient handling of their administrative, financial, and business needs. The staff provides centralized College processing and support for purchasing, contracting, travel, human resources, payroll, grant budgeting and accounting, inventory management, invoicing, and payables.

Forestry Maintenance and Project Support (Rand Sether, Director)

This group of multi-talented trades workers provides comprehensive support for College facilities and research activities. From minor repairs to major remodeling projects, they help keep classrooms and labs up-to-date and capable of meeting the changing needs of instructors and researchers. The College labs contain a variety of machinery and equipment that this group keeps running in top condition. The group also designs and constructs unique research apparatus for use in lab or field experiments.

Philanthropy and the OSU Foundation (Lisa French, College of Forestry Development Director, OSU Foundation)

Philanthropy and the OSU Foundation (Lisa French, Director of Development, College of Forestry)

The silent-phase of the very first campus-wide campaign at Oregon State continues and with great success. The campaign goal for the College of Forestry has been set at \$31.5 million. Scholarships, graduate fellowships, faculty positions, and unrestricted support are the campaign priorities identified by the College of Forestry.

Once again, the loyal alumni and friends of the College of Forestry have made generous gifts totaling \$6,076,862.97 for the fiscal year ending June 30, 2006.

To all of our generous alumni and friends, we extend our sincere thanks. It is through your gifts that we are able to further the legacy of excellence found in the College of Forestry. Thank you!

Highlights of 2005-2006 include

A \$3.6 million gift from Richard Strachan, a 1978 Forest Management Graduate, to establish an endowed chair in Forest Operations Management—a new degree program in the department of Forest Engineering; in addition, Strachan made gifts to support the Lee Harris Memorial Fund, the Gibbet Hill Graduate Fellowship Fund, and the Forest Engineering Department Fund. Strachan was also instrumental in spearheading the creation of the Larry Hoffman Wildfire and Ecosystem Health Scholarship Fund, which he supported along with the Central Oregon and the Columbia Gorge Chapters of the Society of American Foresters and the family and many friends of Larry Hoffman.

The estate of Marvin and Eva Noble provided \$345,000 to establish the Marvin and Eva Noble Wildlife Ecosystem Health Fund—an interdisciplinary fund to be shared between the College of Forestry and the Department of Fish and Wildlife in the College of Agricultural Sciences.

Edmund Hayes, Jr., and Harriet Hayes continue to give generously to support the Hayes Fellowship in Forest Science, and they recently established the Hayes Silviculture Fellowship Fund with a gift of over \$101,000.

The Heinz Foundation made a gift of \$75,000 in honor of Jerry Franklin, Ph.D., to establish the HJ Andrews Long-Term Measurement Program Endowment Fund. Franklin holds bachelor's and master's degrees from the College of Forestry.

Marvin and Marcia Coats continued their generous support of the Willamette Industries Legacy Scholarship Fund by making an additional gift of \$50,000.

The Guistina Foundation continued their generous support of the Guistina Family Forest Research fund in the amount of \$35,000.

Fred Swanson, Ph.D., generously pledged \$25,000 to permanently endow The Andrews Fund to provide much-needed unrestricted support to further the scientific efforts at the HJ Andrews Experimental Forest.

Sam Wheeler, a 1950 Forest Products graduate, continued his generous annual support of the Willamette Industries Legacy Scholarship Fund with a gift of \$10,000.

Mike Barnes, a 1971 Forest Management graduate, along with Edmund Hayes, Jr., and Jack Smith, a 1939 Forest Management graduate, made generous gifts in support of the Oregon Small Woodland Association Scholarship Fund.