College of Forestry (CoF) and Oregon Forest Research Laboratory (OFRL) faculty, staff, and students completed another outstanding year across all areas of our mission. We celebrated our 100th class of graduates with a growing enrollment and a continued strong demand for graduates. Faculty and staff demonstrated extraordinary resiliency in providing a high-quality educational experience for students, in growing a world-class program of research and scholarship, and in extending results for the benefit of society and economies. Faculty demonstrated disciplinary and service leadership at local to international scales, and several received awards in recognition of their efforts. CoF faculty and administrators actively collaborated with campus colleagues in exploring opportunities afforded by Divisional alignment, both within and beyond the Earth Systems Science Division. Phase II of the OSU Strategic Plan and last year’s CoF strategic visioning exercise helped guide discussion of a future college that is timely and responsive in areas such as climate change, green building materials, water, urban forestry, and even environmental humanities, while updating core strengths that have proven value for sustaining forests, supporting rural economies, and improving urban quality of life. The College, broadly recognized as a top-ranked program among national and international peers, looks forward to another century of excellence for the benefit of Oregonians and the world. The following is a sample of our achievements over the past year.

2009–10 PROGRAMMATIC ACHIEVEMENTS

1. Brief list of key initiatives undertaken and noteworthy outcomes achieved in the following areas:

   a. Student engagement and success (for additional accomplishments, see Appendix A)

   - During the past academic year, 151 undergraduate (UG) students and 37 graduate (G) students received degrees. In all, 763 UG and 107 G students were enrolled in the CoF in AY10. UG enrollment continued the upward trend that has doubled enrollment over the past 5 years. The greatest growth is in the delivery of online degrees. Exit interviewees indicated that the combination of high-quality instruction, a friendly atmosphere, and the personal relationships they built with professors was the best aspect of their time at OSU.

   - The Wood Science and Technology (WST) UG degree in Wood Science and Engineering (WSE) was transformed and renamed “Renewable Materials.” It is the first of its kind in the country and is expected to graduate students capable of helping to address the growing demand for more sustainable “green” products and processes. This revised curriculum provides flexibility for transfer students to complete the degree in fewer terms. New students begin the program in fall 2010.

   - A proposal has been developed to transform the Recreation Resources Management (RRM) UG degree into an option within the Natural Resources (NR) Program.

   - Following the CoF reorganization in 2008, Forest Engineering, Resources and Management (FERM) and Forest Ecosystems and Society (FES) developed proposals to restructure and rebrand graduate degrees to improve marketing to new students and solidify departmental communities and support. FERM will offer graduate degrees under the title of Sustainable Forest Management (SFM). FES will establish graduate degrees under the title of Forest Ecosystems and Society.

   - The new, distance-based Masters in Natural Resources (MNR) graduate program was approved on September 8, 2010—with a queue of 25 prospective students waiting to enroll. It is designed to complement growing enrollment in the Sustainable Natural Resources Graduate Certificate Program.

   - The first student in Peace Corps Master's International Program in forestry and natural resource economics completed her initial academic year and begins a 27-month Peace Corps experience in
Ethiopia. Two new students have been accepted for fall 2010.

- In collaboration with Horticulture, a proposal was developed to create an option in Urban Forestry/Ecology, within the Natural Resources Program and within the Horticulture degree program, to be offered largely via Ecampus and supported with Ecampus income.
- The CoF offered a new study-abroad experience on climate change and natural resources focusing on Scandinavia. Ten students participated in a successful 2-week study tour in September 2009.
- The Forest Engineering (FE) and FE/CE degree programs were reviewed by ABET and accreditation was maintained. The FE degree remains unique as the only program in the U.S. professionally accredited in both forestry and engineering.
- The Student Services Office (SSO) did a superb job of supporting student success and building community in the CoF. In addition to crucial roles in recruiting and retention, the team hosted events to foster student engagement, including Annual Ring (new student orientation); Student Success! Day mini-conference; Student Awards Banquet (300+ attendees); Commencement Breakfast (200+ attendees); Student Clubs and volunteer service days to promote participation and leadership development outside the classroom; Student Photo of the Week contest; and Fernhopper daily e-Newsletter and Blog. SSO also facilitated summer and permanent jobs by conducting two resume writing workshops, facilitating the Student Job Fair (14 employers attended in 2010) and five Employer Information Nights, and collaborating with departments to foster new internships.
- A new mentor-protégé program was established with $25K in support from the CoF Board of Visitors, enabling eight faculty mentor and UG pairs to interact on research, teaching, Extension, and other creative projects. This was very successful, and additional pairs will be supported in AY 2011.
- CoF students benefit from outstanding support and facilities, including indoor and outdoor lab facilities. The McDonald-Dunn College Forests and the HJ Andrews Forest (HJA) were widely used by students and faculty from CoF and elsewhere for research, teaching, and outreach, including the following examples:
  - Two NSF-funded Research Experience for Undergraduates (REU) programs provided opportunities at the HJA for more than 20 UG students.
  - The Student Logging Training Program operates primarily on the McDonald-Dunn College Forests and benefits from more than $200k annually in industry support, enabling students to gain experience with state-of-art technology.
  - CoF made an investment to host the Institute for Water and Watersheds (IWW) Collaboratory within Peavy Hall to support research in water. The lab supported 24 different OSU graduate student users/projects from 10 different departments—up by ~40% from last year. A new laser spectrometer has been donated by Los Gatos Instruments to add unique capacity to the lab.
  - 2010 INTO students were welcomed into Peavy Hall and provided access to computer teaching labs and support from the Forestry Computing Helpdesk staff.
- The CoF awarded $354,000 in UG scholarships to 104 students and $97,600 in graduate fellowships to 22 students for AY11. Departments awarded $178,160 of additional financial support from gifts funds.
- CoF students were national “quiz bowl” champions at the Society of American Foresters Convention in 2009. Students and student groups received more than $10k in travel grants from CoF gift funds that enabled their participation in activities such as professional meetings and conferences.

b. Research and its impact (for additional accomplishments, see Appendix B)

The CoF, through the OFRL, conducts a mixture of basic and applied research that ranges in focus from discovery to decision support and at microscopic to local to global scales. In addition to individual faculty programs, the CoF/OFRL is known nationally for its research cooperatives that bring stakeholders to OSU with pooled resources. CoF/OFRL scientists also collaborated with and benefited from a large group of
courtesy faculty from the Forest Service, USGS, EPA, and other partners.

- CoF faculty obtained a total of $16,286,776 in extramural funding in FY 2010: $14,568,574 from 135 grants and agreements and $1,718,202 through the 11 research cooperatives. The FES Department was the top department in the university for new awards!
- Forestry Communications staff worked closely with OSU to promote and expand use of ScholarsArchive (SA). Research articles and reports by CoF authors have been viewed nearly 49,000 times thus far in 2010 by researchers from 147 different countries around the world.
- COF retained distinction as one of 12 national Wood Utilization Research Centers, with continued Congressional support for a USDA Special Research Grant. Work is underway with Congressional delegations and the Obama administration to secure long-term funding via a budget line within NIFA.
- The CoF and the Institute for Natural Resources (INR) are collaborating with the Forest Service PNW Research Station on a $5.5 million American Recovery and Reinvestment Act project that creates or retains about 50 jobs to work on watershed-level prioritization of land-management activities across Arizona, New Mexico, Oregon, and Washington. Integrated Landscape Assessment Project (ILAP) analysts are creating landscape information and tools that will help managers, planners, and policymakers identify high priority watersheds for cost-effective restoration and economic development. OSU received $3.62 million.
- Bev Law led a National Research Council report on methods for verifying greenhouse gas emissions for international agreements. The team provided recommendations for reducing uncertainty in emissions estimates, including emissions from agriculture, forestry, and changing land use.
- CoF/OFRL and EPA researchers collaborated to challenge fundamental assumptions about how water moves through soil in a seasonally dry climate such as the Pacific Northwest. A century of research based on those assumptions will have to be reconsidered [see Nature Geoscience 3, 100–104 (2010)].
- The CoF/OFRL added one new research cooperative and closed one in 2010, leaving 10 active cooperatives in FY2011. The new Environmental Performance of Treated Wood (EPTW) Cooperative was established under the leadership of University Distinguished Professor Jeff Morrell (WSE) with a national focus on treated wood in aquatic environments. The CoF/OFRL is closing the Nursery Technology Cooperative after 28 years, due to financial challenges affecting members and evolving member interests.
- Results from the Tree Biosafety and Genomics Research Cooperative have shown that newly tested genes created at OSU can increase the rate of growth of poplar trees in the greenhouse more than 100%, with field trials underway. New collaborations with China will allow field tests of OSU-produced genetically engineered trees that have become too costly to undertake with the strict regulations in the U.S.
- Claire Montgomery is collaborating with Institute of Computational Sustainability scientists at Cornell University to apply cutting-edge optimization methods to determine when it might be optimal to allow a wildfire to continue to burn and how to optimally place fuel treatments on a forested landscape.
- John Sessions completed a biomass availability and cost assessment for northwest Oregon, and developed supply curves for cogeneration facilities in six northwestern Oregon locations.
- Temesgen Hailemariam continued to develop (or extend) imputation and sampling methods to improve the accuracy of forest inventory and monitoring. The methods have been pivotal in multi-temporal mapping of potential forest productivity and in examining potential impacts of climate change on forests of the PNW.
- Four CoF faculty—Kaichang Li, Joe Karchesy, Lech Muszynski, and Mike Milota—and colleagues have applied for or have been awarded patents this year.
• A second NSF Industry/University Cooperative Research Center (I/UCRC) was established at OSU—this one in wood-based composites—led by Jeld-Wen Chair Fred Kamke and supported by five other WSE faculty and faculty at Virginia Tech. Oregon BEST (Built Environment and Sustainable Technologies Center) provided some matching funds for this initiative. The focus is on emissions, green building, long-term durability, sustainability, process characterization, and wood-adhesive interaction.

• The existing multi-university I/UCRC led by OSU is the Center for Advanced Forestry Systems, which remained focused on optimizing genetic and cultural systems for producing forest products by integrating research at the molecular, cellular, individual-tree, stand, and ecosystem levels. This center is an integral element of the Pacific Northwest Tree Improvement Research Cooperative portfolio.

• A new Green Building Materials Laboratory has been established at the Oak Creek Building with initial funding from Oregon BEST. This lab is a joint venture between WSE and Civil and Construction Engineering. It is being equipped with state-of-the-art equipment to make and test new, innovative low-energy products from renewable materials and concrete for green building applications.

• Additions to CoF research facilities include (1) a pilot plant to produce materials using Fred Kamke’s innovative Viscoelastic Thermal Compression (VTC) technology, (2) a pilot model of a new-generation rotary dryer that will be used to explore drying of biomass, furnish for composite materials and torrefaction of wood for energy purposes, and (3) an experimental deep-bed dryer for biomass to assess characteristics of PNW fuels and the potential of this technology to convert biomass to steam and energy.

• The HJA Forest program was awarded $348K from NSF to build a new “green” residential building at the forest to serve as a model educational facility for demonstrating energy use and conservation.

• Brenda McComb led the OSU team that developed a preproposal for an NSF Environmental Synthesis Center.

c. Outreach and engagement (for additional accomplishments, see Appendix C)

College faculty and staff developed and offered a rich suite of outreach programs that communicated research, experiential, and decision-support information to a wide assortment of stakeholders that includes professionals, woodland owners, the public, policy makers, and K-12 teachers and students. The Forestry and Natural Resources (FNR) Extension Program continued its national leadership through 15 agents covering 24 counties and 9 statewide specialists. The FNR Program is the administrative home for the Oregon Natural Resources Education Program (ONREP), the Oregon Master Naturalist Program, the Oregon Master Woodland Manager Program, and the Oregon Wood Innovation Center (OWIC). Some examples follow:

• Ties to the Land, a national award-winning educational program focused on intergenerational transfer of forestland, presented workshops to 600 participants in 15 states, developed 10 new organizational partners, and trained 40 volunteer facilitators. Forest Service grants ($300,000+) will support new curriculum development and program delivery in Oregon, California, Washington, Idaho, and Michigan over the next 3 years. This is a collaborative public/private effort between OSU FNR Extension, OSU Austin Family Business Program, and the American Forest Foundation.

• The new Pest Scene Investigator program grew its volunteer base and expanded educational offerings, with a focus on Swiss needle cast and mountain pine beetle epidemics. The Oregon Forest Resources Institute (OFRI) funded a new publication “Managing Insects and Diseases of Oregon Conifers” by D. Shaw, P. Oester and G. Filip, that assists volunteers in recommending pest management solutions.

• The Oregon Master Naturalist Program, a collaborative effort between Extension Forestry and Natural Resources, Agricultural Sciences, 4-H, Oregon Sea Grant, and the Oregon Departments of Forestry and Parks and Recreation, completed its first year with a draft statewide curriculum to be delivered online, and an evolving partnership with a citizen science program associated with
University of Washington to offer training for participants.

- In its fifth year, OWIC, a collaborative OFRL/FNR Extension initiative administered via WSE, fostered the competitiveness of Oregon’s wood-products industry through outreach, R&D, and distance education. Examples of efforts include the following:
  - R&D support was provided for numerous smaller firms in product development and testing—for example, seismic testing of a new, energy-efficient wall design enabled building code approval for use in a hybrid, zero-net-energy green-building development project
  - Successful workshops included a 4-day workshop on manufacturing plant design and quality control for 45 participants in Mexico and a new continuing education course on the impact of the Lacey Act for 41 Oregon and Washington manufacturers and 30 national participants via webinar.
  - The initial 4 of 19 modules of a Wood-based Composites Science distance learning program—launched in 2009 to target place-bound industry workers—are now available through Ecampus.

- Oregon Natural Resources Education Program engaged 1,158 K-12 educators from 24 counties in Oregon in developing sustainable natural resources and forestry education curricular materials. The Stewardship Schools project is working with Elkton, Fossil, and Triangle school districts to promote systemic practices by working with all teachers and administrators within a school for 2-3 years.

- The Teachers as Researchers project, finishing its second year, is a collaboration between HJA, OFRI, and the Oregon Department of Education. The program brings together scientists and secondary (grade 9-12) classroom teachers to focus on forest science topics and curriculum.

- The Oregon Wood Magic Program and the Wood Magic Traveling Show made 420 presentations to 27,380 students, teachers, and parents at public and private schools throughout Oregon. This science-based educational program about wood includes lesson plans and teaching materials for teachers.

- The CoF and FNR Extension hosted the first “Forest Health in Oregon: State of the State” conference. Topics included climate, fire, insects, diseases, vertebrates, weeds, and non-native invasive pests that influence decline of forests. It provided recent research, assessment tools, and emerging technology for management; there were 71 paid registrants, plus at least 15 students who participated gratis.

- The CoF hosted a module of the Forest Service’s National Advanced Silviculture Program on Inventory/Monitoring and Decision Support for 34 participants from around the U.S.

- Glen Murphy directed four all-day workshops on “maximizing value recovery along the forest-to-mill supply chain” in Western Australia, South Australia, Tasmania, and Victoria (64 participants).

d. Community and diversity (for additional accomplishments, see Appendix D)

- The CoF established the new Diversity and Social Justice Committee. One goal is to complete focus groups with campus cultural centers to understand better how the CoF can recruit minority students.

- “SEEDS” (Strengthening Education and Employment for Diverse Students) was initiated to recruit, support, and retain ethnically underrepresented students in forestry and natural resources, and fostered a new relationship with EOP/CAMP and other diversity programs across campus. SEEDS received a $30,000 contract from BLM and a $193,000 2-year grant (ARRA) from the Forest Service.

- The OSU Food Drive for Linn-Benton Food Share continued as a key community-building event; the CoF led all campus units in contributions for the tenth year in a row.

- Thirty people participated in an OSU Safe-Space Training hosted by FES Department.

e. International-level activities and accomplishments (for additional accomplishments, see Appendix E)

- Twenty-eight faculty studied, conducted research, or delivered papers abroad (including 14 invited international research presentations), visiting a total of 29 countries; and two received Fulbright or
other international awards.

- The CoF/OFRL hosted 56 international scholars, visiting scientists, and trainees, and was home to 26 international G students and 1 UG student. These visitors hailed from 30 different countries.
- The CoF/OFRL hosted Dr. Don-Koo Lee, President of the International Union of Forest Research Organization (IUFRO), the leading international forestry research body, for a sabbatical, and Giustina Professor Doug Maguire co-organized a technical session, “Statistical methods in biodiversity assessment and biodiversity responses to silviculture,” for the XXIII IUFRO World Congress in Seoul.
- Two WSE graduate students conducted research in Australia as part of their USDA National Needs Fellowships. One FES student conducted research in Ethiopia with support from three international fellowships: SYLFF OUS international fellowship; Foreign Language Area Studies fellowship, U.S. Department of Education; and Land Deal Politics Initiative award (University of the Western Cape). Two UG students attended IUFRO World Congress conference in Seoul, South Korea, and one was selected to participate in a Taiwan-funded 3-week study tour of forestry.
- Two new courses, “Global Trade with Renewable Materials” and “Global Issues with Renewable Materials” (a WIC course), have been developed and will be taught for the first time in AY11.
- Five new MOUs were completed this year, for a total of 20 current international agreements: Hawassa University–Wondo Genet College of Forestry, Ethiopia; Forestry Development Centre TAPIO, Finland; Korea Forest Research Institute, South Korea; University of Valladolid, Spain; and Chiang Mai University, Thailand.

2. Brief assessment of unit’s efforts in areas in (1): what worked; areas that need improvement; major barriers

a. On student engagement and success

Undergraduate enrollment continued to grow. New and reconfigured UG and G programs, along with planned marketing and targeted recruiting, should support further increases in majors and course enrollment. On-campus enrollment grew modestly; the greatest growth was in the Ecampus offering of the Natural Resources degree. Ecampus delivery of courses expanded and further efforts are planned. Outstanding effort and commitment by WSE faculty led to rebranding of UG Wood Science and Technology degree into Renewable Materials. FERM faculty have an ambitious plan to develop a Cooperative Education Program and a Professional School. FERM and FES faculty are working to restructure graduate programs to improve the student experience and increase enrollment; the effort to establish the new Masters in Natural Resources (MNR) program has been outstanding. In the next year, we hope collaboration with colleagues in the ESS Division and beyond will lead to new offerings in Urban Ecology/Forestry and Plant Sciences.

The major challenge associated with increasing enrollment, especially for on-campus courses, is funding additional sections of courses and staffing advising in a time of shrinking E&G resources. Recognizing that the same challenge is faced across the university, the current model for funding teaching does not reward enrollment growth. The funding model for teaching also does not provide an incentive to provide service classes for the campus community. The current cross-campus access challenges are likely to create problems that will delay graduation for CoF students. The funding model is better for growth in Ecampus course and degree enrollment, but growth in the Ecampus version of the NR degree requires investments in advising that are not currently supported.

Private gifts and growth in external research funding are helping support graduate program recruiting, but enrollment is negatively impacted by unfilled vacancies after key faculty retirements. Some faculty are making greater use of post docs and FRAs to efficiently manage expectations for increasing research funding, at the expense of supporting the graduate education mission.

b. Research and its impact

The disciplinary breadth and distinction of the CoF/OFRL research portfolio continues to be impressive. Faculty did a remarkable job of preparing proposals and competing for funding in a mixed recessionary and stimulus environment. Many proposals engaged collaborators across campus and beyond the university.
College faculty obtained substantial funding via ARRA.

Several faculty received awards for their science and innovation leadership; some were called upon by policymakers to share their expertise; and a remarkable number served in research leadership roles at regional, national, and international levels.

College faculty and administrators provided leadership for the development of several large multi-disciplinary and multi-institutional proposals, including the OSU proposal for the NSF Environmental Synthesis Center (unsuccessful); the USDI Climate Change Center (successful); IWW NSF Willamette Basin Project (successful); and several AFRI proposals. Federal RFAs are increasingly complex and require a large time and financial commitment to prepare successful proposals. They represent a challenge for teamwork among the faculty, colleges, centers and institutes, and the university. There are perceptions among faculty that improvements in processes and policies in Sponsored Programs and OPAA would yield more proposals and happier faculty.

The current federal agency strategy of large and complex project RFAs will make it increasingly difficult for less experienced, early-career faculty to compete for competitive grants to support promotion dossiers.

As state resources decline, the decision on how to best deploy faculty talent, both in terms of student success and grantsmanship, becomes a greater challenge. Assigning successful research faculty to more UG teaching can save on instructor costs, but likely at the expense of time for preparing proposals.

The funding challenges facing Oregon’s Statewide Public Service units are becoming acute for units that support faculty through split appointments in teaching and research/extension. The ability to support funding shortfalls with growing tuition revenue would help sustain the COF/OFRL top-tier status for the future. Reductions in the Oregon timber harvest further reduced revenue received by the OFRL in 2010 by around $2.5 million; with the current housing market outlook, recovery is unlikely soon.

c. On outreach and engagement

COF/OFRL faculty and staff, with integral linkage to the FNR Extension Program, had an outstanding year in outreach and engagement. Faculty in the FNR Program were aggressive in leveraging state support with more than $2.5 million dollars in outside funding and in seeking external partners. Some newer programs, such as Ties to the Land, matured and expanded from the regional to the national scope. Partnerships have enabled the hiring of new staff, adding fresh ideas and capacity to the outreach portfolio.

The declining financial support for Statewides also affects the FNR Extension Program and could diminish program accomplishments in the future. Support for county-based FNR programs was mixed this year, with the passage of a tax measure supporting Extension in Clackamas County and the failure of a similar measure in Lane County, jeopardizing its future in that county.

d. On community and diversity

The newly reconfigured CoF Diversity and Social Justice Committee (DSJ) benefitted from enthusiastic leadership by Brenda McComb. DSJ has already sponsored events within the CoF and has encouraged participation in events offered elsewhere on campus. Progress in diversifying the faculty has been slow in the absence of new T/TT faculty hires, though several women were hired through soft money faculty appointments. Efforts to diversify the UG population should benefit from BLM and Forest Service funding that will support aggressive development of the new SEEDS program, in partnership with campus partners EOP and CAMP. Joint efforts between DSJ and SEEDS over the next year will be aimed building stronger connections with campus cultural centers.

e. On international-level activities and accomplishments

Many CoF faculty are active in international work and eagerly extend OSU’s reputation worldwide. The CoF is widely recognized globally, with the long list of international faculty and student visitors a testament to our reputation. The level of faculty international engagement and leadership is remarkable, given the relatively small investment in this area by both the college and the university. Greater investments in international programs and the Research Office would better position OSU to take advantage of the many
apparent opportunities to grow our international visibility and impact. Recent experiences suggest that OSU is not well positioned to compete against institutions that have made this a higher priority.

3. Brief summary of major faculty and student awards (for more details, see Appendix F)

<table>
<thead>
<tr>
<th>Faculty or Student</th>
<th>Award</th>
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<tbody>
<tr>
<td>Temesgen Hailemariam</td>
<td>Emerging Scholar 2009, OSU Phi Kappa Phi</td>
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<tr>
<td>Rakesh Gupta</td>
<td>Society of Wood Science &amp; Technology, George Marra Award for Excellence in Writing—First Place</td>
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<tr>
<td>Kate McCulloh</td>
<td>New Phytologist Tansley Medal paper competition—Runner-up</td>
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<tr>
<td>David Smith</td>
<td>Distinguished Service Award, International Wood Composites Symposium</td>
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<tr>
<td>Edward C. Jensen</td>
<td>President’s Award, Oregon Community Trees</td>
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<tr>
<td>Jim Kiser</td>
<td>Dar Reese Excellence in Advising Award, OSU</td>
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<tr>
<td>Marv Pyles</td>
<td>Fellow Grade, American Society of Civil Engineers</td>
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<tr>
<td>Scott Leavengood</td>
<td>Awesome Force Award, OSU Forestry and Natural Resources Extension</td>
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<tr>
<td>Bo Shelby</td>
<td>Outstanding Contribution to River Management, River Management Society</td>
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<tr>
<td>Arijit Sinha, WSE PhD student</td>
<td>2010 Wood Award, Forest Products Society, outstanding paper from thesis</td>
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<tr>
<td>Cody Hale, FERM PhD student</td>
<td>2009 Horton Research Grant from the American Geophysical Union</td>
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<tr>
<td>Logan M. Bernart, Richard Mosier, WSE students</td>
<td>Robert E. Dougherty Scholarships, Composite Panel Association, 2010</td>
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<tr>
<td>HJA LTER Group</td>
<td>The Long Term Ecological Research (LTER) Network received the 2010 American Institute of Biological Sciences Distinguished Scientist Award.</td>
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<tr>
<td>Scott Russell Sanders, HJA Writer-in-Residence</td>
<td>HJA LTERReflections received John Burroughs Essay Award for Natural History</td>
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2009-10 RESULTS AND OUTCOMES

1. Performance on college-level metrics (see attached tables)

2. Key initiatives to leverage E&G and other base resources and to improve administrative efficiencies

The CoF surpassed its initial capital campaign goal of $31.5 million. The college filled two new endowed faculty positions. Gifts also provided new equipment that benefited students and research facilities, including new harvesting equipment from Papé that supports the Student Logging Training Program. The CoF Board of Visitors added three new members to this campaign support steering committee, with their $10 K per year gifts and commitment to a future major gift.

The CoF/OFRL was highly successful in competing for external grants, contracts, and agreements, maintaining a nearly 6:1 leverage against the state General Fund OFRL appropriation. Despite a very challenging financial environment for many members, our 11 research cooperatives—the primary focus of our industry partnerships—generated more than $1.7 million in dues and accounted for 10.5% of our total research funding. One new research cooperative was established, which will have a national focus with a new suite of members, and one new NSF Industry/University Cooperative Research Center (I/UCRC) was established. A new Green Materials Laboratory benefitted from an investment partnership by Oregon BEST.

The CoF/OFRL completed the transition of its business office into the new Forestry, Oceanic and Atmospheric Business Center (FOBC).
### College of Forestry 2009-2010

**Goal 1: Provide Outstanding Academic Programs**
2004-05 Themes: Increase research and outreach  
Increase diversity

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<tr>
<td>1.1 Total R&amp;D Expenditures</td>
<td>$18,270,617</td>
<td>$20,577,008</td>
<td>$23,892,923</td>
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<td>1.2 Invention Disclosures°</td>
<td>2</td>
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<td>3</td>
<td>0</td>
<td>3</td>
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<td>1.3 % of Faculty, Staff, and Students Comfortable with Climate for Diversity</td>
<td>N/A</td>
<td>68.3</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
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<td>1.4 % of U.S. Minority Students of Total College Enrollment</td>
<td>7.1</td>
<td>7.3</td>
<td>7.2</td>
<td>7.3</td>
<td>7.5</td>
<td>7.0</td>
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<td>1.x.1 External Funds Generated per State Dollar Invested in Statewide Public Services (FRL)</td>
<td>6.25</td>
<td>6.80</td>
<td>6.81</td>
<td>6.63</td>
<td>6.02</td>
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**Goal 2: Improve the Teaching and Learning Environment**
2004-05 Themes: Improve student success and retention  
Increase diversity

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<tbody>
<tr>
<td>2.1 First Year Retention Rate (% Within College / % Within University)</td>
<td>75.0 / 80.0</td>
<td>69.4 / 86.1</td>
<td>70.5 / 81.8</td>
<td>63.3 / 73.5</td>
<td>66.7 / 82.2</td>
<td>61.8 / 83.6</td>
<td>67.3 / 86.5</td>
<td>Mar 2011</td>
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<tr>
<td>2.2 6-Year Graduation Rate (% Within College / % Within University)</td>
<td>57.7 / 59.0</td>
<td>41.2 / 56.9</td>
<td>46.8 / 68.1</td>
<td>52.5 / 62.5</td>
<td>55.2 / 69.0</td>
<td>62.5 / 72.5</td>
<td>44.4 / 72.2</td>
<td>Mar 2011</td>
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<tr>
<td>2.3 Undergraduate Degrees Awarded</td>
<td>86</td>
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<td>79</td>
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<td>2.4 Graduate Degrees Awarded</td>
<td>51</td>
<td>46</td>
<td>47</td>
<td>43</td>
<td>43</td>
<td>41</td>
<td>51</td>
<td>39</td>
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<tr>
<td>2.5 % of Seniors Participating in Student Engagement Activities / Number of Respondents</td>
<td>N/A</td>
<td>75.0 / 8</td>
<td>93.3 / 15</td>
<td>N/A</td>
<td>80.7 / 62</td>
<td>N/A</td>
<td>N/A</td>
<td>Nov 2010</td>
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<td>2.6 Student Primary Major to Faculty FTE Ratio / Student Course to Faculty FTE Ratio</td>
<td>14.1 / 10.2</td>
<td>13.0 / 9.0</td>
<td>14.3 / 9.3</td>
<td>21.1 / 12.9</td>
<td>20.5 / 11.7</td>
<td>27.7 / 15.7</td>
<td>22.0 / 13.0</td>
<td>24.0 / 13.1</td>
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**Goal 3: Increase Revenues**

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<tbody>
<tr>
<td>3.1 Awards from Grants and Contracts (# / $)</td>
<td>149 / 8,101,750</td>
<td>168 / 14,074,018</td>
<td>161 / 17,566,572</td>
<td>157 / 12,614,264</td>
<td>138 / 9,488,854</td>
<td>125 / 8,630,135</td>
<td>118 / 12,770,634</td>
<td>160 / 14,568,574</td>
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<tr>
<td>3.2 Annual Private Giving</td>
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<td>--</td>
<td>54,163,291</td>
<td>51,720,537</td>
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° Invention Disclosure data for FY 2005 and 2006 is reported based on fiscal year, while data for 2002-03 and 2003-04 are based on calendar years. This change was made for '05 and '06 so that the numbers correspond to the data period requested by the annual Association of University Technology Managers (AUTM) survey, completed by the OSU Office of Technology Transfer.

¹ For 2004-05, two USDA grants for the Center for Wood Utilization Research were eliminated based on the definition, which states awards include only external competitive awards. The two awards deleted from the Forestry totals were basically provided to a number of universities on a formula basis. Data for other years may contain non-competitive grants/contracts and Federal formula funds.

² For FY03-FY08, the number of awards is equivalent to the number of accounting transactions made under a college’s award index, rather than the number of awards received by the college.

Notes:
1) For FY 2003, 2004, and 2005, all awards affiliated with both a campus department and the OSU Extension Service were reported under the affiliated campus department. Beginning FY 2006, these awards will be reported under the OSU Extension Service and not the campus department or college. College of Forestry award metrics include Forest Research Lab (FRL).

2) In 2007, Seventy-seven (77) students who were previously allocated to the NR degree within CAS were reallocated to COF. This reallocation should be considered in the interpretation of enrollment, degrees awarded, retention, and SCH data.

“N/A” -- Not Applicable

Numbers in Italics are estimates.
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<td>Faculty FTE</td>
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<tr>
<td>Professional</td>
<td>86.7</td>
<td>83.1</td>
<td>86.8</td>
<td>79.5</td>
<td>78.1</td>
<td>80.1</td>
<td>78.0</td>
<td>63.9</td>
<td>58.5</td>
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<td>114.7</td>
<td>122.1</td>
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<td>133.2</td>
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<td>190.4</td>
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<td>Total Faculty Headcount</td>
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<td>E&amp;G - Initial Budget ($)</td>
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<td>*Awards from Grants and Contracts (##) [1]</td>
<td>152</td>
<td>153</td>
<td>140</td>
<td>149</td>
<td>168</td>
<td>161</td>
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<td>138</td>
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<td>SCH by Course Level (Academic Year)</td>
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<td>5,939</td>
<td>5,923</td>
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<td>149</td>
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<tr>
<td>Total Degrees</td>
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<td>127</td>
<td>125</td>
<td>137</td>
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<td>108</td>
<td>122</td>
<td>149</td>
<td>165</td>
<td>183</td>
<td>177</td>
<td>7.3%</td>
</tr>
</tbody>
</table>

Notes:
1) Numbers in italics are estimates.
2) For FY03-FY08, the number of awards is equivalent to the number of accounting transactions made under a college’s award index, rather than the number of awards received by the college.
3) Tenured/tenured-track faculty headcount and FTE include faculty funded by E&G funds at 50% and greater. 4) In 2007, seventy-seven (77) students who were previously allocated to the Natural Resources degree in the CAS were reallocated to COF. This reallocation should be considered in the interpretation of enrollment, degrees awarded, retention, and SCH data.

* For 2004-05, two USDA grants for the Center for Wood Utilization Research were eliminated based on the definition, which states that awards include only external competitive awards. The two awards deleted from the Forestry totals were basically provided to a number of universities on a formula basis. Data for other years may contain non-competitive grants/contracts and Federal formula funds.

***Source: Enrollment Summary.
[1] Includes Forest Research Lab.
[2] Roger Admiral: Your grant definition eliminated two USDA grants for Center for Wood Utilization Research. These are basically provided to a number of universities on a formula basis.
[3] See comment for Awards (Grant, Contract) (#).
[4] Roger Admiral: Your grant definition eliminated two USDA grants for Center for Wood Utilization Research. These are basically provided to a number of universities on a formula basis.
These are important accomplishments that were not included in the main body of the report because of space limitations.

Appendix A. Student engagement and success

i. Facilities and support units

- **Student Services Office** maintained community college articulation agreements and articulated transfer coursework; monitored BAC Core requirements; enrolled students in degree partnership programs; assisted post-baccalaureate student application, review, and advising; and coordinated course-based enrollment management across the College.

- **Computer labs and helpdesk.** The Forestry Computing Helpdesk provides support to students, faculty, and staff, such as software training workshops and by maintaining 50 specialized software packages required for classes; 37 of these applications are only available in the CoF student computing labs, and students have 24-hour access.

- **Writing support.** The Forestry Communications Group (FCG) provided individualized writing instruction/guidance for the WSE Senior Projects course WSE 411 throughout the academic year. This 3-term series of writing intensive courses emphasizes skills in critical thinking, analysis and problem solving, and in making oral presentations. Students typically pick a project of interest in conjunction with a faculty advisor and frequently with an industrial sponsor. FCG mentors met bi-weekly with students during fall and spring terms.

- **College Forests.** 11,500 acres of College Forests are located 20 minutes from campus and provide outstanding opportunities for research and participation in forestland management activities. The Forests supported a variety of courses from the CoF and other campus departments, including two senior capstone classes; employed and mentored several students; and facilitated operations for the Student Logging Training Program, a unique and comprehensive educational program.

- **HJ Andrews Experimental Forest (HJA).** As a part of the National Science Foundation Long Term Ecological Research (NSF-LTER) program, the HJA hosts long-term field experiments and measurement programs focused on climate dynamics, streamflow, water quality, and vegetation succession, as well as classes from a variety of colleges and universities. OSU faculty serve as PIs, with CoF Spaniol Chair Barbara Bond as lead PI for the LTER. HJA is an iconic research facility on par with Woods Hole for oceanography, NCAR for atmospheric research and JPL for space research.

- **CoF departments conducted or sponsored series of seminars and graduate student sympsia to help engage OSU students in the scientific community. CoF graduate students participated both in presenting research and as organizers of events.**

ii. Enrollment and graduation data

- Enrollment in FERM’s graduate program also increased from 33 in 2008 to 38 in 2009; and 12 graduate students completed their degrees this year (7 with master’s degrees and 5 with PhDs).

- All of the UG programs administered by FERM enjoyed expanded enrollment in 2009 and stable or slightly increased numbers of women, minorities, and non-resident international students. FERM graduated 44 undergraduate students this year, up about 30% from last year. This growth has forced addition of more sections and encouraged development of new classes.

- The total number of graduate students supervised by FES faculty was 66 (38 doctorate, 29 master’s)
and there were additional students in other graduate programs advised by FES faculty (e.g., Environmental Sciences, Fisheries and Wildlife, Applied Economics); 19 graduated.

- FES UG majors increased from 385 to 457, largely through Ecampus additions.
- The Natural Resources Interdisciplinary Program has its administrative home in FES. The faculty have adopted this program as one that many would like to foster, as it alters its curriculum and adds options (such as Recreation and Urban Forestry). As a result of University guidelines on program size, FES will incorporate the current Recreation Resource Management program into the NR degree as an option. Enrollment in the Natural Resources program is exploding; the only concern with that program is how to continue to advise an increasing number of students.
- The UG Tourism and Outdoor Leadership program also has its home in FES but is administered from the Cascades campus.
- FES graduate students are split primarily between those in the Forest Science program and those in the Forest Resources program, with students also in Applied Economics, Environmental Science, Conservation Education, and Wildlife and Fisheries.
- FES serves as the home department for the Sustainable Natural Resources Certificate Program and the newly developed Masters of Natural Resources Program that is available as an on-line graduate degree program as of fall 2010.
- FES has developed a Category 1 proposal to revise the Forest Science Graduate degree program into a departmentally based Forest Ecosystems and Society Graduate Program that will serve social as well as biophysical science students in our department, while effectively retiring the Forest Science and Forest Resources degree programs.
- Five WSE students graduated from the UG WST program in AY10 and all found jobs. Starting salaries remain in the $40-60,000 range. While the economy has contracted the job market, the demand continues to outstrip supply in the region. All indications are that demand will build significantly in AY11.
- A number of MS and PhD students in WSE completed their programs this year (7 MS, 3 PhD). Based on current offers and acceptances we expect that the Fall 10 census to be considerably larger.
- Student exit interviews in AY10 point to effective advising, the caring nature of the faculty and career/internship counseling as a major factor in their success and strength of WSE. This is one of the competitive advantages of WSE compared to programs with larger enrollment such as engineering and business.

Appendix B. Research and scholarship productivity and impacts.

i. Highlights of research contributions:

- CoF faculty published 211 refereed journal articles and 71 other non-extension publications; gave 141 research presentations and 181 outreach/extended education presentations; and serve as editors or on editorial boards for 31 research journals.
- Jo Albers found that establishing large parks in some settings leads to less conservation or more forest degradation than the establishment of small parks with surrounding zones where resource extraction occurs legally. Without this kind of integrated ecological-economic-behavioral framework, policies fail to meet conservation or rural development goals.
- Matt Betts recently found that even a highly mobile species of tropical hummingbird is sensitive to fragmentation of tropical forest; it alters its movement to remain under forest cover when possible. This has potential implications for pollination of tropical herbaceous plants that depend on this species and ones similar to it for reproductive success.
- Bryan Black used tree-ring techniques to develop growth-increment chronologies from long-lived rockfish species. He found that rockfish chronologies strongly relate to records of seabird reproductive success, and that the relationship is due to a shared sensitivity to upwelling during the
winter months, especially February.

- John Bliss documented the disintegration of the industrial forest estate and its impacts on rural America. No region of the country has escaped this radical transformation of forestland from commodity production lands to investment vehicle.

- Lisa Ganio worked with Travis Woolley to evaluate the ability of published logistic regression models to predict post fire mortality. The result will be useful for managers who wish to identify trees for salvage logging.

- Mark Harmon and Carlos Sierra used a simulation model to predict that variability of temperature reduces the carbon store in forests. It is not only the increase in temperature that must be considered during climate change, but also year-to-year temperature variability, which influences the amount of carbon that is stored.

- Glenn Howe developed the Seedlot Selection Tool (SST), a web-based decision support tool that forest managers can use to determine which seed sources are appropriate for planting at a given location under a specific climate change scenario. This tool will help forest managers maintain forest health and productivity under changing climates. Robert Kennedy’s LandTrender tools provide new ways that satellite imagery can capture the pulse of landscapes. Information from time series maps and LandTrender output help land managers to make better decisions about management, policy makers to better balance tradeoffs among diverse landscape services, ecologists and social scientists to better understand drivers of natural and anthropogenic processes, and modelers to better understand how their view of the future can be constrained by observations of the recent past.

- Olga Krankina estimated that implementation of the Northwest Forest Plan resulted in a significant increase in carbon (C) stores in affected forest lands. Between 1992 and 2010 the net increase in forest C stores in western Oregon was approximately 1.48 TgC/year. Considering the annual fossil fuel emissions in Oregon at about 15 TgC/year, the gain in C stored on forest lands under NWFP represents a 10% offset and is projected to increase at a slightly increased rate.

- Mark Needham studied shore-based whale watchers who participated in the "Whale Watching Spoken Here" program along the Oregon coast. Participation in these types of programs fosters a stronger environmental ethic, which in turn makes people more aware of the consequences of their own personal actions on animals and ecosystems.

- Randy Rosenberger identified four primary types of selection bias that may affect a body of scientific literature, including research priority selection, methodological selection, publication selection, and sample selection. All of these forms of selection can affect the distribution and reliability of applying research outcomes to policy analysis.

- Steve Strauss has identified hundreds of new or newly involved genes related to shoot regeneration in vitro and stem development in trees.

- Bev Law and her student Garrett Meigs quantified carbon emissions for mixed severity fires (low, moderate, high) in two forest types in central Oregon to improve estimates of fire emissions in relation to fossil fuel emissions.

- Jo Tynon and Josh Bauer found that not all Americans are participating in outdoor recreation to the same degree. National parks and national forests are not meeting their mandates as well as they could in serving the needs of racial and ethnic groups in the United States.


- LiDAR (Light Detection And Ranging) technology has revealed features of the HJA landscape that
have not been seen sharply until now. The data are allowing researchers to see fine features of the landscape and to characterize vegetation structure for ecological and forest management studies and objectives. The LiDAR data analysis is funded, in part, through the NSF grant, “Long-Term Ecological Research at the H.J. Andrews Experimental Forest (LTER6)”

- Claire Montgomery and Michael Wing were awarded $480k for 3 years to participate in a major USDA FS ARRA grant on integrated priority areas for fuel treatments in the west (includes graduate student support at OSU).
- Jeff McDonnell was awarded $314k for 3 years to develop instrumentation and watershed characterization for assessment of hydrologic and water quality.
- David Shaw was awarded $276k for 5 years to study how to manage forest-fire fuel loads by limiting mortality caused by bark beetles and sudden oak death. David Shaw and Steve Fitzgerald were also awarded $262k for 3 years to study the influence of pine bark beetle mortality on forest fires in southern Oregon.
- Doug Maguire received a new grant to develop innovative techniques to evaluate forest soil productivity.
- Darius Adams and Greg Latta were awarded $295k by the Forest Service to study climate change impacts on forests and forest-based mitigation options and their costs.
- Kevin Boston received funding for the first phase in examining post-fire determination of standing activities using LiDAR and downed tree volume and optimizing restoration management activities using LiDAR.
- Temesgen Hailemariam has begun a new project on riparian function and stream temperature with a 1-year grant of $126k from the Oregon Department of Forestry.
- Marv Pyles has undertaken a study on the effect of implementation of the fluvial performance standard on maintenance of bridges and culverts with the Oregon Department of Transportation.
- John Sessions’ research concentrated on an array of projects aimed at improving the efficiency of biomass harvesting and transportation. He developed chip van transportation models and road assessment procedures for evaluating biomass operations in steep terrain, and new decision support tools for evaluating economic feasibility of biomass operations and evaluating approaches to improve vehicle logistics.
- John Bailey’s Wildland Fire Lab completed data collection and analyses on two projects: (1) age structure, fire history, and community shifts over time within the ponderosa/lodgepole pine ecotone in central Oregon; and (2) post-fire snag and coarse wood dynamics in central Oregon—implications on fuel reaccumulation and stand dynamics. They collected data in southwestern Oregon on stand structure, fire risk, and northern spotted owl habitat quality for an ongoing study, and initiated work on several new areas: the role of post-fire salvage on fuels and stand dynamics, the use of restoration and fuel treatment byproducts for bioenergy, and coupling fuel treatment alternatives and fire risk with human behavior systems. In wetter forest types, the Silviculture Lab continued work on promoting structural development under variable densities and arrangements of thinning treatments, as well as the impact of precommercial thinning and vegetation management in spruce/hemlock stands in southeast Alaska.
- Glen Murphy and his post doc, Joshua Clark, developed techniques for biomass assessment using hemispherical photography. Josh’s work was carried out in Douglas-fir and ponderosa pine/lodgepole pine stands in Oregon and mixed conifer stands in northern California. MS student Bodie Dowding estimated spatial changes in acoustic velocity (a surrogate measure for wood stiffness) of felled Douglas-fir stems. This is a necessary step for implementing stiffness-based log optimization and sorting on mechanized harvesting heads on an array of projects aimed at improving the efficiency of biomass harvesting and transportation.
- Loren Kellogg completed field studies and data collection on skyline harvesting and residual stand
damage for stand diversity development in young coastal forests. He submitted three co-authored referred journal publications on mechanical forest fuel reduction operations and integrated harvesting with biomass utilization, and another comparing alternative cut-to-length harvesting technologies for mechanical thinning.

- Temesgen Hailemariam has been appointed to serve on the editorial boards of Forest Ecology and Management and Western Journal of Applied Forestry Research.

- Doug Maguire and Tzeng-Yih Lam completed analysis of two general methods for enhancing our understanding of biotic responses to variable-retention harvesting. The first involved assessing the efficacy of zero-inflated statistical models for detecting responses of rare species. The second involved structural equation modeling for testing complex mechanisms driving late-seral herb responses to overstory retention. The Center for Intensive Planted-forest Silviculture (CIPS) made good progress toward developing a new set of equations for simulating young stand development, specifically tree growth (diameter and height), tree mortality, and development of competing vegetation. In the forest nutrition arena, 3-year growth re-measurements were completed on the 'Beyond N' fertilization trials, and branches were sampled and processed from trees fertilized during the previous year under a Giustina Innovation Grant.

- Robin Rose constructed and tested an in situ freezer to determine the cold hardiness of seedlings in nursery beds; the first time this has been attempted. If this freezer can be made operational it will allow nursery managers to determine suitability for storage from field tests rather than sending seedlings off to a testing lab. In another project he created a model to demonstrate the cold hardiness of various Douglas-fir seed lots sent into the Seedling Quality Evaluation System lab over the past 10 years. This one of a kind data set shows how Douglas-fir goes into a cold hardiness state over the period from fall to winter on a regional basis. A new project was implemented that will show how cover changes on various sites using vegetation pictured as pixels or "vixels". This project also looks at how four different weed species photosynthesize over a growing season and how individual weed photosynthesis responds to drought. The experiment will help to guide managers toward new ways of thinking about vegetation control to increase Douglas-fir seedling growth.

- Dave Shaw and the Swiss Needle Cast Coop used dendrochronological techniques to provide further evidence that the epidemic is intensifying and can be a major issue in older trees, as well as in plantation trees. They have synthesized the considerable knowledge of this disease into an Integrated Pest Management strategy and have a paper in press that will provide the basis for extension outreach. They have two studies currently underway to determine the disease’s response to fertilization.

- Claire Montgomery is collaborating with scientists at the USDA Forest Service Pacific Northwest Research Station and the Institute of Natural Resources at OSU to develop indicators of how forest-fire fuel treatments impact communities that could receive woody biomass for processing.

- Arne Skaugset and the Watershed Research Coop collected the first summer of data after the second harvest entry in Hinkle Creek. During that entry harvest units were placed adjacent to the main stem and tributary fish-bearing streams. Stream temperature data was collected to evaluate the impact of the timber harvest on stream temperature. They also collected micro-meteorological data and the low flow hydraulics of the streams was detected using dye-tracer dilution methods. This research helps determine the proximal cause of any harvest related impacts to stream temperature. The results are the best look at the cumulative impacts of timber harvest on stream temperature at a watershed scale that exist. The results were highly variable and, at times, counterintuitive. For some stream reaches where measurable amounts of shade were removed, increases in stream temperature were observed. For other stream reaches where timber harvest resulted in increased summer low flows and in stream reaches with significant amounts of hyporheic flow, decreases in stream temperature were observed. No detectable changes in stream temperature were observed at the mouth of the 3rd order, 2,500 acre watershed. It was not possible to identify impacts on stream temperature that could be labeled “cumulative impacts” for a
number of reasons.

- Michael Wing recently completed a project using GPS to monitor biomass transportation. He continues to serve on the editorial board for the *Journal of Forestry* and as faculty advisor for the OSU chapter of the American Society for Photogrammetry and Remote Sensing.

- Paul Adams reviewed detailed changes in Oregon’s Forest Practice Rules adopted over the past decade, in preparation for an update of the popular publication “Oregon’s Forest Protection Laws – An Illustrated Manual,” which is being revised with the assistance of the CoF’s Forestry Communications Group. He also reviewed policy proposals for federal forest lands to assist in professional responses by the Society of American Foresters. Adams helped organize and conduct field tours for federal, state and local policy and decision makers, which featured department research studies and key findings.

- A project led by Lech Muszynski on using woody biomass in sustainable bio-composites for highway signs and other products is generating considerable interest from local entrepreneurs, rural community leaders associated with the Oregon BEST initiative, and the ODOT sustainability office. The research team is evaluating the viability of sustainable infrastructure products for highway applications and progress toward other goals of rural communities (safe/healthy forests and sustainable job creation). The project was summarized at two invited Oregon BEST meetings and featured as a showcase project in the Oregon BEST “e-news update” in July 2009.

- Mike Milota developed and built an experimental deep-bed dryer for biomass to assess characteristics of PNW fuels and feed stocks and the potential for this technology to efficiently and cleanly convert biomass to steam and energy. This is part of a project to develop a low-cost, energy efficient and scalable dryer for biomass to increase fuel value and reduce transportation costs by reducing water content.

- One barrier to energy efficiency and product quality with drying hemlock lumber is highly variable moisture content in charges of lumber taken from the dry kiln. This results in either over drying some parts, resulting in lower quality and wasted energy, or under drying other components, resulting in a need to redry or to accept lower value. Research by Mike Milota discovered the key factors in hemlock that caused this variability and showed that relatively simple and inexpensive techniques of presorting can reduce variability by half and result in significant cost savings and higher value.

- John Nairn has developed several software programs that are at the core of his research program in computational mechanics of composite materials. One program performs 2D, static, finite element analysis (FEA) and the other is a robust package for dynamic, 2D/3D material point method (MPM) calculations. These tools enable Nairn’s research group to solve a variety of very complex problems with anisotropic materials, explicit crack growth, imperfect interfaces, fracture problems, and coupled moisture transport, heat conduction, and mechanics. The software is freely distributed around the world to other scientists and engineers through Nairn’s web site. Over 500 copies have been downloaded since January 2010 and Nairn’s web page is the most often visited site on the WSE web.

**ii. Research cooperative highlights and impacts:**

The 11 research cooperatives of the CoF seek to advance science; resolve management, business, and environmental issues in Oregon and beyond; and provide a continuous program of outreach to a broad spectrum of forestland owners, agencies, and lay public groups.

- The **Environmental Performance of Treated Wood (EPTW) Research Cooperative** is a new cooperative established this year with eight charter members under the leadership of Jeff Morrell. The members are treating or chemical companies in the Northwest. A new analysis lab is being constructed in the west bay of the Oak Creek Building and a lab manager has been hired. The goals for this new cooperative are as follows:
• Develop fundamental data on preservative migration from wood
• Develop standardized accelerated methodologies for assessing treated wood risks
• Work cooperatively to develop and improve models to predict the risk of using treated wood in various applications
• Assess the effectiveness of various best management practices
• Identify improved methods for reducing the potential for migration
• Evaluate the environmental impacts and identify methods for reuse, recycling and/or disposal of preservative waste wood taken out of service.

• The **Utility Pole Research Cooperative** continues to increase its membership despite the economic downturn and now has 21 members. Members are electrical utilities and suppliers from across the U.S. The focus of the UPRC is to extend the life of the wood-based infrastructure in the nation’s electrical utility grid using environmentally appropriate means and to maintain the long-term role that wood plays in ensuring cost-effective and reliable distribution of electricity. The work of this coop is very important to Oregon consumers who depend on electricity and to Oregon landowners who benefit from the high market potential of pole timber. The price for pole timber is over four times that of saw logs.

• A major study of the strength and stiffness of wood poles was completed this year under the Utility Pole Research Cooperative. Over 100 poles, each 40 ft long were tested to determine the effects of through-boring patterns on strength and to assess techniques to identify compression breaks in poles before treating. Compression breaks are a serious problem for PNW landowners and manufacturers because they generally cannot be detected in the field and yet they reduce pole timber value by more than 60% when discovered. Initial results are being used to support changes in national standards that limit use of Douglas-fir poles. Follow-up studies are underway to address some of the findings about compression breaks. The broken poles were cut up into firewood by volunteers and proceeds from the sale of the firewood were donated to the Linn-Benton Food Share.

• The **Watersheds Research Cooperative** (WRC) has three major paired watershed studies underway, each at a different stage of progress over the past year.
  o Roseburg Forest Products completed the second harvest entry adjacent to fish bearing reaches in the South Fork of Hinkle Creek. Plum Creek initiated the first entry in the Alsea Study. Eight flumes have been installed in the Trask Study to measure discharge in headwater streams. The landowners (BLM, Roseburg Forest Products, ODF, Plum Creek, Weyerhaeuser, and USDA Forest Service) all remain enthusiastic and, while financial contributions are down, Oregon Forest Industries Council, Douglas County, and Roseburg BLM have contributed sufficient funds to maintain the studies during very difficult times.
  o WRC hosted a State Board of Forestry field trip in July 2009 to Hinkle Creek to discuss policy implications.

• The **Center for Intensive Planted-forest Silviculture** (CIPS) was formally established (15 members) and the first set of funded projects was initiated in 2009. The mission to facilitate collaboration among existing research cooperatives was pursued by a project on modeling young stand development, making use of expertise and data from the Vegetation Management Research Cooperative and Nursery Technology Cooperative and modeling expertise from CIPS. Resulting growth equations transform data from designed experiments into a form more readily incorporated into client decision-making tools.

• The **Hardwood Silviculture Cooperative** has been providing information for foresters interested in hardwood management for over 20 years. Red alder is poised to become the next extensively managed timber species in the PNW largely because of the work of this group.
  o Work with ORGANON, the forest growth and yield modeling system, is nearing completion of a
plantation alder version. With this tool, foresters will be able to see the productive potential of red alder and make informed decisions about its management.

- The cooperative continues to maintain the oldest and most extensive red alder growth database in existence.

- The **Swiss Needle Cast Cooperative (SNCC)** was established in January 1997 to conduct research on Douglas-fir productivity and forest health in the presence of Swiss needle cast (a native fungus) and other diseases in coastal forests of Oregon and Washington. The 2009 aerial survey found over 300,000 acres visibly impacted by the disease in Oregon, but the impacts are spread over 2,000,000 acres.
  - SNCC recently developed an integrated pest management strategy for Douglas-fir forests in the Oregon Coast Range. This strategy is based on 14 years of aerial survey data and on-the-ground growth impact plot data, as well as new models that predict growth impacts from existing tree growth models (ORGANON). Results are being applied in land management decisions by forest companies, ODF, USDA Forest Service, and BLM.
  - The epidemiology of the disease is closely associated with weather, so current efforts include modeling the spread of disease given various climate change scenarios and the economic implications of these changing disease thresholds.
  - Collaborations with the Pacific Northwest Tree Improvement Research Cooperative are resulting in identification of needle cast tolerant families of Douglas-fir.

- The **Pacific Northwest Tree Improvement Research Cooperative (PNWTIRC)** has been instrumental in the formation of three large national and regional research collaborations, with each relying on cash and in-kind support from members.
  - The goal of the Taskforce on Adapting Forests to Climate Change is to develop strategies that forest managers can use to maintain healthy and productive forests in the face of climate change.
  - The Conifer Translational Genomics Network is a USDA-funded project that seeks to bring marker-based breeding to application in US tree-breeding programs within the next five years.
  - Although wood stiffness is important to the forest products industry, it has been difficult to measure and improve wood stiffness in tree breeding programs. Recently, the cooperative demonstrated that new “acoustic” tools can be used by breeders to rapidly and reliably estimate wood stiffness on standing trees or logs in genetic tests. Breeders are now using these tools to improve wood stiffness in operational breeding programs.

- The **Northwest Tree Improvement Cooperative** members have decided to proceed to a third cycle of breeding and testing coastal Douglas-fir and western hemlock, and five third-cycle breeding orchards have been grafted. This is a historic moment, given that the first cycle ran from 1966 to about 2000, while the second cycle began around 1990 and continues to the present. NWTIC has measured and analyzed age-15 data for a Realized Genetic Gain Verification trial for Douglas-fir on six sites in the North Oregon Cascades and shown that realized gains in block-plot trials match gains predicted from progeny tests at the same age.

- For the last 17 years, the **Vegetation Management Research Cooperative** has focused research and outreach on the establishment of high performing forest plantations. Studies have pioneered knowledge on the relationships between plant competition for limited site resources and seedling survival and growth across Oregon and Washington. A recent finding demonstrated that 3-year growth of Douglas-fir seedling volume could be increased over 400% when competing vegetation was reduced below 20% for the first two years after planting. Cooperators have utilized results to create more cost effective plantation establishment prescriptions that exceed legal reforestation requirements and that help keep forest products from the Pacific Northwest competitive in the global marketplace.
• After 15 years, the **Tree Biosafety and Genomics Research Cooperative** completed a plan to shifts its main focus to eucalyptus, the world’s most widely planted forest tree. The Coop focus is on biosafety, particularly the reduction of ecological and social concerns about gene dispersal from genetically engineered trees.

• Since 1982, the **Nursery Technology Cooperative** has conducted research and outreach focused on growing vigorous seedlings and improving their performance after planting. Current projects range from wetting agents on seedlings prior to planting to dormancy issues in nursery grown Douglas-fir seedlings. A new project is examining the cold tolerance of seedlings in forest nursery beds. The Forest Service is building a unique freezer that can be placed over seedlings to help study the impacts of freezing. In some years many nurseries pay a heavy price for seedlings lost to sudden frosts.

### iii. Commercialization and licensure

• Kaichang Li, in cooperation with PNNL, is developing water-resistant, natural-fiber-reinforced polyester composites for automobile application. In other work, he recently made a breakthrough in development of a pressure-sensitive adhesive (PSA) based on vegetable oils rather than petrochemicals. A provisional patent has recently been filed and commercialization of this new PSA technology is ongoing.

• Joe Karchesy was awarded a patent in AY10 for natural pest control chemistry.

• Lech Muszynski and colleagues were awarded a patent on a composite material reinforcement system.

• Mike Milota and colleagues filed an application on a new lumber moisture management system.

### Appendix C. Outreach and engagement:

#### i. Extension: FNR Program

• In 2009, the Master Woodland Manager (MWM) program conducted a 3-day advanced training in Corvallis called “MWM Mini-College.” This event included field and classroom technical sessions, tours, and an awards banquet. Eighty-three MWM participants attended one of six Learning Tracks: Forest Health, Silviculture, Wildlife in Managed Forests, Ties to the Land, The Woodland Pond, or Fundamentals of Forest Nutrition.

• Brad Withrow-Robinson taught a Master Woodland Manager class in 2009 that included 29 people managing 4,500 acres of family land in Polk, Yamhill, and Marion counties. He also received $277,000 to deliver coordinated Ties to the Land programming in four western states.

• Mike Bondi again offered Tree School, which was attended by 525 people and featured 62 classes and 52 exhibitors. Working in conjunction with the Pacific Northwest Christmas Tree Association, Extension provides technical and education outreach to the media in major market areas and made an estimated 5-10 million impressions. The Basic Forestry Short Course was taught to 12 families.

• D. Shaw and P. Oester also provide the column, “Forest Health Matters,” published four times/year in the **MWM Gazette**, which highlights current insect and disease issues and solutions in Oregon. PSI volunteers also were able to attend a two day conference in February 2010 called, “Forest Health in Oregon: State of the State.”

#### ii. Oregon Wood Innovation Center (OWIC)

• OWIC and WSE faculty completed nearly 60 technical assistance and market assessment projects for small Oregon businesses. Selected examples include the following:
  
  o Veneer checking of maple hardwood—technical assistance to multiple firms. Established a graduate student research project on this problem. Oregon is the largest producer of hardwood plywood in the west and this checking problem is a sporadic but significant drag on profitability.
  
  o Screw withdrawal testing for ceiling panels—assisted Eugene-based 9Wood by measuring screw
pullout strength in particleboard core ceiling panels. As a result, 9Wood has created an industry leading quality control system.

- Durability testing of western juniper—the College has been assessing the durability of juniper fence posts since the late 1920s. In 2009, this work was supplemented with research on termite resistance of juniper. The combined results led to juniper’s listing in the Oregon building codes as a ‘naturally durable’ species. This greatly increases the market potential for this underutilized species.

- Research on coatings for wood decks conducted in cooperation with Viance LLC and OSU’s Klamath Basin Research and Extension Center to test the efficacy of wood coatings that seek to minimize checking and discoloration on wood decking materials. Materials are being exposed to precipitation and UV light at OSU's Klamath Basin Research & Extension Center. This cooperative project is targeted at proving concepts and methodologies that can be used in new product development for this important area of wood protection.

- OWIC faculty members actively represent the College and University on a multi-State agency Forest Cluster Strategy Project that develops and facilitates a state-wide economic development plan. They led the development of a proposed Forestry Innovation Initiative for the Oregon Innovation Council.

- OWIC and WSE host an annual industry day with the Portland Wholesale Lumber Manufacturers Association. This day-long event connects OSU with PWLA and their parent National Assn. of Wholesale Lumber Mfrs.; typically, several students present selected current projects and the participants explore mutual interests.

- OWIC delivered nine issues of an electronic newsletter to almost 1000 subscribers. Other electronic resources include an “Ask the Expert Feature,” FAQ on technical issues, topical blogs, and the Forest Industry Directory.

- OWIC has begun a new publication series called the “Wood-Based Entrepreneurs Toolkit”; “Strategic Marketing” is the first issue. The publication is part of the Forest Research Laboratory’s Contributions in Education and Outreach (CEO) series, produced by the CoF Forestry Communications Group.

- Materials developed by Scott Leavengood on statistical process control (SPC) are being used by companies around the globe.

- OWIC faculty member David Smith is providing technical assistance to many groups on the use of woody biomass for energy, including helping with the design and development of a wood-fired heating system to be installed in the newly rebuilt Vernonia School system with US Dept of Energy and FEMA support. He has also established several research projects to quantify fuel characteristics using different in-woods processing systems.

iii. K-12 student and teacher education efforts

- WSE faculty and staff took portions of the Wood Magic Program to “Kids Day for Conservation” in Benton County and AgFest in Salem. Over 1,000 people passed the booth in those two programs; a short WM presentation will be offered at the Benton County Fair in August.

iv. Other College/FRL outreach activities

- Amy Grotta taught a seven-session short course spanning 2 months on forest management planning and leveraged the talents of local Master Woodland Manager volunteers, who served as mentors to the class participants as they developed their management plans.

- Viviane Simon-Brown co-coordinated and taught Climate Masters at Home, an 11-week volunteer-based course, for 27 adult students.

- HJA Day took place on June 24, 2010. There were 150 attendees from OSU, other universities, Pacific Northwest Research Station, Willamette National Forest, private industry, and the public.

- John Bliss, Jesse Abrams, and Erin Kelly presented a seminar on forestland tenure change at the
2009 Tree School in Clackamas County.

- Glenn Howe worked with Nick Wheeler and Dave Harry in the preparation of an intensive five-day short course on “Genomics in Tree Breeding and Forest Ecosystems,” attended by 24 participants representing seven countries.
- Bruce Shindler and Ryan Gordon are making a DVD production about successful citizen-agency partnerships for sustainable forests and sustainable communities. They are featuring on-the-ground success stories in five states.
- Paul Oester presented many programs including the Woodland Owner Update Workshop, a Biomass Workshop, Diversifying Income Opportunities on Small Woodlands, a Union County Forestry and Natural Resources Tour, an Oregon Tree Farmer of the Year Tour, a Chinese Delegation Tour and Program, and Pest Scene Investigator trainings in Medford, Roseburg, and Baker City among many others.
- Randy Rosenberger was host and instructor for the Meta-Analysis of Economics Research International Training Workshop, held in Corvallis, Oregon. There were 20 students representing 11 countries.
- FERM remains highly active in the Council on Forest Engineering (COFE). Loren Kellogg served as organizer and moderator for the 2009 Western Region Council on Forest Engineering meeting in Eugene.
- Jeff Wimer is a board member of OLC and helped organize an array of educational events at the Oregon Logging Conference. FERM organized an alumni luncheon with nearly 100 in attendance.
- FERM helped to organize the Western Forests Economists Meeting putting together sessions on climate change and bio-energy.

Appendix D. Community and diversity

- The Student Services Office, departments, and the College host numerous special events to build community, welcome picnics for new students, and a spring awards picnic, the annual recognition and retirement reception, a variety of monthly potlucks and coffees.
- The CoF raised $10,960.49 or 54,858 pounds of food for Linn-Benton Food Share through CoF community fundraising events during the OSU Food Drive.
- CoF supported Latino summer camps and provided funds and staff support for Mario Magana’s 4-H Program efforts with Latinos.
- More than half of graduate students in FES are women; women now make up 32% of the professorial faculty in FES, up from 27% last year. In FERM, the enrollment of women, minorities, and nonresident international students has grown in all undergraduate programs; the proportion of these underrepresented groups in total enrollment was 32% last year.
- About half of Wood Science graduate students come from one of 11 foreign countries. WSE hosted 24 international scholars and trainees in AY09. One third of WSE graduate students and 20% of WST undergraduates are women. WST hosts quarterly lunch meetings of all WSE women to support them and their professional development.
- Exit interviews also revealed a strong sense of community within the junior and senior WST classes, which included a core group of older-than-average students with families that created a mutually supportive environment, which was fostered by institutional and faculty informality.
- FES has been proactive in providing tools to empower staff, students, non-tenured faculty and others who have the potential to feel marginalized by individuals in a higher level of power. FES has convened meetings with students, FRAs, and staff to ensure that they are united and empowered in their stance against any form of abuse of power by others.

Appendix E. Some examples of specific international faculty activities

- Jo Albers and colleagues published: "Optimal Enforcement and Practical Issues of Resource
**Protection in Developing Countries**, a joint publication of Environment for the Development Initiative and Resources for the Future (www.rff.org)

- Matt Betts work on hummingbirds in Costa Rica resulted in a note in Science: [http://www.sciencemag.org/cgi/reprint/323/5917/989d.pdf](http://www.sciencemag.org/cgi/reprint/323/5917/989d.pdf). He found that even a highly mobile species of tropical hummingbird is sensitive to fragmentation of tropical forest.
- Badege Bishaw is developing a Ph.D. training program in Sustainable Natural Resources Management and Climate Change at Wondo Genet College of Forestry and Natural Resources (Hawassa University, Ethiopia) with a consortium of universities (Swedish University of Agricultural Sciences, Helsinki University, University of Bangor, OSU).
- Bryan Black taught two sclerochronology workshops in Australia, received an award for outstanding presentation in biological oceanography at the North Pacific Marine Science Organization annual meeting in Jeju, South Korea, and has been appointed to the Scientific Steering Committee for the North Pacific Marine Science Organization / International Council for the Exploration of the Seas Early Career Scientists Meeting.
- Bev Law is Chair, International Panel on Global Terrestrial Observing System – Terrestrial Carbon Observations (sponsored by UNEP, WMO, FAO, UNESCO, ICSU for detecting and managing global and regional environmental change); she presented invited papers at the IPCC Expert Meeting on Uncertainty and Validation of Emission Inventories and a Carbon Observation System workshop, Programme on Climate Change in The Netherlands.
- Klaus Puettmann held a workshop in Valdivia, Chile about managing forests as complex, adaptive systems.
- In Spain, Doug Maguire led five workshops in the fall at University of Valladolid (Palencia) and one at Institute for Agriculture & Food Research (Madrid) on silvicultural challenges, regeneration dynamics and impacts on biodiversity conservation in the Pacific Northwest (total 180 participants).
- Kevin Boston was invited speaker at Australian National University, July 2009 (Fenner Lecture, Information and Forest Supply chain management).
- In Australia, Loren Kellogg was appointed as Principal Research Fellow; The University of Melbourne, School of Land and Environment, taught Forest Operations Masters Course as part of Australia’s collaborative Forestry Master of Science Degree, was appointed Research Advisor to the Cooperative Research Center (CRC) for Forestry, Program 3, Harvesting and Operations, and served as Research Program 4th year Review Co-Chair of the Cooperative Research Center (CRC) for Forestry.
- Jeff McDonnell was Visiting Professor, Nanjing Hydraulic Research Institute, China; 6th Century Chair, University of Aberdeen, Scotland; Visiting Project Scientist, Isotope Hydrology Division, International Atomic Energy Agency, Vienna, Austria; gave seven international invited lectures (European Geosciences Union, Vienna; American Geophysical Union and Canadian Geophysical Union, Toronto Canada; led workshops on Tropical Hydrology (U.S. Army Research Office, Republic of Panama) and UN-funded workshop on State of the Art of Residence Time Computation, Analysis and Modeling (International Atomic Energy Agency, Vienna, 40 participants).
- Glen Murphy directed four 1-day workshops on “Maximizing value recovery along the forest-to-mill supply chain” in Western Australia, South Australia, Tasmania and Victoria (64 participants); participated in the National Masters Course on Forest Harvesting Systems (University of Melbourne); served on the organizing committee, chaired a session, and gave multiple presentations at the IUFRO Division 4.01 conference in Mount Gambier, South Australia, Australia, August 2009.
- The United States-Mexico Training, Internships, Exchanges, and Scholarships (TIES) Project, led by Eric Hansen, was completed this year.
- Jeff Morrell is involved in a year-long contract with Queensland Australia to conduct research on
treating native species. Jeff travels to Australia every quarter.

- Kaichang Li is assisting South China Technology Laboratory with establishing a wood-based composites research program.
- WSE faculty hold editorships of three international journals:
  - *International Association of Wood Anatomists Journal* - Barbara Lachenbruch, Associate Editor

**Appendix F. Additional examples of faculty and student awards**

<table>
<thead>
<tr>
<th>Faculty or Student</th>
<th>Award</th>
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<tbody>
<tr>
<td>Jo Tynon</td>
<td>Xi Sigma Pi Mentor Award</td>
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<tr>
<td>Marv Pyles</td>
<td>CoF Auderheide Award for Excellence in Teaching</td>
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<tr>
<td>Barbara Bond</td>
<td>Dean’s Award for Research &amp; Scholarship</td>
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<tr>
<td>Mike Bondi</td>
<td>Dean’s Award for Extended and Continuing Education</td>
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<tr>
<td>Paul Doescher</td>
<td>Dean’s Award for Service</td>
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<tr>
<td>Christopher Jackson</td>
<td>Dean’s Award for Outstanding Support Staff</td>
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<tr>
<td>Mark Needham</td>
<td>Dean’s Award for Advising &amp; Mentoring</td>
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<tr>
<td>John Punches</td>
<td>Dean’s Award for Extended and Continuing Education</td>
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<tr>
<td>Terralyn Vandetta</td>
<td>Dean’s Award for Service</td>
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<tr>
<td>Travis Woolley</td>
<td>Dean’s Award for Outstanding FRA</td>
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<tr>
<td>Dave Zahler</td>
<td>Dean’s Award for International Education &amp; Outreach</td>
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<tr>
<td>Jeff McDonnell</td>
<td>Named 6th Century Chair, University of Aberdeen, Scotland</td>
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<tr>
<td>Sam Lovelace</td>
<td>Outstanding FE/CE Senior</td>
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<tr>
<td>Amber Craig</td>
<td>Outstanding FM Senior</td>
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<tr>
<td>Rachel Heath</td>
<td>Outstanding RRM Senior</td>
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<tr>
<td>Tyler Roemer</td>
<td>Outstanding TOL Senior</td>
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<tr>
<td>Jonathan Gates</td>
<td>Outstanding WST Senior</td>
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<tr>
<td>Allison Field</td>
<td>Outstanding NR Senior</td>
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<tr>
<td>Rachel Heath (RRM)</td>
<td>Paul and Neva Dunn Outstanding Senior</td>
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<tr>
<td>Becky Brenton (NR)</td>
<td>Charles Lathrop Pack Essay Award</td>
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<tr>
<td>Rose Hansen (RRM)</td>
<td>Charles Lathrop Pack Essay Award</td>
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<tr>
<td>Andrew Merschel (NR)</td>
<td>Harold “Hal” Bowerman Leadership award</td>
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<tr>
<td>Casey Davis (FM)</td>
<td>Harold “Hal” Bowerman Leadership award</td>
</tr>
<tr>
<td>Luke Durkee (FE)</td>
<td>Kelly Axe Award</td>
</tr>
</tbody>
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