

GRADUATE STUDIES

IN WOOD SCIENCE

OREGON STATE UNIVERSITY

DEPARTMENT OF
WOOD SCIENCE & ENGINEERING
CORVALLIS, OREGON



PREFACE

The Department of Wood Science & Engineering at Oregon State University is a multidisciplinary science, technology and business program that is committed to excellence in education and research to extend available forest resources to meet society's growing need for forest products while maximizing their value. We view research and the education of future scientists, technologists and other professionals as being of paramount importance in meeting the challenges of the future.

The MS and PhD degrees in Wood Science are intended for those likely to enter careers as research and development scientists, marketing consultants, professors, structural engineers, industry technologists and managers, or other highly skilled professionals. These degrees are strongly connected to a program of research or problem solving and emphasize oral and written communication skills. The Master of Forestry (MF) is a non-thesis masters degree in Forest Products and can usually be completed in less time. The MF is a terminal degree for professionals seeking advanced education in a specialized area.

This booklet is designed for both prospective and current graduate students in Wood Science. It was developed to acquaint you with some of the opportunities with our degree programs and is a compilation of our rules, procedures and guidelines associated with applying for admission and successful completion of a degree. If you have questions that are not covered in this booklet, please give us a call or send an e-mail to the address below.



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WHY A GRADUATE DEGREE IN WOOD SCIENCE?

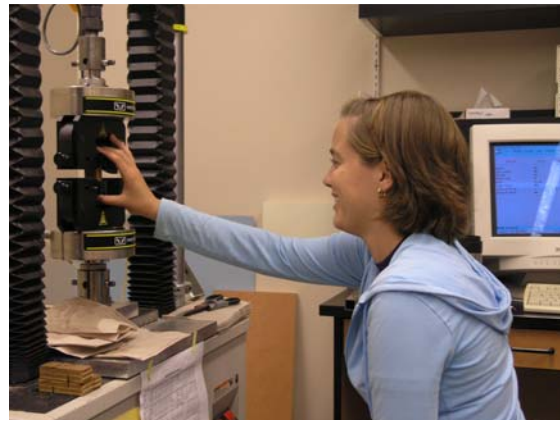
Pacific Northwest forests are an integral part of the economic and social development of this nation and the world. The demand for wood-based products is expanding with a growing population and rising global standard of living. This increased demand comes at a time when the quality and quantity of our wood supply are changing and when there is increasing interest in the sustainability of forests and surrounding communities. These pressures demand new products and materials to compensate for changing resources and markets, new technologies to improve processing efficiency, and a recommitment to stewardship in our use of forest-based renewable resources.

We will have to be smarter in making and using products from renewable resources to meet consumer demand and to minimize environmental impacts. Consequently, the demand for professionals knowledgeable about forest products or wood science and technology outstrips the supply at the present time and for the foreseeable future.

The field of wood science and technology is relatively young, having evolved primarily since the 1940's. Engineering, product design, manufacturing, marketing and fundamental research on wood as an industrial material were done by engineers, chemists, botanists, MBA's, foresters, and others who devoted their careers to working with wood. Greater sophistication and knowledge led to the development of scientists and technologists who had specific training in wood as a material as well as solid foundations in business, science, and engineering. These specialists find employment in all aspects of manufacturing and utilization of forest products from the raw material to the ultimate use by the consumer.

Wood science is the interdisciplinary body of knowledge about wood as a material, including its origin, properties and characteristics. Wood technology deals with the application of knowledge in the conversion, processing, marketing and use of wood and wood-based materials. In recent years, the field of wood science has expanded to include a range of composite and nontraditional products. Advanced wood-based composites have become a model for other modern bio-based composites.

The Pacific Northwest forest products industry is very much in transition and will continue to be an extremely important segment of the state's economy. Over 40 percent of Oregon's forest land supports an industry that accounts for one quarter of the total manufacturing sector of the State's economy.



As the industry moves from being labor-intensive to more knowledge-intensive, the programs of this department increase in importance. Improved efficiency, new products and markets, competitiveness, value-added secondary manufacturing, alternative raw materials, and nontraditional resources are all important initiatives that require science-based evaluation and support to succeed. These new challenges offer exciting opportunities for wood science and forest products at OSU and in Oregon.

JOB OPPORTUNITIES: Students with graduate degrees are especially sought by private manufacturing industry, retail sales centers, global commercial firms, government agencies, universities and others. Examples of jobs taken upon graduation by WSE students:

- ✦ *Design Engineer,*
Degenkolb Engineers, Inc., Portland, OR
- ✦ *Research Engineer,*
TrusJoist A Weyerhaeuser Business, Boise, ID
- ✦ *Research Associate,*
Michigan State University, East Lansing, MI
- ✦ *Research Scientist,*
Forintek Canada, Vancouver, BC
- ✦ *Technical Representative,*
Dynea USA, Inc., Winnfield, LA
- ✦ *Assistant Professor,*
University of Santa Maria, Brazil
- ✦ *Research and Development Scientist,*
Hickson Corporation, Conley, GA
- ✦ *Assistant Professor,*
University of Hamburg, Germany
- ✦ *Structural Engineer,*
CSA Consulting Engineers, Gladstone, OR
- ✦ *Scientist, Weyerhaeuser,*
Federal Way, WA
- ✦ *Extension Specialist,*
University of Tennessee, Knoxville, TN



Richardson Hall

ABOUT THE DEPARTMENT

The Department of Wood Science & Engineering at Oregon State University is one of the largest comprehensive wood science and technology programs in North America. The Department's faculty are active in all aspects of the Land Grant university mission: teaching, research and extended education (please see our Faculty section at the end of this booklet). Research and graduate education are the largest part of their activity, but no less important is undergraduate instruction leading to a Bachelor of Science degree in Wood Science & Technology or a minor in Forest Products for other majors. Our undergraduate program is accredited by the Society of Wood Science and Technology. We offer five technical or business-related options.

FACILITIES: The Wood Science & Engineering Department occupies over 50,000 square feet of laboratory, classroom and office space in Richardson Hall, Peavy Hall, and in the former Forest Research Laboratory (FRL). Graduate students are generally assigned office space in Richardson Hall.

MISSION STATEMENT

Our mission is to advance science, engineering and business to help society use renewable wood and related materials and products in an environmentally sound and sustainable manner. We will enable Oregonians and the wood industry to be successful in a globally competitive environment through our teaching, research and outreach programs.



Information Services Center

The Wood Science & Engineering Information Services Center is located in Richardson Hall and is available to all students and faculty. The College of Forestry research support services, such as the carpentry and machine shops are located in the FRL. The Forestry Communications office is located in Peavy Hall and provides services such as editing student and faculty co-authored manuscripts.

Courses are taught in both Richardson and Peavy Halls which house excellent classrooms and computer facilities. The College provides ample and well-equipped computer laboratories as well as excellent network services which include a full-time computer helpdesk. A learning resource center and communications laboratory, available to all students, is located in Peavy Hall. Our continuing education program is greatly facilitated by a state-of-the-art electronic teaching facility.



Peavy Hall

SOME CURRENT RESEARCH PROGRAM AREAS

- ◆ *Composite Materials Science*
- ◆ *Wood Anatomy & Quality*
- ◆ *Forest Products Marketing*
- ◆ *Process Modeling & Analysis*
- ◆ *Transport Processes in Wood*
- ◆ *Wood & Adhesives Chemistry*
- ◆ *Wood Drying & Moisture Relations*
- ◆ *Timber Engineering and Structural Design*
- ◆ *Scanning Technology/Computer-Aided Processing*
- ◆ *Biodegradation and Wood Preservation*

OUR GRADUATE PROGRAMS: The Master of Science (M.S.), Master of Forestry (M.F.) and Doctor of Philosophy (Ph.D.) degrees are offered with emphasis in a variety of subject areas. We participate in the Master of Science in Materials Science, and in the Master of Arts in Inter-disciplinary Studies (MAIS) program.

Beyond core course requirements, each student has the flexibility to design a curriculum that achieves a desired blend of theory and practice in one or more specialties. All degree programs include course-work in other departments of the University. Thesis research typically draws from these related departments with their faculty serving on the graduate advisory committees of Wood Science students. Minors are most commonly selected from disciplines such as Statistics, Engineering, Chemistry, and Business.

Our educational programs are continually reviewed to keep them abreast of new developments in the field, new needs of students and new desires of potential employers. We have a very active and expanding extended education program that annually conducts many short courses, workshops and symposia in wood drying, plywood manufacturing, lumber quality control, selling, and other topics. These courses also offer students an opportunity to participate and interact with professors and industry personnel.

DUAL MAJORS: Students may pursue a dual major in Wood Science and another field for either the M.S. or Ph.D. degrees. Only one degree is granted, but both majors are noted on the student's transcript. Many students find that this added value opens additional doors for employment. Successful students must

complete all requirements for both degrees. In recent years, many Wood Science graduate students have successfully completed dual or concurrent degrees in Civil Engineering, Statistics, Mechanical Engineering, Forest Science, Economics and other programs.

PARTNERSHIPS: The Department has key partnerships with the departments of Forest Resources, Forest Science, Statistics, Botany & Plant Pathology, as well as Civil, Chemical, Industrial and Mechanical Engineering and the College of Business. We also have close working relationships with users and producers of forest products who provide program relevance and unique research opportunities as well as financial support. Because Oregon's forest industry is one of the largest in North America, we can provide unique research and education opportunities not found elsewhere.

FINANCIAL SUPPORT: The Department is supported from a variety of sources. Major sources of State funds are through the Oregon Forest Research Laboratory and a tax on the harvest of timber. The Department is recognized as a USDA National Center for Wood Utilization Research which is supported by a series of major federal grants. Contracts and grants from public and private sources are a major form of support for our research and graduate education programs.

REQUIRED BACKGROUND FOR A GRADUATE STUDENT IN WOOD SCIENCE

◆ *B.S. degree from accredited four-year program with a strong background in science and mathematics.*

◆ *A scholastic record or background indicating a potential for success with graduate work.*

◆ *Entering students come from a wide range of backgrounds, such as:*

- *Agricultural Engineering*
- *Biology*
- *Botany*
- *Business*
- *Chemical Engineering*
- *Chemistry / Biochemistry*
- *Civil Engineering*
- *Computer Science*
- *Forest Products*
- *Forest Science*
- *Forestry*
- *Industrial Engineering*
- *Mechanical Engineering*
- *Microbiology*
- *Physics*
- *Plant Pathology*
- *Polymer Science*
- *Pulp and Paper*
- *Statistics/Mathematics*
- *Wood Science and Technology*



Mary's Peak — Highest in the Coastal Range.

OREGON STATE UNIVERSITY

OSU is the Land, Sea, and Space Grant University in Oregon and home to more than 16,600 undergraduates, 3,600 graduate students, and 1600 faculty from 90 countries and every state in the United States. OSU is one of the leading research institutions in the country with annual extramural research funding of over \$250 million supporting programs in eleven colleges.

OSU is located in Corvallis, Oregon, a modern family-oriented city of 53,000 that retains the friendliness and convenience of a small town.

Corvallis is located near the center of the beautiful Willamette Valley, and lives up to its Latin name which means "heart of the valley". Near the banks of the Willamette River, a vital, multi-purpose waterway replete with natural beauty and abundant wildlife, Corvallis is one of the state's leading centers of commerce, culture and education. Major employers such as Hewlett-Packard and CH2M Hill add to the breadth of the university community. Situated 80 miles south of Portland and 40 miles north of Eugene, Corvallis enjoys a mild climate year-round.

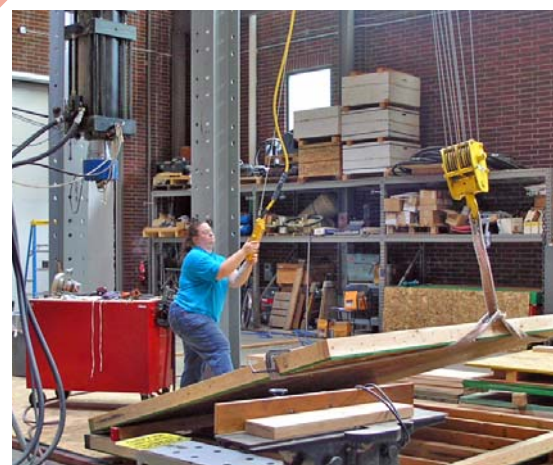
With the Coastal Range to the west and the Cascade Mountains to the east, all surrounding areas abound with outdoor sports and leisure activities such as white-water rafting, alpine and Nordic skiing, mountain biking, fishing, and hunting. There are streams, rivers, mountain lakes, snow-capped peaks, golf courses, and hiking trails. Natural and wilderness areas, wildlife refuges, and public forests are within easy reach of Corvallis. Adjacent to the city boundary is the 11,000 acre McDonald-Dunn Research Forest that supports the mission of the College of Forestry and offers ample recreational opportunities as well.

FOREST RESEARCH LABORATORY

The College of Forestry is one of the premier natural resource science institutions in the country with over 100 faculty, and is dedicated to increasing scientific understanding of forest resources. The College is closely allied with research units in the Bureau of Land Management, US Forest Service PNW Research Station, Environmental Research Laboratory of the EPA, National Biological Service, and a Long-Term Ecological Research (LTER) site. The College of Forestry has six research forests spread throughout the state which are used for demonstrations, research, education, and revenue generation. The 11,000 acres of the McDonald-Dunn Forest, within 20 minutes of the campus, is used most extensively and is also a site for recreation. Collectively, these facilities and faculty comprise one of the largest forest research centers in the world.

The College's research program is conducted under the aegis of the Oregon Forest Research Laboratory (FRL), which is a statewide public service agency separate from, but closely linked with, OSU. The FRL Advisory Committee is appointed by the governor and represents the many diverse interests in Oregon's forests.

Undergraduate and graduate education is offered through the four departments in the college: Wood Science & Engineering, Forest Science, Forest Resources, and Forest Engineering. The College also uses an active continuing education program to update public and private clientele on the latest technical findings which focus on management, extraction, manufacturing, and use of forest resources.



Wood Engineering Lab

APPLYING FOR GRADUATE ADMISSION

To assure prompt processing of applications, applicant's should follow these instructions carefully. Please mail the following materials to:

**Graduate School
Oregon State University
300 Kerr Administration Building
Corvallis, OR 97331-2106**

1. **APPLICATION FORM:** Submit an original and one copy of the application form. If applying online at: https://adminfo.ucsadm.oregonstate.edu/prod/bwskalog.P_DisplLoginNon, the electronic application process will create the necessary duplicate copies.
2. **APPLICATION FEE:** Include a \$55 check or money order in U.S. dollars payable to Oregon State University for the non-refundable application fee. Applying online requires payment by credit card.
3. **STATEMENT OF OBJECTIVES:** Two copies of the applicant's statement of objectives and particular fields of interest must be submitted. However, if applying online, the electronically submitted statement of objectives will be forwarded to the department along with the application form.
4. **TRANSCRIPTS:** Two photocopies of all official transcripts (grade slips and web printable transcripts or reports will not be accepted for use in evaluation) of previous academic work, undergraduate and graduate. Transcripts showing the last 90 quarter (60 semester) credit hours of graded work of the first baccalaureate degree must be included. All graduate and post baccalaureate transcripts must be included. International applicants must provide a certified English translation of their academic transcripts. If admitted, two official, unopened transcripts from the above institutions must be received by the Graduate School prior to your second term of registration.

Note: Current and former Oregon State University students are not required to provide OSU transcripts.
5. **LETTERS OF PROFESSIONAL REFERENCE:** Three letters of professional reference are required. Applicant's with a Master's degree must include a letter of reference from their major professor. Letters of professional reference must be written on official letterhead and contain the contact information of the referee.

6. **GRE SCORES:** All graduate applicants in the Department of Wood Science & Engineering must take the Graduate Record examination (GRE) General Test, including analytical writing, verbal, and quantitative sections (<http://www.gre.org>). GRE scores must not be older than five (5) years. To ensure ETS forwards your scores to Oregon State University, use the four-digit institutional code 4586 for OSU, and the four-digit departmental code 1003 for Wood Science.

ADDITIONAL INTERNATIONAL APPLICANT REQUIREMENTS: International applicants must also send the following documents with their application materials:

1. **TOEFL SCORES:** One photocopy of official TOEFL scores (MAIS applicants must submit four photocopies of their TOEFL score.) If admitted, official TOEFL scores must be received by the Graduate School prior to the start of your first term of enrollment.
2. **CERTIFICATION OF FINANCES FORM:** A financial certificate must be submitted, along with supporting documentation, to certify sufficient financial resources for the desired academic program (please read "International Certification of Finances" on page 11).

NATIONAL APPLICATION DEADLINES: Applicants from the United States may apply at any time. However, to ensure full consideration for admission and financial assistance, applications and all supporting documents should be received no later than 30 days prior to the first term of attendance.

INTERNATIONAL APPLICATION DEADLINES:

Please note: All new students accepted for fall term may be nominated for College of Forestry fellowship awards if they submit a completed application (including all supporting documents) by January 15th of the year they plan to begin their program (see "College of Forestry Fellowships" on page 12).

	Non-U.S. citizens/ Non-U.S. permanent residents	
	Outside the U.S.	In the U.S.
Fall Term	April 1	June 1
Winter Term	July 1	September 1
Spring Term	October 1	December 1
Summer Term	January 1	March 1



APPLICATION REVIEW PROCEDURE: Applications are received by the OSU Graduate School and a copy is forwarded to the Department of Wood Science & Engineering. The Department's Graduate Admissions Committee reviews all materials in detail and may contact you if they have questions. Please make sure you meet the minimum requirements before you apply (*see specific WS&E criteria regarding GRE and TOEFL scores on this page*).

Successful applicants have a strong science, engineering or business background with evidence of good communication skills. Prior experience or training in wood science is not a prerequisite for admission in all study areas.

Admission to the Wood Science & Engineering graduate program is a competitive process, and depending on faculty interests, space availability, and limited financial resources, some otherwise qualified students may not be accepted. Applicants will be notified by the Department Head as soon as a decision is made regarding their application.

OFFICIAL NOTICE OF ADMISSION: Applicants usually receive notice of the Department's decision within two to three months after the student completes their application. However, the official Notice of Admission is issued solely by the Oregon State University Graduate School indicating completion of the admission requirements and eligibility for enrollment. For successful international applicants, the official notice of admission will be mailed to the applicant along with the I-20 visa document.

ADMISSION STANDARDS

Graduate applicants must provide complete documentation of all certificates, degrees, titles, or diplomas earned, as well as grade transcripts from all academic institutions attended. Be sure to give the dates and names of the certificates, diplomas, degrees, titles, or licenses you received. Faxed copies of academic records are not acceptable. A photocopy is temporarily acceptable only if applicant cannot provide the original documents until after their arrival on campus.

Applicants must have a degree equivalent to a four-year U.S. Bachelor's degree from an accredited college or university. A "B" average (3.00 GPA) on the last two years (90 quarter hours or 60 semester hours) of undergraduate work is required and any work completed thereafter.

GRADUATE RECORD EXAMINATION (GRE): The Department of Wood Science & Engineering has not established a minimum passing GRE score for admission, but GRE scores are considered in conjunction with the applicant's overall academic and experience record. Admission to the graduate program is a competitive process and excellent GRE scores can often be a deciding factor. To obtain more information about the Graduate Record Examination (GRE), please visit their webpage at <http://www.gre.org/>.

TEST OF ENGLISH AS A FOREIGN LANGUAGE (TOEFL): Department of Wood Science & Engineering minimum standards require a score of 575 or above for the paper-based test (PBT), 238 or above for the computer-based test (CBT), or 93 or above for the internet-based test (iBT). More information about the TOEFL exam may be found at the following web page: <http://www.toefl.org/>.





Wood Scanning Laboratory

INTERNATIONAL ENGLISH LANGUAGE TESTING SYSTEM (IELTS): The IELTS exam is an acceptable alternative to taking the TOEFL. The minimum standard score for admission to the Department of Wood Science & Engineering is 7.0. More about the IELTS exam may be found at <http://www.ielts.org/>.

The minimum standard IELTS score for admission is 6.5 for the University and 7.0 for the Department. Students may still be admitted under the Conditional Admission Program with a score of 6.0

OSU'S ENGLISH LANGUAGE PROFICIENCY STANDARDS: International applicants must provide official English language proficiency test scores, (i.e., TOEFL or IELTS), unless they are exempt from testing (see criteria listed under "Exemption from English Language Testing" on this page).

The minimum standard TOEFL score for admission to Oregon State University is 213 (computer), 550 (paper) or 80 (internet). However, the Department of Wood Science & Engineering has established higher minimum score standards (see page 10). If an applicant meets academic standards, but their TOEFL score is below the minimum required by the Department and/or the University, they may still be admitted under the Conditional Admission Program (CAP).

CONDITIONAL ADMISSION PROGRAM (CAP): CAP is a way for international students whose English proficiency level is below the minimum standard to obtain full admission to OSU and register for classes. Although these students have not met the formal admission requirements, their accomplishments have convinced the University Graduate Admissions Committee and their major program that they have potential for success as advanced degree candidates and therefore may be

conditionally admitted. The TOEFL and IELTS score ranges requiring conditional admission are included in the table below:

EXEMPTION FROM ENGLISH LANGUAGE TESTING:

ENGLISH LANGUAGE PROFICIENCY EXAM	REGULAR ADMISSION MINIMUM SCORE	CONDITIONAL ADMISSION SCORE RANGE
Paper-based TOEFL (PBT)	550 ¹ 580 ²	500–549
Computer-based TOEFL (CBT)	213 ¹ 237 ²	173–212
Internet-based TOEFL (iBT)	80 ¹ 93 ²	60–79
IELTS	6.5 7.0 ²	6.0

1 Minimum standard score to be eligible for admission to OSU.
 2 Minimum standard score to be eligible for admission to the Department of Wood Science & Engineering.

- Individuals may be exempt from English language testing if they have completed a Bachelor's or another advanced degree from regionally accredited institutions in the United States or other English speaking country (see list below).
- Individuals who are in the process of earning an advanced degree from an accredited institution in the U.S. or another English speaking country may be conditionally admitted.
- Citizens of the following countries: Australia, Belize, Canada, Ghana*, New Zealand, Scotland, West Indies, and the United Kingdom are exempt from English language testing.

* Exemptions for citizens of African countries are considered on a case-by-case basis.

INTERNATIONAL CERTIFICATION OF FINANCES: International applicants must complete and return an *International Student Certification of Finances* form. They must also include all supporting documents that substantiate sufficient financial resources before the I-20 document will be issued for an F-1 visa.

- Financial documentation should be submitted at the same time as the *International Student Certification of Finances* form.
- Certified copies and originals of financial documentation are preferred. Faxes are acceptable temporarily, however original documents are required prior to enrollment.
- Bank statements must bear an original signature

and seal and should be no more than nine months old before the first term of enrollment at OSU.

- Other types of financial documentation, such as governmental or agency sponsorship letters, should be official and specify dates of validity.
- A copy of the applicant's letter of acceptance and Graduate Research Assistantship offer from the Department of Wood Science & Engineering must also be submitted with the *International Certification of Finances* form (see "Graduate Research Assistantships" on page 13).

GENERAL INFORMATION ABOUT GRADUATE SCHOOL

GRADUATE CATALOG: The Oregon State University Bulletin – Graduate Catalog is issued annually. It provides information on university rules and regulations, tuition and fees, graduate-level courses, curricula, degree requirements, and a general overview of campus programs and student activities. You may view the online Graduate Catalog at <http://catalog.oregonstate.edu/>.

GRADUATE STUDENT HOUSING: There are numerous housing options available to graduate students at OSU. Convenient, affordable and quality housing is provided for either individuals or families. To help students make the right choice of housing that will support their particular needs, the following resources are available:

- University Housing & Dining Services:
<http://oregonstate.edu/uhrs/>
- Halls and Cooperatives:
http://oregonstate.edu/uhrs/halls_coops/
- Family Housing:
http://oregonstate.edu/uhrs/family_housing/
- College Housing Northwest - "The GEM":
<http://www.housingnorthwest.org/studenthousing/osu/index.asp>

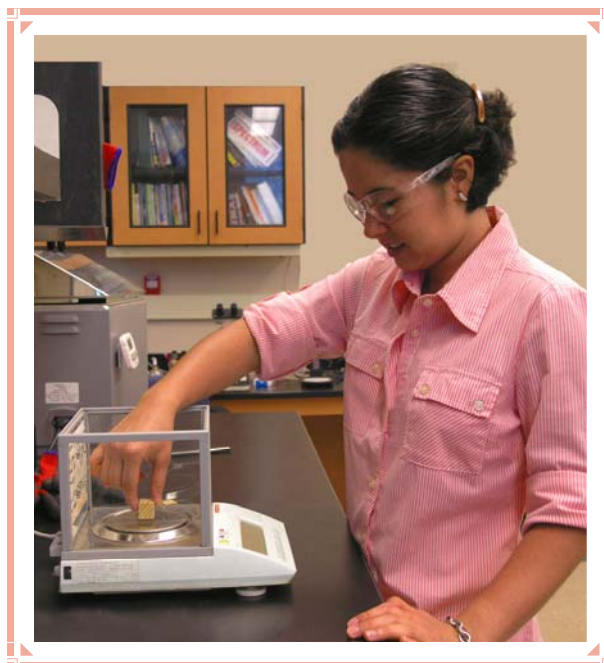
CONTINUOUS ENROLLMENT POLICY: Unless on an approved leave of absence, all graduate students in degree and certificate programs must register continuously for a minimum of 3 graduate credits until their degree or certificate is granted or until their status as a credential-seeking graduate student is terminated. This includes students taking only preliminary comprehensive or final examinations or presenting terminal projects. During any given term, students must register for a minimum of 3 credits and pay fees if they will be using university resources (e.g. facilities, equipment, computing and library services,

or faculty and staff time). During Summer session, students not planning to use university resources are not required to register and do not need to request a Leave of Absence. More information about the Continuous Enrollment Policy can be found in the online catalog section covering registration requirements at: <http://catalog.oregonstate.edu/ChapterDetail.aspx?key=38#Section1804>.

FINANCIAL ASSISTANCE

Successful graduate applicants are usually considered for some form of financial assistance. Applicants funded by their government, employer, or a program external to OSU may not qualify for consideration of all types of assistance.

COLLEGE OF FORESTRY FELLOWSHIPS: Ranging from \$500-\$5,000 annually, fellowships are competitively awarded each spring within the College of Forestry (COF). Winners are eligible to receive a COF fellowship in addition to a Graduate Research Assistantship (GRA). Students new to the College are nominated by their major professors and are selected on the basis of their academic record, GRE scores, statement of objectives, and letters of recommendation. To be considered for a COF Fellowship, applicants must apply for Fall term admission by January 15th of the year they plan to begin their graduate program. Continuing graduate students must apply for a COF Fellowship by mid-February and are selected based on the above criteria and their academic performance at OSU.



GRADUATE SCHOOL ADMINISTERED FELLOWSHIPS: The Graduate School administers several centralized graduate scholarship and fellowship programs such as the *Oregon Laurels Graduate Scholarship Program*. These programs require nomination by the Department. For more information visit the following webpage: http://oregonstate.edu/dept/grad_school/current/fellowships.html.

LOANS, GRANTS, & STUDENT EMPLOYMENT: The OSU Office of Financial Aid administers, student loans, grants, work-study programs, or part-time employment. You can obtain more information about loans grants and student employment opportunities on the following webpage: <http://oregonstate.edu/financialaid/>.

GRADUATE RESEARCH ASSISTANTSHIPS

A Graduate Research Assistantship (GRA) is a stipend paid for specific research or other duties. GRA duties are usually associated with a faculty research project and are supervised by a faculty member. Work assigned for the GRA is separate from that required for coursework, but work on a student's thesis or dissertation may be assigned. GRA work hours are usually flexible and will vary with the appointment level and expectations of the supervisor. For example, a 0.49 FTE (full-time equivalent) position requires an average of 20 hours work per week. However, the actual time worked each week will vary and it is common for a GRA to work fewer hours during the academic year and more hours when not attending classes.

Some GRA's may become members of a labor union bargaining unit if part of their assignment is devoted to service to OSU as an employee.

GRA SALARIES: GRA salaries are offered on a 3, 6, 9, or 12-month basis. The starting dates are October 1, January 1, April 1, or July 1. Renewals are contingent upon:

1. Satisfactory performance of assigned duties.
2. Reasonable progress toward completing degree requirements.
3. Availability of funds.

Most M.S. students in the Department of Wood Science & Engineering receive financial support for up to two years, and most Ph.D. students receive support for up to three years.

CURRENT ANNUAL PAY RATES: Effective July 1, 2009, the M.S. Graduate Research Assistantship pays \$20,827 (0.49 FTE) per year and the Ph.D. Graduate Research Assistantship pays \$21,668 (0.49 FTE) per year. A Graduate Research Assistantship of 0.20 FTE or greater carries the added benefit of a tuition waiver, but GRA's must pay mandatory student fees of about \$422 per term.

FULL-TIME REGISTRATION REQUIREMENT: GRA's must be registered as full-time students for each quarter they hold a GRA appointment. Registering for a minimum of 12 credit hours is considered full-time enrollment during the fall, winter and spring terms, and 9 credit hours is considered full-time during the summer term. The Department strongly encourages students to enroll for the maximum of 16 credit hours of course work (including thesis credits) during fall, winter and spring terms. During summer term, students may hold an assistantship or be employed hourly depending on course requirements.

BENEFITS: GRA's with a 0.20 FTE appointment or greater must enroll in a mandatory health insurance plan. The University will contribute \$330 per term toward the cost of this insurance and \$15.00 toward administrative fees, but any additional costs for premiums or administrative fees will be deducted, pre-tax, from the GRA's paycheck. Some students may qualify for a waiver. More information about the health insurance plan, waiver requirements and forms may be found at the following website: <http://studenthealth.oregonstate.edu/graduate-assistant-insurance-plan>. The University also provides a \$110.00 Recruitment and Retention Differential each term to GRA's holding an assistantship of 0.20 FTE or greater. Since students are not eligible to accrue sick leave or vacation leave, they must make arrangements with their major professor for any time off, including periods when the university is not in session.



GRADUATE PROGRAMS IN THE DEPARTMENT OF WOOD SCIENCE & ENGINEERING

The Department offers Master of Forestry, Master of Science, and Doctor of Philosophy degrees. A Master's of Material Science (with a minor in Wood Science) is also offered. Wood Science can also be combined with two fields to obtain a Master of Arts in Interdisciplinary Studies (MAIS). This section describes the specific departmental requirements for these degrees. The OSU Graduate Catalog and the application package details general requirements for graduate programs.

MAJOR PROFESSORS: Each graduate student is assigned a major professor who will serve as their principal program and thesis advisor. Normally, the major professor is identified during the application process. Although the specific relationship between a major professor and student will vary, all major professors are expected to:

- Help students determine interests and choose the course work that best matches their needs.
- Work with student and student graduate advising committee to see that all departmental and University requirements are met.
- Provide specific suggestions on designing, carrying out and documenting thesis research, particularly at the MS level.
- Provide guidance or mentoring on career and personal decisions that impact professional development.

GRADUATE ADVISING COMMITTEE: The Graduate Advising Committee is principally responsible for ensuring that the student meets the requirements for the degree sought. As such, it maintains the standards of the Department, College and University. The committee also advises the student with respect to the study program. Individual members often provide guidance and advice on specific elements of the thesis research. All members ensure that a sound research plan is proposed.

Dual Majors: Dual major students typically have one Graduate Advising Committee for both majors. Faculty from each program serve as co-chairs of the committee and one or both may function as the major professor. The Wood Science Major Professor is the best source of information on these programs.

GRADUATE-LEVEL COURSES IN WOOD SCIENCE & ENGINEERING

WSE 501. RESEARCH AND SCHOLARSHIP (1-16)

WSE 503. THESIS (1-16)

WSE 505. READING AND CONFERENCE (1-16)

WSE 506. PROJECTS (1-16)

WSE 507. (SECTION 1) BEGINNING SEMINAR (1);
(SECTION 2) GRADUATE SEMINAR (1)

WSE 521. WOOD SCIENCE I (4): A comprehensive overview and integration of wood anatomy, wood physics, wood chemistry and wood mechanics; global contemporary issues impacting the wood and fiber sector; integration of basic wood sciences to understand the complex relationships between environment and wood material properties, and the influence of both on the use of wood-based materials.

WSE 522. WOOD SCIENCE II (4) Continuation of the comprehensive overview and integration of wood and fiber anatomy, physics, chemistry, and mechanics; integration of basic wood science to understand relationships with wood and fiber properties and their impact on final use. Focus on biological, chemical and physical degradation of wood; adhesion; and physical and engineering properties of wood.

WSE 530. POLYMER COMPOSITES (3): A comprehensive survey of the material and mechanical properties of polymer-based composite materials including failure mechanisms, interfacial and nanoscale effects, and transport and thermal properties. PREREQS: CHE 545. Recommended: multivariable calculus.

WSE 535. POLYMER SYNTHESIS AND STRUCTURE (3): A comprehensive overview of various synthetic methods for various synthetic polymers; structures of various synthetic and natural polymers. PREREQS: 3 credits of undergraduate organic chemistry or CH 331 or CH 334 are recommended.

WSE 540. WOOD DRYING AND PRESERVATION (3): Drying wood, including lumber, veneer, and particles. Moisture-related problems of wood during processing and in-service. Wood-destroying organisms; extending the life of wood using preservatives. PREREQS: WSE 314 or equivalent (may be taken concurrently).

WSE 541. PRIMARY WOOD PROCESSING (4): Mechanical breakdown of lumber, veneer, and chips from a processing perspective; mill/plant layout; quality and process control applications. Field trips. PREREQS: WSE 210, WSE 440

WSE 542. COMPOSITES MANUFACTURING (4): Composites, wood adhesive and adhesion processes and plant layouts; laminated and panel products; coatings and overlays; quality control, recovery and grades. Field trips. PREREQS: WSE 210

WSE 545. CHEMICAL WOOD PROCESSING AND POLLUTION CONTROL (3): A survey of the chemical processing of wood with emphasis on its environmental impact. Topics include treating of wood to resist decay, pulping and papermaking, and adhesives used in wood composites. PREREQS: WSE 316 or equivalent.

WSE 552. PROCESS CONTROL IN THE FOREST PRODUCTS INDUSTRY (4): Use of sensing devices, analysis methods, and hardware to control variables found in typical wood product processes. PREREQS: WSE 314 and (WSE 441 or WSE 442) and (ST 351 or BA 275).

WSE 555. FOREST PRODUCTS MARKETING (3): Marketing and its application in the forest products industry. PREREQ: BA 390

WSE 558. WOOD DESIGN (4): Study of basic wood properties and design considerations. Design and behavior of wood connectors, beams, columns and beam columns. Introduction to plywood and glue laminated members. Analysis and design of structural diaphragms and shear walls. PREREQS: CE 381 and CE 382.

WSE 565 WOOD QUALITY (2): An examination of what constitutes wood quality and how it can be measured. Factors that affect wood quality such as the environment, genetics, and silvicultural practices are also explored.

WSE 599 SPECIAL TOPICS (1-16)

WSE 601. RESEARCH AND SCHOLARSHIP (1-16)

WSE 603. THESIS (1-16)

WSE 605. READING AND CONFERENCE (1-16)

WSE 606. PROJECTS (1-16)

WSE 607. (SECTION 1) BEGINNING SEMINAR (1);
(SECTION 2) GRADUATE SEMINAR (1)

WSE 611. SELECTED TOPICS IN WOOD & FIBER SCIENCE (1-3)
(May be taken more than once.)

WSE 699. Special Topics (1-16)

**SELECTED UNDERGRADUATE COURSES
(NOT FOR GRADUATE CREDIT)**

- WSE 210.** WOOD TECHNOLOGY & UTILIZATION (4)
- WSE 211.** WOOD PROPERTIES & MEASUREMENTS LAB (1)
- WSE 312.** WOOD & FIBER ANATOMY (4)
- WSE 314.** WOOD & FIBER PHYSICS (4)
- WSE 316.** WOOD & FIBER CHEMISTRY (4)
- WSE 318.** MECHANICAL BEHAVIOR OF WOOD (4)
- WSE 440.** WOOD DRYING AND PRESERVATION (3)
- WSE 446.** SECONDARY WOOD-PRODUCTS MFG. (3)

TYPICAL SCHEDULE OF WS&E GRADUATE COURSES					
Course No.	Credits	Fall Term	Winter Term	Spring Term	Even Years
WSE 507 (Sec. 1)	1	X		X	
WSE 507 (Sec. 2)	1	X	X	X	
WSE 521	4		X		
WSE 522	4			X	
WSE 530	3			X	
WSE 535	3				X
WSE 540	3		X		
WSE 541	4			X	
WSE 542	4	X			
WSE 545	3	X			
WSE 552	4		X		
WSE 555	3		X		
WSE 558	4		X		
WSE 565	2	X			
WSE 607 (Sec. 1)	1	X		X	
WSE 607 (Sec 2.)	1	X	X	X	
WSE 611	1-3		X		X

Degree Requirements

REQUIREMENTS FOR MASTER OF SCIENCE DEGREE IN WOOD SCIENCE

I. GENERAL REQUIREMENTS

General University requirements are included in the Graduate School's **"Guide to Success"** found online at: http://oregonstate.edu/dept/grad_school/current/success.html.

Students seeking a dual Master of Science degree should see the section Requirements for Dual Master of Science Degree in Wood Science.

II. REQUIREMENTS OF THE DEPARTMENT

A. Graduate Course Requirements

1. Requirements in the wood science major.

	Credits
a. WSE 521 Wood Science I	4
WSE 522 Wood Science II	4
b. Any WSE 5xx courses	8
c. WSE 507-1 Beginning Seminar	1
WSE 507- 2 Graduate Seminar	1
d. WSE 503 Thesis	6-12
e. 5xx/6xx level courses in Wood Science & Engineering major field of study.	0-6

2. Requirements in the minor:
 5xx/6xx level courses approved
 by the minor department. 15

Total credits in M.S. program (minimum): 45

B. Seminar Participation

All full-time wood science Master of Science (MS) graduate students are expected to register for and attend WSE 507, Section 2, each term that it is offered unless excused by the Department Head. All wood science MS graduate students must give at least one Graduate Seminar presentation as a requirement for their degree.

C. Thesis Requirements

The student must submit a satisfactory thesis on his/her research. The thesis must be approved by the student's graduate advisory committee and must meet Graduate School requirements. The student shall provide one hard bound copy of the approved thesis to be a permanent reference in the Department, which is in addition to the University requirements.

D. Qualifying Examination (Effective for new students entering Summer 2009)

Master's students must pass a qualifying exam that evaluates understanding of basic wood sciences per the SWST Basic Wood Sciences competencies (http://www.swst.org/accred_handbook.pdf), and to test ability to identify common wood products. Details of the test are found in the Student Information Section of the WSE Intranet.

The test will be offered one time each quarter. Students must pass the test prior to scheduling their final exam and may take the exam a maximum of three times. The Qualifying Exam Committee will grade the exam and judge whether the student has passed or failed the exam.

E. Final Examination

A final oral examination is required that includes a presentation of the thesis and then a comprehensive examination covering the thesis and course work. The examining committee is the student's graduate advisory committee. The thesis presentation for this examination is open to all University faculty, graduate students, undergraduate students, and the public. At the conclusion of the examination, the committee decides if the student has passed or failed. The time and place of the final examination must be announced to the Department of Wood Science & Engineering at least seven days in advance.

III. PROCEDURAL REQUIREMENTS

A. Graduate Student Advisory Committee

The committee is composed of the major and minor professors, the departmental representative, and a Graduate Council Representative. The departmental representative is selected from the Wood Science & Engineering faculty by the major professor and the student. This representative is a





permanent member of the student's faculty advisory committee and has responsibility for ensuring that departmental requirements are met. The departmental representative is involved in planning the course program and the topic of the thesis, and assuring that during the examination, a fair balance of questions is maintained on all coursework in the student's program. A faculty member representing the minor department is also included as a permanent member of the advisory committee. The Graduate Council Representative is selected by the student from an approved list provided by the Graduate School.

B. Programs

A program of study must be filed with the Graduate School before completing 18 hours of graduate credit. The program is required to have a stated major in Wood Science and a minor.

C. Research Plan

All Wood Science graduate students shall prepare a written research study plan or proposal with the guidance and direction of their major professor and committee. The plan shall be presented to the committee for approval by the end of four terms in residence. The approved plan shall be filed in the departmental office.

D. Performance Expectations

Students shall be evaluated annually by their major professor and/or committee on their progress toward completing the degree program. A written copy will be filed in the departmental office. For students employed as GRAs, this evaluation will normally be done prior to reappointment. The major professor and/or committee may require more frequent evaluations and additional means of assessing performance and ability.

Students are expected to maintain a 3.0 grade point average, both overall and on program of study classes to be satisfactorily progressing toward degree completion.

REQUIREMENTS FOR DUAL MS IN WOOD SCIENCE AND A SECOND MAJOR

I. GENERAL REQUIREMENTS

General University requirements are included in the Graduate School's "Guide to Success" found online at: http://oregonstate.edu/dept/grad_school/current/success.html.

II. REQUIREMENTS OF THE DEPARTMENT

A. Graduate Course Requirements

1. Requirements in the wood science major.

	<u>Credits</u>
a. WSE 521 Wood Science I	4
WSE 522 Wood Science II	4
b. Any WSE 5xx courses	8
c. WSE 507-1 Beginning Seminar	1
WSE 507- 2 Graduate Seminar	1
d. WSE 503 Thesis	6
e. 5xx/6xx level courses in Wood Science & Engineering or departments related to wood science.	0-6

2. Requirements in the second major:

a. Courses in or related to the second major.	24
b. Thesis	6

Total credits in dual M.S. program (minimum): 60

B. Seminar Participation

All full-time wood science Master of Science (MS) graduate students are expected to register for and attend WSE 507, Section 2, each term that it is offered unless excused by the Department Head. All wood science MS graduate students must give at least one Graduate Seminar presentation as a requirement for their degree.

C. Thesis Requirements

The student must submit a satisfactory thesis on his/her research. The thesis must be approved by the student's graduate advisory committee. In this regard it must be satisfactory to both major departments. The student will provide one unbound copy of the approved thesis with original signatures to be permanent reference in the department. A second copy of the thesis may be required by the second major department.

D. Qualifying Examination: (Effective for new students entering Summer 2009)

Master's students must pass a qualifying exam that evaluates understanding of basic wood sciences per the SWST Basic Wood Sciences competencies (http://www.swst.org/accred_handbook.pdf) and to test ability to identify common wood products. Details of the test are found in the Student Information Section of the WSE Intranet.

The test will be offered one time each quarter. Students must pass the test prior to scheduling their final exam and may take the exam a maximum of three times. The Qualifying Exam Committee will grade the exam and judge whether the student has passed or failed the exam.

E. Final Examination

A final oral examination covering course work and thesis is required. The thesis presentation for this examination is open to University faculty, graduate students, and the public. The time and place of the final examination must be announced in advance to WS&E. At the end of the presentation, the non-committee attendees are dismissed, and the session becomes closed for the student and committee. At the conclusion of the examination, the committee decides if the student has passed or failed.

III. PROCEDURAL REQUIREMENTS

A. Program of study for the Dual MS Degrees

A program of study must be filed with the Graduate School before completion of 18 credits of graduate study. Students on a GRA funded by a WS&E account must identify WS&E as the primary department on their program of study.

B. Committees for Dual MS Degrees

Each dual major MS student shall have one committee which is typically composed of a major professor



from WS&E, a major professor from the second major department, one representative from each department, and the Graduate Council Representative. The departmental representatives are selected by the student and the major professors and are permanent members of the student's advisory committee. The departmental representatives are involved in planning the course program and topic of the thesis, ensuring that departmental requirements are met, and that a fair balance of questions on all course work in the student's program are raised at the examination. The Graduate Council Representative is selected by the student from an approved list provided by the Graduate School.

C. Research Plan

All Wood Science graduate students, including dual majors, will prepare a written research study plan or proposal with the guidance and direction of their major professor and committee. The plan will be presented to the committee no later than the end of four terms in residence. The approved plan will be filed in the departmental office.

D. Performance Expectations

All students will be evaluated annually by their major professor and/or committee on their progress toward completing the degree program. An evaluation will be filed with the departmental office. For students employed as GRA's, this evaluation will normally be done prior to reappointment. The major professors and/or the committee may require more frequent evaluations and additional means of assessing performance and ability.

Students are expected to maintain a 3.0 grade point average, both overall and on program of study classes to be satisfactorily progressing toward degree completion.

REQUIREMENTS FOR MASTER OF FORESTRY DEGREE IN FOREST PRODUCTS

I. GENERAL REQUIREMENTS

General University requirements are included in the Graduate School's **"Guide to Success"** found online at: http://oregonstate.edu/dept/grad_school/current/success.html.

Students seeking a Master of Science degree should see the section Requirements for Master of Science Degree in Wood Science

II. REQUIREMENTS OF THE DEPARTMENT

A. Graduate Course Requirements

The Master of Forestry (MF) program requires 45 credits, and at least 21 credits must be selected within the College of Forestry. A minimum of 11 credit hours of 500/600-level WSE courses are required, including blanket numbered (50x/60x) courses.

1. Requirements in the Forest Products major.

	<u>Credits</u>
a. WSE 521 Wood Science I	4
WSE 522 Wood Science II	4
b. WSE 507-1 Beginning Seminar	1
WSE 507-2 Graduate Seminar	1
c. One paper on a subject related to the major field in Forest Products or Wood Science; can receive credit as WSE 505 Reading and Conference, or WSE 506 Projects.	3
d. 5xx/6xx level courses in Wood Science, other departments in the College of Forestry (21 minimum), or departments related to major field of study.	32
Total credits in M.F. program (minimum.):	45

B. Seminar Participation

All full-time wood science Master of Forestry (MF) graduate students are expected to register for and attend WSE 507, Section 2, each term that it is offered unless excused by the Department Head. All wood science MF graduate students must give at least one Graduate Seminar presentation as a requirement for their degree.



C. MF Paper

The student must submit a report written in thesis format. The report must be approved by the student's graduate advisory committee, which will review and critique the paper prior to the final oral examination. The report is not submitted to the Graduate School. The student shall provide one hard bound copy of the MF report to be a permanent reference in the Department.

D. Qualifying Examination (Effective for new students entering Summer 2009)

Master's students must pass a qualifying exam that evaluates understanding of basic wood sciences per the SWST Basic Wood Sciences competencies (http://www.swst.org/accred_handbook.pdf), and to test ability to identify common wood products. Details of the test are found in the Student Information Section of the WSE Intranet.

The test will be offered one time each quarter. Students must pass the test prior to scheduling their final exam and may take the exam a maximum of three times. The Qualifying Exam Committee will grade the exam and judge whether the student has passed or failed the exam.

E. Final Examination

A final oral examination is required that includes a comprehensive examination covering the report and course work. The examining committee is the student's graduate advisory committee. At the conclusion of the examination, the committee decides if the student has passed or failed. The final examination cannot be scheduled until an acceptable paper has been received by the committee. The time and location of the final examination must be announced to the Department of Wood Science & Engineering at least seven days in advance.



REQUIREMENTS FOR DOCTOR OF PHILOSOPHY DEGREE IN WOOD SCIENCE

I. GENERAL REQUIREMENTS

General University requirements are included in the Graduate School's *"Guide to Success"* found online at: http://oregonstate.edu/dept/grad_school/current/success.html.

Students seeking a dual Doctor of Philosophy degree should see the section *"Requirements for Dual Doctor of Philosophy Degree in Wood Science"*.

II. REQUIREMENTS OF THE DEPARTMENT

The program may include all courses beyond the Bachelor's degree level. A single, double, or integrated minor must be specified.

III. PROCEDURAL REQUIREMENTS

A. Graduate Student Advisory Committee

The committee is composed of the major professor, the departmental representative, and at least one more faculty member from the Department of Wood Science & Engineering or another department that is involved in the student's program. The departmental representative is selected from the Wood Science & Engineering graduate faculty by the major professor and the student. This representative is a permanent member of the student's advisory committee and has responsibility for ensuring that departmental requirements are met. The departmental representative is involved in planning the course program and the topic of the report, and assuring that during the examination, a fair balance of questions is maintained on all coursework in the student's program. A Graduate Council Representative is not included in the committee.

B. Programs

A program of study must be filed with the Graduate School before completing 18 hours of graduate credit.

C. Performance Expectations

Students shall be evaluated annually by their major professor and/or committee on their progress toward completing the degree program. An evaluation will be filed with the departmental office. The major professor and/or committee may require more frequent evaluations and additional means of assessing performance and ability.

A. Graduate Course Requirements

	<u>Credits</u>
1. Requirements in the wood science major.	
a. WSE 521 Wood Science I	4
WSE 522 Wood Science II	4
b. Any three WSE 5xx courses	9 - 12
c. WSE 507/607-1 Beginning Seminar	1
WSE 507/607-2 Graduate Seminar	2
d. WSE 603 Thesis (minimum)	30- 45
e. Non-blanket numbered courses (5xx/6xx) in Wood Science & Engineering and departments related to major field of study.	variable
2. Requirements in the wood science minor(s)	
a. Non-blanket numbered (5xx/6xx level) courses approved by the minor department. However, non-blanket numbered courses taken as a requirement for major may be counted toward this requirement.	variable
Total credits in Ph.D. program :	108+

B. Program Requirements

- A level of work consistent with the degree.
- A maximum of 15 credits other than thesis credits of blanket numbered courses (50x/60x) for the entire program.
- Three years of full-time work beyond the Bachelor's degree.
- Minimum of 36 credits of graduate work in residence.
- Transfer courses must have a grade of B or better.
- Without special permission from the Dean of the Graduate School, Ph.D. students may not have had all undergraduate and graduate training at Oregon State University.

C. Seminar Participation

All full-time wood science PhD graduate students are expected to register for and attend WSE 607, Section 2, each term that it is offered unless excused by the Department Head. All wood science PhD students must give at least two Graduate Seminar presentations as a requirement for their degree.

D. Qualifying Examination (Effective for new students entering Summer 2009)

PhD students must pass a qualifying exam to be eligible for the preliminary exam. The Qualifying Exam evaluates understanding of basic wood sciences per the SWST Basic Wood Sciences competencies (http://www.swst.org/accred_handbook.pdf), and tests ability to identify common wood products. Details of the test are found in the Student Information Section of the WSE Intranet.

The test will be offered one time each quarter. Students must pass the test prior to scheduling their preliminary exam and may take the exam a maximum of three times. The Qualifying Exam Committee will grade the exam and judge whether the student has passed or failed the exam.

E. Dissertation Requirements

The student must submit a satisfactory dissertation based on his/her research. The dissertation must be approved by the student's graduate advisory committee and must meet Graduate School requirements. The student will provide one hard bound copy of the approved dissertation to be a permanent reference in the Department, which is in addition to the University requirement.

F. Preliminary and Final Examinations

All Wood Science doctoral students are required to pass both a preliminary and a final examination. The objectives of these examinations are to evaluate a candidate's understanding of fundamental subject matter in wood science and technology, and associated basic principles in his or her specialized area. The exams test the student's ability to recall, interpret and use facts and ideas, to communicate answers, and to think critically, logically, and originally.

Preliminary Exam: The preliminary exam evaluates the student's knowledge and understanding of subject matter areas. This exam has both written and oral portions. The written exam must be passed before the oral exam is administered. The major professor, in consultation with the student's graduate committee, may choose either a traditional written exam or development of a research proposal.

The traditional written exam will consist of a series of questions developed by the doctoral committee. The student is given a specific time limit to complete the exam and return the responses to the major professor. The major professor will distribute all questions and student response to the entire committee. Each committee member evaluates the specific questions they posed and then responds to the major professor with either pass or fail. Students pass the written exam with no more than one vote of fail.

The development of a research proposal option may be chosen if there is evidence that the student has mastered the basics of wood science and his or her core area, has shown maturity in intellectual development, is planning a career that will involve numerous proposals, and has little experience with proposal writing. The major professor, in consultation with the doctoral committee, will select a topic for which the student will develop a research proposal. Any topic in wood science may be selected as long as it is not closely related to the research area that the student has selected for his/her dissertation or for a previous degree. At the discretion of the major professor, the student may be offered a list of potential topics developed by the doctoral committee from which one may be selected by the student, or the student may be asked to submit a list of potential topics from which the committee will pick one.

The proposal assignment will be given in writing and will include the topic, instructions about limitations on the use of outside resources (e.g., internet, discussions with other people, editing/writing help, etc.), document preparation guidelines such as length limitations and format, scope of what the proposal should include (e.g., background, objectives, project description, timeline, references, budget, budget justification, layperson summary, etc.), and any specific guidance on budget assumptions, equipment availability, etc. The student will be given a time limit for writing the proposal that usually will range from 2 to 4 weeks. The proposal will be delivered to the entire doctoral committee. Each committee member independently evaluates the proposal and responds to the major professor with either pass or fail. Students pass the written exam with no more than one vote of fail.

Oral Exam: The oral examination will be given by the student's doctoral committee, typically within 3 weeks after the student has passed the written portion. It should be scheduled for a 3 hour period. The oral exam will not include a presentation by the student, nor will it be combined with other committee business to ensure that the committee and student are focused on the exam itself. Students should review core disciplinary materials in advance and may talk to committee members about potential areas of questioning. The committee judges whether the student has passed the exam and is advanced to candidate status following the requirements in the OSU Graduate Catalog.

Final Examination: A final presentation on the dissertation work and an oral examination covering the dissertation and knowledge of major and minor fields is required. The candidate will make a public presentation of the dissertation. This is open to faculty, staff, students, guests, and the public and targets a lay audience; it should be about 45 minutes long. Following the open presentation, the candidate will be examined in a closed session by the doctoral committee that should be scheduled for an additional 2.5 hours. During this examination the candidate is expected to defend his or her dissertation and to demonstrate satisfactory knowledge of wood science and associated fields. The examining committee judges if the candidate passes or fails the final examination and follows the proscribed procedures of the OSU Graduate Catalog.

After satisfactory completion of the written exam, the oral preliminary examination is given by the student's doctoral committee. Graduate School regulations dictate procedures for ascertaining the successful or unsuccessful completion of the oral preliminary examination and subsequent advancement of the student to Ph.D. candidate status.

III. PROCEDURAL REQUIREMENTS

A. Student Advisory Committee

The student's advisory committee consists of at least five members of the graduate faculty. These include the major professor, a departmental representative, one from the minor department (optionally two for a double minor of the principal fields of the integrated minor), and a Graduate Council Representative. The departmental representative is selected from the Wood Science & Engineering graduate faculty by the major professor and the student. This representative is a permanent member of the student's advisory committee and has responsibility for ensuring that departmental requirements are met. The departmental representative is involved in planning the course program and the topic of the report, and assuring that during the examination, a fair balance of questions is maintained on all coursework in the student's program. The committee is selected by the major professor and the student with the approval of the Department Head. The Graduate Council Representative is selected by the student from an approved list provided by the Graduate Student.

B. Program of Study

A program planning meeting must be held with the student and the student's advisory committee members. A Doctoral Program Meeting checklist is required (see the Graduate School's "Guide to Success" found online at http://oregonstate.edu/dept/grad_school/current/success.html). The approved program of study must be filed with the Graduate School by the fourth or fifth term of graduate study.

C. Research Plan

All Wood Science graduate students shall prepare a written research study plan or proposal with the guidance and direction of their major professor and committee. The plan shall be presented to the committee for approval by the end of four terms in residence. The approved plan shall be filed in the departmental office.

D. Performance Expectations

All students shall be evaluated annually by their major professor and/or committee on their progress toward completing the degree program. A written copy will be filed in the departmental office. For students employed as GRAs, this evaluation will normally be done prior to reappointment. The major professor and/or committee may require more frequent evaluations and additional means of assessing performance and ability.

Students are expected to maintain a 3.0 grade point average, both overall and on program of study classes to be satisfactorily progressing toward degree completion.

REQUIREMENTS FOR DUAL PHD IN WOOD SCIENCE AND A SECOND MAJOR

I. GENERAL REQUIREMENTS

General University requirements are included in the Graduate School's "Guide to Success" found online at: http://oregonstate.edu/dept/grad_school/current/success.html.

II. REQUIREMENTS OF THE DEPARTMENT

A. Graduate Course Requirements

	<u>Credits</u>
1. Requirements in the Wood Science major.	
a. WSE 521 Wood Science I	4
WSE 522 Wood Science II	4
b. Any WSE 5xx courses	9-12
c. WSE 607-1 Beginning Seminar	1
WSE 607-2 Graduate Seminar	2
d. WSE 603 Thesis (minimum)	15-23
e. (5xx/6xx) level courses in Wood Science & Engineering or departments related to wood science.	variable
2. Requirements in the second major.	
a. Courses in or related to the second major	variable
b. Thesis	15-23

Total credits in dual Ph.D. program (minimum): 108

B. Program Requirements

- A level of work consistent with the degree.
- A maximum of 15 credits other than thesis credits of blanket numbered courses (50x/60x) for the entire program.
- Three years of full-time work beyond the Bachelor's degree.
- Minimum of 36 credits of graduate work in residence.
- Transfer courses must have a grade of B or better.
- Without special permission from the Dean of the Graduate School, Ph.D. students may not have had all undergraduate and graduate training at Oregon State University.
- All other, non-conflicting rules and requirements governing the Ph.D. apply.



C. Seminar Participation

All full-time wood science PhD graduate students are expected to register for and attend WSE 607, Section 2, each term that it is offered unless excused by the Department Head. All wood science PhD students must give at least two Graduate Seminar presentations as a requirement for their degree.

D. Qualifying Examination (Effective for new students entering Summer 2009)

PhD students must pass a qualifying exam to be eligible for the preliminary exam. The Qualifying Exam evaluates understanding of basic wood sciences per the SWST Basic Wood Sciences competencies (http://www.swst.org/accred_handbook.pdf), and tests ability to identify common wood products. Details of the test are found in the Student Information Section of the WSE Intranet.

The test will be offered one time each quarter. Students must pass the test prior to scheduling their preliminary exam and may take the exam a maximum of three times. The Qualifying Exam Committee will grade the exam and judge whether the student has passed or failed the exam.

E. Dissertation Requirements

The thesis must show evidence of originality and a real contribution to knowledge in both of the major fields. The thesis must be approved by the student's graduate committee. In this regard it must be satisfactory to both major departments. The student will provide one unbound copy of the approved thesis with original signatures to be a permanent reference in the department. A second copy of the thesis may be required by the second major department.

F. Preliminary and Final Examinations

Doctoral students are required to pass both a preliminary and a final examination. The objective of these examinations are to evaluate a candidate's understanding of fundamental subject matter in wood science and technology and the associated basic principles in his/her specialized area.

Candidates must be able to demonstrate an ability to analyze subject matter questions and problems and synthesize answers and solutions. The examination tests a student's ability to interpret and use facts and ideas rather than merely recall them. It also reveals the student's ability to think critically and originally about a research problem in their area of specialization.

Preliminary Exam: The preliminary exam evaluates the student's knowledge and understanding of subject matter areas. This exam has both written and oral portions. The written exam must be passed before the oral exam is administered. The major professor, in consultation with the student's graduate committee, may choose either a traditional written exam or development of a research proposal.

The traditional written exam will consist of a series of questions developed by the doctoral committee. The student is given a specific time limit to complete the exam and return the responses to the major professor. The major professor will distribute all questions and student response to the entire committee. Each committee member evaluates the specific questions they posed and then responds to the major professor with either pass or fail. Students pass the written exam with no more than one vote of fail.

The development of a research proposal option may be chosen if there is evidence that the student has mastered the basics of wood science and his or her core area, has shown maturity in intellectual development, is planning a career that will involve numerous proposals, and has little experience with proposal writing. The major professor, in consultation with the doctoral committee, will select a topic for which the student will develop a research proposal. Any topic in wood science may be selected as long as it is not closely related to the research area that the student has selected for his/her dissertation or for a previous degree. At the discretion of the major professor, the student may be offered a list of potential topics developed by the doctoral committee from which one may be selected by the student, or the student may be asked to submit a list of potential topics from which the committee will pick one.

The proposal assignment will be given in writing and will include the topic, instructions about limitations on the use of outside resources (e.g., internet, discussions with other people, editing/writing help, etc.), document preparation guidelines such as length limitations and format, scope of what the proposal should include (e.g., background, objectives, project description, timeline, references, budget, budget justification, layperson summary, etc.), and any specific guidance on budget assumptions, equipment availability, etc. The student will be given a time limit for writing the proposal that usually will range from 2 to 4 weeks. The proposal will be delivered to the entire doctoral committee. Each committee member independently evaluates the proposal and responds to the major professor with either pass or fail. Students pass the written exam with no more than one vote of fail.



The oral examination will be given by the student's doctoral committee, typically within 3 weeks after the student has passed the written portion. It should be scheduled for a 3 hour period. The oral exam will not include a presentation by the student, nor will it be combined with other committee business to ensure that the committee and student are focused on the exam itself. Students should review core disciplinary materials in advance and may talk to committee members about potential areas of questioning. The committee judges whether the student has passed the exam and is advanced to candidate status following the requirements in the OSU Graduate Catalog.

Final Examination: A final presentation on the dissertation work and an oral examination covering the dissertation and knowledge of major and minor fields is required. The candidate will make a public presentation of the dissertation. This is open to faculty, staff, students, guests, and the public and targets a lay audience; it should be about 45 minutes long. Following the open presentation, the candidate will be examined in a closed session by the doctoral committee that should be scheduled for an additional 2.5 hours. During this examination the candidate is expected to defend his or her dissertation and to demonstrate satisfactory knowledge of wood science and associated fields. The examining committee judges if the candidate passes or fails the final examination and follows the proscribed procedures of the OSU Graduate Catalog.

III. PROCEDURAL REQUIREMENTS

A. Program of study for the Dual PhD Degree

A program planning meeting must be held with the student and the student's advisory committee members. A Doctoral Program Meeting checklist is required (see the Graduate School's "Guide to Success" found online at: http://oregonstate.edu/dept/grad_school/current/success.html). The approved program of study must be filed with the Graduate School by the fourth or fifth term of graduate study.

B. Committees for Dual PhD Degrees

Each dual major PhD student shall have one committee. The student has the option of one or two

major professors. If one major professor is selected, this professor must be approved to direct doctoral theses in both of the major fields. If two major professors from the two major fields are selected, each must be approved to direct doctoral theses in their field. The committee will include a minimum of two representatives from each department, and the Graduate School Representative, for a total of five committee members. If there is only one major professor, two committee members must be selected from the other major department. The departmental representatives are selected by the student and the major professors and are permanent members of the student's advisory committee. The departmental representatives are involved in planning the course program and topic of the thesis ensuring that departmental requirements are met, and that a fair balance of questions on all course work in the student's program are raised at the examination. The Graduate Council Representative is selected by the student from an approved list provided by the Graduate School.

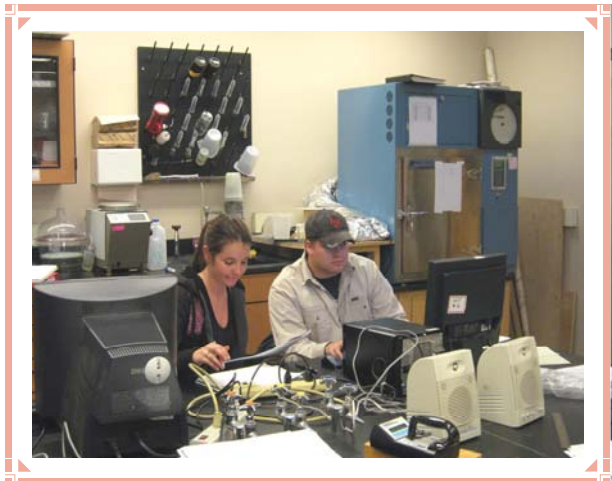
C. Research Plan

All Wood Science graduate students, including dual majors, will prepare a written research study plan or proposal with the guidance and direction of their major professor(s) and committee. The plan will be presented to the committee no later than the end of four terms in residence. The approved plan will be filed in the departmental office.

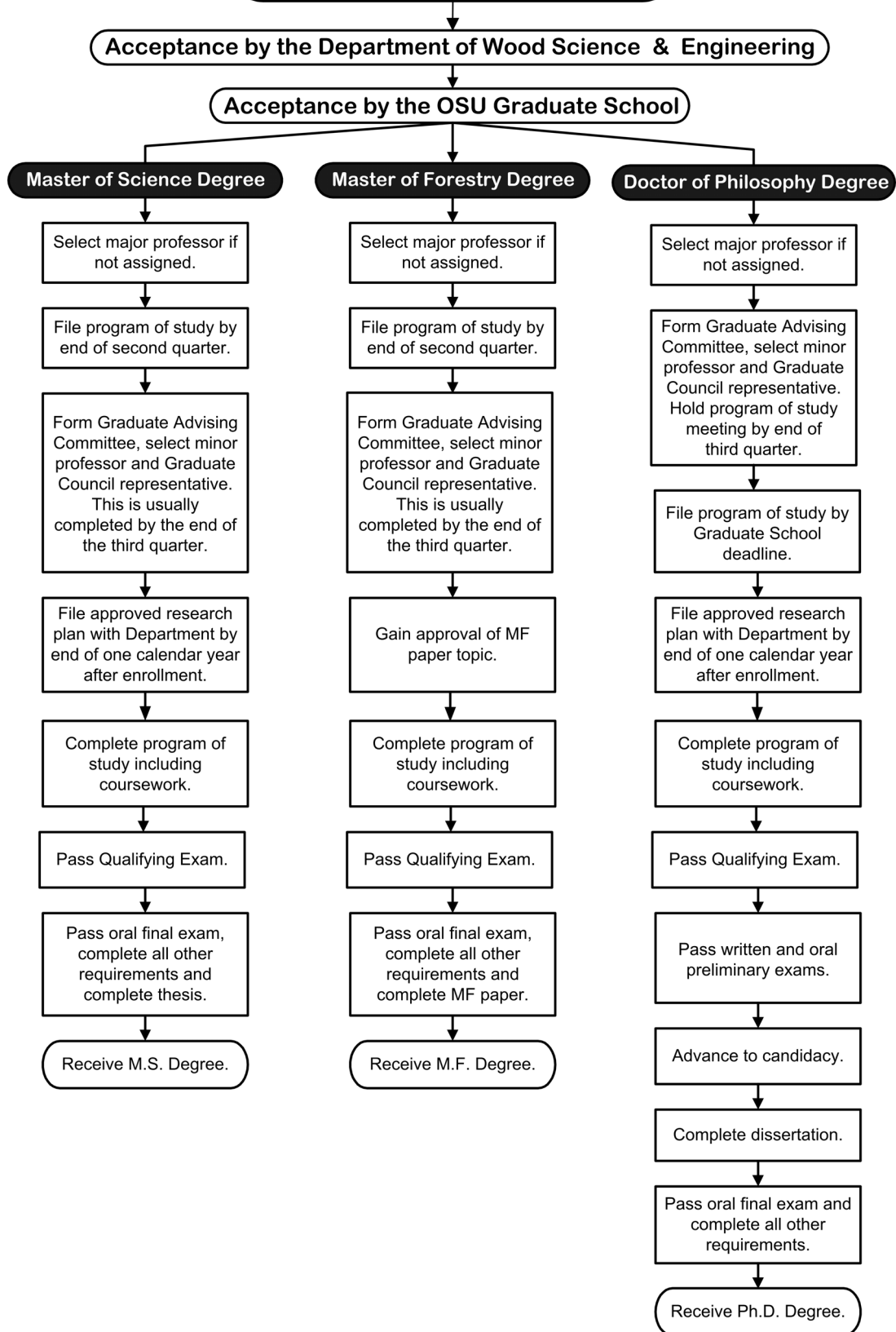
D. Performance Expectations

All students will be evaluated annually by their major professor and/or committee on their progress toward completing a degree program. A written copy will be filed in the departmental office. For students employed as GRA's, this evaluation will normally be done prior to reappointment. The major professor(s) and/or the committee may require more frequent evaluations and additional means of assessing performance and ability.

Students are expected to maintain a 3.0 grade point average, both overall and on program of study classes to be satisfactorily progressing toward degree completion.



Steps to a Graduate Degree in Wood Science



Faculty

CHARLES C. BRUNNER

*Associate Professor
and Lead Undergraduate Advisor*

B.S., 1968, Virginia Tech., Blacksburg
M.B.A., 1979, Virginia Tech., Blacksburg

EXPERTISE

Wood processing, operations research, optical properties of wood; modeling secondary-manufacturing processes; computer-aided-manufacturing.

COURSES:

WSE 210 Wood Technology and Utilization
WSE 211 Wood Properties and Measurements Lab
WSE 446/546 Secondary Wood Products Mfg.

SELECTED PUBLICATIONS:

Liu, Y., **C.C. Brunner**, J.E. Reeb, W. F. Reiter Jr., and J.W. Funck. 2005. Integrity of serpentine-end-matched joints during veneer slicing. *Forest Products Journal* 55 (7/8):63-66.

Funck, J.W., Y. Zhong, D.A. Butler, **C.C. Brunner**, and J.B. Forrer. 2003. Image segmentation algorithms applied to wood defect detection. *Computers and Electronics in Agriculture*. 41 (2003) 157-179.

Butler, D.A., **C.C. Brunner**, and J.W. Funck. 2002. Wood-surface feature classification via extended-color imagery. *Forest Products Journal*. 52(6):80-84.

Hamilton, E.D., D.A. Butler, and **C.C. Brunner**. 2002. Cutting to order in the rough mill: A sampling approach. *Wood and Fiber Science*. 34(4):560-576.

Anderson, J.D., **C.C. Brunner**, and S.U. Randhawa. 1997. Design and implementation of a fuzzy logic controller for wood parts recovery in rough mills. *International Journal of Flexible Automation and Integrated Manufacturing* 4(3-4):255-271.

Brunner, C.C., A.G. Maristany, J. Anderson, J.W. Funck, and D.A. Butler. 1997. The interaction of sawing and edging operations on red alder finger-joint cut-stock production. *Forest Products Journal* 47(7/8):75-82.

RECENT STUDENT THESES:

Salichon, Maxence. 2005. Simulating changing diameter distributions in a softwood sawmill. M.S.

Liu, Yuqing. 2000. Properties of veneer sliced from serpentine end-matched flitches. M.S.

RAKESH GUPTA

Professor

B.S. 1982. University of Agriculture and Technology, Pantnagar, UP, India
M.S.. 1984. University of Manitoba, Winnipeg
Ph.D. 1990. Cornell University, Ithaca, NY

EXPERTISE

Wood engineering/mechanics; mechanical properties of wood

CURRENT RESEARCH

Mechanical properties of lumber; load sharing in truss assemblies; dynamic behavior of wood shear walls.

COURSES:

WSE 318 Mechanical Behavior of Wood
WSE 458/558 Wood Design
WSE 522 Wood Science II

SELECTED PUBLICATIONS:

van de Lindt, J.W., Li, Y., Bulleit, W.M., **Gupta, R.**, Morris, P.I. 2009. The Next Step for AF&PA/ASCE 16: Performance-Based Design of Wood Structures, *Journal of Structural Engineering*, 135(6):611-618.

Sinha, A. and **Gupta, R.** 2009. Strain Distribution in OSB and GWB in Wood-Frame Shear Walls. *Journal of Structural Engineering*, 135(6):666-675.

Seaders, P., **Gupta, R.** and Miller, T.H. 2009. Monotonic and cyclic load testing of partially and fully anchored wood-frame shear walls. *Wood and Fiber Science*, 41(2):145-156.

van de Lindt, J.W., Graettinger, A.J., **Gupta, R.**, Skaggs, T.D., Pryor, S.E. and Fridley, K.J. 2007. Performance of Wood-Frame Structures During Hurricane Katrina. *Journal of Performance of Constructed Facilities*, 21(2):108-116.

RECENT STUDENT THESES:

Wilson, Jebediah. 2008. Behavior of a 1/6th scale, two-story, wood framed residential structure under surge wave loading. M.S.

Lewis, Michael. 2008. Performance of wood frame wall with thin shell ECC shear panel. M.S.

Sinha, Arijit. 2007. Strain distribution in OSB and GWB in wood frame shear walls. M.S.

ERIC N. HANSEN

Professor and Extension Specialist

B.S. 1990. University of Idaho, Moscow

Ph.D. 1994, Virginia Tech, Blacksburg

EXPERTISE:

Forest products marketing; environmental marketing; certification; innovation; corporate social responsibility.

COURSES:

WSE 455/555 Forest products Marketing

SELECTED PUBLICATIONS:

Panwar, Rajat, Juslin, Heikki, **Hansen, Eric**, and Tomi Amberla. 2009. A Framework for Identifying Social and Environmental Issues: A Case of the US Forest Products Industry. *Social Responsibility Journal*. (In Press).

Thompson, Derek, Roy Anderson, **Hansen, Eric**, and Lynne Kahle. 2009. Understanding Sustainable Consumption: Insights from Eco-labeled Products. *Business Strategy and the Environment*. (In Press).

Crespell, Pablo and **Hansen, Eric**. 2008. Managing for innovation: Insights into a successful company. *Forest Products Journal*. 58(9):6-17.

Nybakk, Erlend and **Eric Hansen**. 2008. Entrepreneurship and innovativeness in the Norwegian nature-based recreational services industry. *Journal of Forest Policy and Economics*. 10(7-8):473-479.

Knowles, Chris, **Eric Hansen** and Clay Dibrell. 2008. Measuring Firm Innovativeness: Development and Refinement of a New Scale. *Journal of Forest Products Business Research*. 5(5):1-24.

Crespell, Pablo and **Eric Hansen**. 2008. Work Climate, Innovativeness, and Firm Performance: In search of a conceptual framework. *Canadian Journal of Forest Research*. 38(7):1703-1715.

Hansen, Eric, Heikki Juslin, and Chris Knowles. 2007. Innovativeness in the Global Forest Products Industry: Exploring New Insights. *Canadian Journal of Forest Research*. 37(8):1324-1335.

RECENT STUDENT THESES:

Panwar, Rajat 2008. Corporate social responsibility in the forest products industry : an issues management approach. Ph.D.

Crespell, Pablo 2008. Organizational climate and innovativeness in the forest products industry. Ph.D.

FREDERICK A. KAMKE

Professor and JELD-WEN Chair of Wood-based Composites Science

B.S., 1979, University of Minnesota, St. Paul

Ph.D., 1983, Oregon State University, Corvallis

EXPERTISE:

Heat and mass transfer in wood and wood-based materials, with emphasis on adhesion science, modeling, and the manufacture and performance of wood-based composite materials.

CURRENT PROGRAMS:

Development of high performance composites from modified wood; micro x-ray tomographic analysis of adhesive bonds.

SELECTED PUBLICATIONS:

Gabrielli, C. and **F.A. Kamke**. 2008. Treatment of chemically modified wood with VTC process to improve dimensional stability. *For. Prod. J.* 58(12):82-86.

Kutnar, A., **F.A. Kamke** and M. Sernek. 2008. The mechanical properties of densified VTC wood relevant for structural composites. *Holz als Roh- Werkst.* 66(6): 439-446

Kutnar, A., **F.A. Kamke**, J.A. Nairn and M. Sernek. 2008. Mode II fracture behavior of bonded viscoelastic thermal compressed wood. *Wood and Fiber Sci.* 40 (3):362-373.

Kutnar A., **F.A. Kamke**, M. Petrič , and M. Sernek. 2008. The influence of viscoelastic thermal compression on the chemistry and surface energetics of wood. *Colloids Surf. A: Physicochem. Eng. Aspects*, 329: 82-86

Shu, J., L.T. Watson, N. Ramakrishnan, **F.A. Kamke** and C. North. 2008. Unification of problem solving environment implementation layers with XML. *Advances in Engineering Software* 39(3):189-201.

Lee, J.N., L.T. Watson and **F.A. Kamke**. 2007. Simulation of the hot pressing of a multi-layered wood strand composite. *J. Composite Materials. J. Composite Materials.* 41:879-904.

RECENT STUDENT THESES:

Gabrielli, Christopher, M. 2008. Chemical modification of wood: dimensional stabilization of viscoelastic thermal compressed wood. M.S.

Rathi, Vardan. 2009. Bending property enhancement of wood strand composite using viscoelastic thermal compression. M.S.

JOSEPH J. KARCHESY

Associate Professor

B.S., 1968, University of Washington, Seattle

M.S., 1970, University of Victoria, BC

Ph.D., 1974, Oregon State University, Corvallis

EXPERTISE:

Chemistry of wood extractives and natural products from forest resources; discovery of new bioactive substances for use in forestry, agriculture and the protection of human health.

CURRENT PROGRAMS:

Chemistry of mill residues for increased and improved resource recovery in traditional forest products operations; natural products from wood for use as insecticides, repellents and antifungal compounds.

COURSES:

WSE 316 Wood Chemistry

WSE 407 Senior Seminar/Professional Development

SELECTED PUBLICATIONS:

Hegazy, Mohamed-Elamir F., Abdel-Lateff, Ahmed, Gamal-Eldeen, Amira M., Turky, Fatma, Hirata, Toshifumi, Paré, Paul W., **Karchesy, J.J.**, Kamel, Mohamed S. and Ahmed, Ahmed A.. 2008 Anti-inflammatory Activity of New Guaiane Acid Derivatives from *Achillea Coarctata* Natural Product Communications Vol. 3 (6) ,851-856.

Kim J.K., Ham Y.H., **Karchesy, J.J.**, and Bae Y.S. 2008. A new phenylpropanoid derivative of catechin from the needles of *Taxus cuspidata*. *Natural product research* 22(15):1365-9

Dolan, M. C., Jordan, R A. , Schulze, T. L. , Schulze, C. J., Manning, M., Ruffalo, D., Schmidt, J.P., Plesman, J. and **Karchesy, J.J.** 2008. (Ability of Two All Natural Products, Nootkatone and Carvacrol, to Suppress *Ixodes scapularis* and *Amblyomma americanum* Acari: Ixodidae) in a Lyme Disease Endemic area of New Jersey. In Press. *Journal of Economic Entomology*

RECENT STUDENT THESIS:

Liu, Xinfeng, 2009. Analysis and comparison of essential oil components extracted from the heartwoods of Leyland cypress, Alaska yellow cedar, and Monterey cypress. M.S.

CHRISTOPHER D. KNOWLES

Assistant Professor

B.S.F, 2000. Stephen F. Austin University, TX

M.S.F., 2003. Stephen F. Austin University, TX

Ph.D., 2007. Oregon State University, OR

EXPERTISE:

Forest Products Marketing; firm innovativeness; responsible material selection.

CURRENT PROGRAMS:

The development of a new measure of innovativeness in the forest products industry; green building with a focus on material selection, purchasing, and specification.

SELECTED PUBLICATIONS:

Crespell, P., **C. Knowles**, and E. Hansen. 2008. Measuring Firm Innovativeness: Cross Validation. *Journal of Forest Products Business Research* 5(7).

C. Knowles, E. Hansen, and M. Engle. 2008. Oregon Wood Fest: Assessing the Educational Impact. *Journal of Extension* 46(4). <http://www.joe.org/joe/2008august/rb5.shtml>

C. Knowles, E. Hansen, and C. Dibrell. 2008. Measuring Firm Innovativeness: Development and Refinement of a New Scale. *Journal of Forest Products Business Research* 5(5).

C. Knowles, E. Hansen, and S. Shook. 2008. Measuring Innovativeness in the North American Softwood Sawmilling Industry Using Three Methods. *Canadian Journal of Forest Research* 38(2): 363-375.

Hansen, E., H. Juslin, and **C. Knowles**. 2007. Innovativeness in the Global Forest Products Industry: Exploring New Insights. *Canadian Journal of Forest Research* 37(8): 1324-1335.

Crespell, P., **C. Knowles**, and E. Hansen, 2006. Innovativeness in the North American softwood sawmilling industry. *Forest Science*. 52(5): 568-578.

C. Knowles. 2006. Characterization of selected wood properties in commercially produced finger-jointed southern pine dimension lumber. *Forest Products Journal*. 55(9): 43-46.

C. Knowles, J. Stamey, and E. Dougal. 2006. The effect of specific gravity and growth rate on bending strength of southern pine finger-jointed lumber. *Wood and Fiber Science*. 38(3):379-389.

BARBARA LACHENBRUCH

*Professor, Wood Science & Engineering
Adjunct, Forest Ecosystems and Society*

B.A.. 1979. Swarthmore College, PA

M.S. 1982. University of Alaska, Fairbanks

Ph.D. 1990. Stanford University, CA

EXPERTISE:

Functional and ecological wood anatomy for trees and wood products

CURRENT PROGRAMS:

Wood quality in relation to silviculture, environment and genetics; tradeoffs among mechanics, hydraulics, and other xylem functions; effects of rapid growth on wood and physiology; juvenile/mature wood changes in softwoods and hardwoods; determinants of sapwood quantity; interactions of disease with wood and bark structure and function.

COURSES:

WSE 312 Wood and Fiber Anatomy

WSE 470 Forests, Wood and Civilization

SELECTED PUBLICATIONS:

Meinzer, F. C., D. M. Johnson, **B. Lachenbruch**, K. A. McCulloh, and D. R. Woodruff. 2009. Xylem hydraulic safety margins in woody plants: coordination of stomatal control of xylem tension with hydraulic capacitance. *Functional Ecology* (in press)

Collins, B., J. L. Parke, **B. Lachenbruch**, E. M. Hansen, and J. L. Parke. 2009. The effects of *Phytophthora ramorum* infection on hydraulic conductivity and tylosis formation in tanoak sapwood. *Canadian Journal of Forest Research* (in press).

Domec, J.C., J.M. Warren, F.C. Meinzer, and **B. Lachenbruch**. 2009. Structural and ecological safety factors against xylem failure by implosion and air-seeding within young and old conifer trees with reference to juvenile and mature wood. *IAWA J.* (in press).

Domec, J.-C., **B. Lachenbruch**, F. C. Meinzer, D. R. Woodruff, J. M. Warren, and K. A. McCulloh. 2008. Maximum height in a conifer is associated with conflicting requirements for xylem design. *Proc. National Academy of Science* 105(33): 12069-12074.

RECENT STUDENT THESES:

Dunham, S. M., 2006. Douglas-fir hydraulic architecture and relationships among xylem properties at multiple scales via a Bayesian analysis. M.S.

Renninger, Heidi, 2005. Effects of release from suppression on hydraulic architecture, photosynthetic capacity and functional wood characteristics in Douglas-fir and western hemlock. M.S.

SCOTT A. LEAVENGOOD

*Associate Professor
Director, Oregon Wood Innovation Center*

BS, 1992, Colorado State University, Fort Collins

MS, 1994, Oregon State University, Corvallis

EXPERTISE:

Extension education in wood technology; quality and process control; manufacturing efficiency; utilization of non-traditional species.

CURRENT PROGRAMS:

Innovation and new product development; applied research in quality and process control methods in the secondary wood-products industry; commercialization of underutilized species.

SELECTED PUBLICATIONS:

Reeb, J.E., **S. Leavengood**, and C. Knowles. 2009. Needs assessment of the Oregon forest products industry. Accepted for publication in the *Forest Products Journal* 1/27/09.

Leavengood, S., J.W. Funck, and J.E. Reeb. 2007. Face veneer checking in maple plywood. Submitted to the *Forest Products Journal*.

Kallioranta, S., R.P. Vlosky, and **S. Leavengood**. 2006. Web-Based Communities: Tools for Forest Sector Outreach and Extension. *Journal of Extension* 44(2). Article No. 2FEA4

Leavengood, S. and Western Wood Products Association. 2003. Lumber Shrinkage Estimator. Excel program to estimate shrink and swell for wood.

D. Nicholls and **S. Leavengood**. 2003. Processing Red Alder for Maximum Local Benefit. In: *Uses and Markets for Alaska Yellow Cedar and Red Alder*, Proceedings from an 8-Hour Wood Products Workshop. Bob Gorman (University of Alaska-Fairbanks) and Dave Nicholls (USFS Sitka) Eds. 5 pp.

E. G. Pearson, **S. Leavengood** and J. E. Reeb. 2000. Comparison of the absorptive capacity of shavings of western juniper, western redcedar, and Douglas-fir for animal bedding. *Forest Products Journal* 50(6): 57-60.

Leavengood, S. and R. Love. 1998. Trials and Triumphs of Expanded Extension Programs. *Journal of Extension* 36(7).

KAICHANG LI

Associate Professor

B.S. 1984. S. China Univ. of Technology, Guangzhou

M.S. 1987. S. China Univ. of Technology, Guangzhou

Ph.D. 1996. Virginia Tech., Blacksburg

EXPERTISE:

Wood adhesives; wood composites; wood-plastic composites; paper additives; biodegradation of lignin; enzymatic pulp bleaching; wood chemistry.

CURRENT RESEARCH:

Development of formaldehyde-free wood adhesives; development and characterization of wood-plastic composites; investigation of interfacial chemistry of wood-plastic composites; development of new paper additives; development of new applications for room temperature ionic liquids; development of pressure sensitive adhesives; development of novel dental adhesives; development of novel dental composite materials.

COURSES:

WS&E 445/545 Chem. Wood Proc. and Pollution Control
WSE 535 Polymer Synthesis and Structure

SELECTED PUBLICATIONS:

Catal, T., S. Xu, K. Li, H. Bermek, and H. Liu. 2008. Electricity generation from polyalcohols in single-chamber microbial fuel cells. *Biosensors and Bioelectronics* 24:849-854

Milota, M., P. Mosher, and K. Li, 2008. RTIL absorption of organic emissions from press and dry exhaust. *Forest Prod J.* 58(4):97-101.

Catal, T., Y. Fan, K. Li, H. Bermek, and H. Liu. 2008. Effects of furan derivatives and phenolic compounds on electricity generation in microbial fuel cells. *J. Power Sources* 180:162-166.

Catal, T., K. Li, H. Bermek, and H. Liu. 2008. Electricity production from twelve monosaccharides using microbial fuel cells. *J. Power Sources* 175:196-200.

Huang, J., and K. Li, 2008. A new soy flour-based adhesive for making interior type II plywood. *J. Am. Oil Chem. Soc.* 85:63-70.

RECENT STUDENT THESIS:

Jian Huang, 2007. Development and characterization of new formaldehyde-free soy flour-based adhesives for making interior plywood. M.S.

THOMAS E. McLAIN

Professor and Department Head

B.S. 1969. Colorado State University, Fort Collins

M.S. 1973. Colorado State University, Fort Collins

Ph.D. 1975. Colorado State University, Fort Collins

EXPERTISE:

Mechanical properties of wood and wood-based products; structural mechanical connections; use of wood in society; consumption and sustainability.

CURRENT PROGRAMS:

Administration of departmental research, education, and outreach programs, Structural mechanical connections.

COURSES:

WSE 507/607 Graduate Seminar
FOR III Introduction to Forestry

SELECTED PUBLICATIONS:

McLain, T.E. 2005. Forestry and Sustainability. Abstract, Proceedings, Forest Products Society International Convention, Quebec Convention, Quebec City Quebec Canada, p 14.

McLain, T.E. 2002. Accreditation standards: setting a course for the future. In, Proceedings 2002 Annual Meeting of the Society of Wood Science and Technology, Madison, WI, pp. 55-61.

Waltz, M.E., Jr., T.E. McLain, T.H. Miller, and R.J. Leichti. 2000. Discrete bracing analysis for light frame wood-truss compression webs. *Journal of Structural Engineering* 126 (9): 1086-1093

Morrell, J.J. and T.E. McLain 1998. Role of Technology in Sustainability: Opportunities and Limits. In: Davis, c., ed. Proceedings of University Interdisciplinary Workshop, Forests and Society, Implementing Sustainability, OSU College of Forestry, Corvallis, OR, pp. 41-52.

Foliente, G.C., T.E. McLain 1998. End-matching effect on flexural stiffness of lumber Preliminary evaluation *Forest Products Journal* 48(718) :54-56

McLain, T.E. 1997. Design axial withdrawal strength from wood: I. Lag screw and wood screws. *Forest Products Journal* 47(5):77 -84.

RECENT STUDENT THESIS:

Waltz, M.E., Jr. 1998. Discrete compression web bracing design for light-frame wood trusses. M.S.

MICHAEL R. MILOTA

Professor

B.S. 1978. Iowa State University, Ames
M.S. 1981. Oregon State University, Corvallis
Ph.D. 1984. Oregon State University, Corvallis

EXPERTISE:

Wood drying and physical properties related the manufacture and use of wood and wood products, process emissions.

CURRENT PROGRAMS:

Modeling and simulation of kilns; drying rates for western species; detection and identification of compounds emitted during wood drying.

COURSES:

WSE 440/540 Wood Drying and Preservation
WSE 521 Advanced Wood Science

SELECTED PUBLICATIONS:

Berberovic A. and **M. Milota**. 2008. Simulation of Drying Using a Kiln Model. *Drying Technology*. 26(9):1097 - 1102.

Milota M. 2008. Drying rate correlation for Douglas-fir lumber. *Forest Products Journal*. 58(7/8):37-40

Milota M. and P. Mosher. 2008. Emissions of hazardous air pollutants from lumber during drying. *Forest Products Journal*. 58(7/8):50-55.

Milota M. and P. Mosher. 2008. A comparison of methods for measuring HAPs from lumber dry kilns. *Forest Products Journal*. 58(7/8):46-49.

Milota M., P. Mosher, and K. Li. 2008. RTIL absorption of organic emissions from press and dryer exhaust. *Forest Products Journal*. 58(4):97-101.

Milota M., P. Mosher, and K. Li. 2007. VOC and HAP removal from dryer exhaust gas by absorption into and ionic liquid. *Forest Products Journal*. 57(5):73-77.

Wang, Fujun, **M.R. Milota**, Paul Mosher, Kaichang Li, and Michelle Yankus. 2007. Henry's Law constants for methanol and α -pinene in ionic liquids. *Wood and Fiber Science*. 39(3):434-442.

RECENT STUDENT THESES:

Berberović, Adin. 2005. Numerical simulation of wood drying. M.S.

Wang, Fujun. 2005. Henry's Law constants for pollutants from the wood industry in room temperature ionic liquids. M.S.

JEFFREY J. MORRELL

University Distinguished Professor

B.S. 1977. SUNY-ESF, Syracuse, NY
M.S. 1979. Penn State, University Park, PA
Ph.D. 1982. SUNY-ESF, Syracuse, NY

EXPERTISE:

Wood preservation and biodeterioration. Effect of incisions on preservative fluid flow and wood strength; feasibility of using biological control against wood staining fungi; improving the performance of wood poles; evaluation of remedial treatments for U.S. species; performance of surface treatments; high pressure wood treatments.

COURSES:

WSE 440/540 Wood Drying and Preservation
WSE 507/607 Beginning Seminar
WSE 611 Wood Biodeterioration Selected Topics
WSE 411/412/413 Senior Thesis

SELECTED PUBLICATIONS:

Simonsen, J., H. Chen, **J.J. Morrell**, C. Freitag and M. Clauson. 2008. Pentachlorophenol migration from treated wood exposed to simulated rainfall. *Holzfor-schung* 62:608-612.

Taylor, A.M., J.R. Brooks, B. Lachenbruch, **J.J. Morrell** and S. Voelker. 2008. Correlation of carbon isotope ratios in the cellulose and wood extractives of Douglas-fir. *Dendrochronologia* 26(2):125-131.

Taylor, A.M., C. Freitag, E. Cadot, and **J.J. Morrell**. 2008. Potential of near infrared spectroscopy to assess hot-water-soluble extractive content and decay resistance of a tropical hardwood. *Holz Roh Werkst* 66:107-111.

Taylor, A., S. Wang, C. Freitag, and **J.J. Morrell**. 2008. Properties of "enhanced" OSB subfloor panels. *Forest Products Journal* 58(5):77-79.

Schauwecker, C.F. and **J.J. Morrell**. 2008. Ability of pressure treatment with wood preservatives to kill or limit emergence of invasive insects using *Arhopalus productus* as a model species. *Forest Products Journal* 58(10):56-60.

RECENT STUDENT THESES:

Schauwecker, Christoph, 2007. The phytosanitation of solid wood packaging materials using wood preservatives. M.S.

Mitsuhashi Gonzalez, June, 2007. Limiting copper loss from treated wood in or near aquatic environments. M.S.

LECH MUSZYŃSKI

Assistant Professor

M.S. 1987. Agricultural University of
Poznań, Poland
Ph.D. 1997 Agricultural University of
Poznań, Poland

EXPERTISE:

Advanced bio-based composites: bonding, interface performance, durability, damage assessment, fracture & fatigue properties, multifunctional barriers; Mechanics of wood and wood composites: time dependent phenomena, hygro-mechanical behavior, mechano-sorption; Wood-water relations: drying stresses in wood Application of advanced imaging techniques: Digital Image Correlation (DIC) and X-ray micro-CT.

CURRENT PROGRAMS:

Sustainable bio-based materials for west coast highways; development of high performance cellulose-based nanocomposites; team-oriented graduate training in forest resources utilization and advanced forest-based products marketing; morphology-based modeling of micro-mechanics and failure mechanisms in bio-materials with polymer matrices; replacing petroleum-based polymers with a novel reinforced biopolymer system; empirical data for modeling; development of integrated experimental protocols for wood and wood-based composites.

COURSES:

WSE 442/542 Composite Manufacturing
WSE 314 Wood and Fiber Physics

SELECTED PUBLICATIONS:

Zhang X., D.J. Gardner, **L. Muszyński**, 2009. Ultrasonic atomization of pMDI wood resin-adhesive. *Wood and Fiber Science*, 41(1): 84-89.

Zhang X., **L. Muszyński**, D.J. Gardner, 2008. Measuring resin-adhesive spray characteristics using a laser diffraction analyzer. *Forest Products Journal*, 58(11): 62-68.

Wang Y., **L. Muszyński**, J. Simonsen, 2007. Gold as an X-ray CT Scanning Contrast Agent: Effect on the Mechanical Properties of Wood Plastic Composites. *Holzforschung*, 61(6): 723-730.

L. Muszyński, 2006. Empirical Data for Modeling: Methodological Aspects in Experimentation Involving Hygro-Mechanical Characteristics of Wood. *Drying Technology* 24(9): 1115-1120.

L. Muszyński, R. Lagana, and S.M. Shaler, 2006. Hygro-mechanical Behavior of Red Spruce in Tension Parallel to the Grain. *Wood and Fiber Science* 38(1): 155-165.

RECENT STUDENTS THESIS:

Wang, Yi, 2007. Morphological characterization of wood plastic composite (WPC) with advanced imaging tools: developing methodologies for reliable phase and internal damage characterization. M.S.

JOHN A. NAIRN

Professor and Richardson Chair in Wood Science and Forest Products

B.A. 1977. Dartmouth College, Hanover, NH
Ph.D. 1981. University of California, Berkeley

EXPERTISE:

Deformation and fracture properties of solid wood and wood-based composites; Numerical modeling ; Micromechanics of solid wood; Fracture mechanics analysis of all kinds of composites; Effect of residual thermal stresses in composites, adhesive applications, and multilayered structures; Analysis of single-fiber model composites; Modeling mechanical properties of adhesive bond, glue lines in wood, and any interface in composite materials; Durability of composites; Cracking of coatings and paint systems .

CURRENT PROGRAMS:

Crack Growth in Wood Composites; Computer modeling of wood compression and of the processing and properties of oriented strand boards; Design, manufacturing, and performance of oriented strand board with modified wood strands; Development of wood and natural fiber plastic composites; Multiscale Modeling and Experimental Study of the Mechanics of Polymer Nanocomposite Materials

COURSES:

WSE 530 Polymer Composites
WSE 535 Polymer Synthesis and Structure

SELECTED PUBLICATIONS:

A. Kitnar, F. A. Kamke, **J. A. Nairn**, and M. Semek, 2008. Mode II Fracture Behavior of Bonded Viscoelastic Thermal Compressed Wood. *Wood & Fiber Sci.*, 40, 362-373.

J. A. Nairn, 2007. A Numerical Study of the Transverse Modulus of Wood as a Function of Grain Orientation and Properties. *Holzforschung*, 61, 406-413.

J. A. Nairn, 2007. Numerical Implementation of Imperfect Interfaces. *Computational Materials Science*, 40, 525-536.

J. A. Nairn, 2007. Material Point Method Simulations of Transverse Fracture in Wood with Realistic Morphologies. *Holzforschung*, 61, 375-381.

RECENT STUDENTS THESIS:

Matsumoto, Noah, 2008. The fracture toughness of medium density fiberboard and other fiber bridging composites. M.S.

JAMES E. REEB

Associate Professor and Manufacturing Extension Specialist

B.S. 1976. Oklahoma State University, Stillwater

M.S. 1979. Oklahoma State University, Stillwater

Ph.D. 1991. Texas A & M University, College Station

EXPERTISE:

Forest Products Manufacturing

CURRENT PROGRAMS:

Using management science to understand and improve manufacturing processes; studying how increasing small diameter timber affects mill processes; extension education to improve manufacturing processes.

SELECTED PUBLICATIONS:

DeVallance, D.B., J.W. Funck and **J.E. Reeb**. 2007. Douglas-fir plywood glue-bond quality as influenced by veneer roughness, lathe checks and annual ring characteristics. *Forest Products Journal* 57(1/2):21-28.

DeVallance, D.B., J.W. Funck and **J.E. Reeb**. 2005. Influence of several preparation conditions on plywood glue-bond quality test results. *Forest Products Journal* 56(2):47-50.

Liu, Y.C., C.C. Brunner, **J.E. Reeb**, W. F. Reiter and J. W. Funck. 2005. The durability of serpentine-end-matched joints during veneer slicing. *Forest Products Journal* 55(7/8):63-66.

Reeb, J.E., C.C. Brunner, J.W. Funck. 2005. Simulating lean manufacturing techniques to assess improvement in a value-added forest products mill. *Ecologies, Economies & OR: INFORMS Annual Meeting*, San Francisco, CA. November 13-16. p. 244.

Funck, J.W., D.L. Nicholls, C.C. Brunner, **J.E. Reeb** and J. B. Forrer. 2005. Edging strategies influences on the cut-stock potential of Alaska birch. *Biographies and Abstracts. Forest Products Society 59th International Convention*, Quebec City, Canada. June 19-22. p. 41.

Neese, J.L., **J.E. Reeb**, and J.W. Funck. 2004. Relating traditional surface roughness measures to glue bond quality. *Forest Products Journal* 54(1):67-73.

Reeb, J.E. 2003. Simulating an extra grader in a sawmill. *Forest Products Journal* 53(11/12):81-84.

RECENT STUDENT THESIS:

Salichon, M. 2005. Simulating changing diameter distributions in a softwood sawmill. MS.

W. JOHN SIMONSEN

Associate Professor

B.S. 1969. University of Missouri, Springfield

Ph.D. 1975. University of Colorado, Boulder

EXPERTISE:

The Material Science of Cellulose Nanocrystals; CNXL-Based Polymer Nanocomposites; Wood-Plastic Composites

CURRENT PROGRAMS:

Compatibilization of cellulose in polyethylene; cellulose/polysulfone nanocomposites; cellulose carbonylmethyl cellulose nanocomposites, cellulose/polyvinylalcohol nanocomposites, and DNA/CNXL hybrid nanomaterials; biomedical applications; cellulose nanocrystal electro-optic effect.

COURSES:

WSE 442/542 Composites Manufacturing

WSE 507-1 Beginning Seminar

WSE 522 Wood Science II

WSE 530 Polymer Composites

SELECTED PUBLICATIONS:

Simonsen, J., J.J. Morrell, H. Chen, C. Freitag and M. Clauson 2008. Pentachlorophenol Migration from Treated Wood Exposed to Simulated Rainfall. *Holzforschung* 62: 608-612.

Noorani, S., **J. Simonsen** and S. Atre. 2007. Nano-enabled microtechnology: Polysulfone nanocomposites incorporating cellulose nanocrystals. *Cellulose*, 14:577-584

Saputra, H., **J. Simonsen** and K. Li. 2007. Effect of compatibilizers on the flexural properties of grass straw-plastic composites. *Journal of Biobased Materials and Bioenergy*, 1:1-6.

Palaniyandi, V. and **J. Simonsen**. 2007. Effect of compatibilizers on the crystallization kinetics of cellulose-filled high density polyethylene. *Composite Interfaces*. 14(1): 73-83.

Choi, Y. and **J. Simonsen**. 2006. Cellulose nanocrystal-filled carbonylmethyl cellulose nanocomposites. *Journal of Nanoscience and Nanotechnology*, 6(3): 633-639.

RECENT STUDENT THESIS:

Mangalam, Anand, 2008. DNA based artificial nanostructures: directed assembly of cellulose nanocrystals into advanced nanomaterials. Ph.D.

DAVID SMITH

Instructor

B.S. 1973, University of Washington

M.S. 1979, University of Washington

EXPERTISE:

Wood Products Manufacturing; providing insight and stimulation to the next generation of scientists and professionals that will take on the responsibility of fashioning better ways to use the world's forest resources to solve important problems.

COURSES:

WSE 411 Forest Products Project I
WSE 412 Forest Products Project II
WSE 413 Forest Products Project III
WSE 442 Process Control in the For. Prod. Industry

Selected Publications and Proceedings:

David Smith. 2004. The Generation and Utilization of Residuals from Composite Panel Products. *Forest Products Journal*, 54(2); 8-17.

David Smith. 2002. Energy Efficient Pollution Control, Proceedings, 36th International Wood Composite Materials Symposium, Pullman, Washington, April.

David Smith. 2002. Raw Material Management – A review of Common Practices, Proceedings, CPA Pressline Technology Seminar, Portland, Charlotte, and Ottawa.

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TERENCE D. BROWN

Professor and Extension Specialist Emeritus

B.S., 1970, Colorado State University, Fort Collins

B.S., 1971, University of Utah, Salt Lake City

Ph.D., 1975, Colorado State University, Fort Collins

WILLIAM L. GALLIGAN

Affiliate Faculty

BS, Washington State University, Pullman

MS, Washington State University, Pullman

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Affiliate Faculty/Consultant
Trus Joist – A Weyerhaeuser Business

B.S., 1966, University of Maine, Orono

M.S., 1968, University of Maine, Orono

Ph.D., 1975, University of Minnesota, St. Paul

ROBERT J. LEICHTI

Courtesy Professor

B.S., 1974, Univ. of Illinois, Urbana-Champaign

M.S., 1977, Univ. of Illinois, Urbana-Champaign

M.S., 1990, Auburn University, AL

Ph.D., 1986, Auburn University, AL

JAMES W. FUNCK

Courtesy Professor

B.S., 1974, Iowa State University, Ames

M.S., 1977, Iowa State University, Ames

Ph.D., 1979, Iowa State University, Ames

JAMES B. WILSON

Professor Emeritus

B.S., 1964, SUNY Col. of Env. Sci. & Forestry,
Syracuse, NY

Ph.D., 1971, SUNY Col. of Env. Sci. & Forestry,
Syracuse, NY

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