

University of Idaho

Introduction

The University of Idaho, established in 1889, is a publicly supported, comprehensive, land-grant institution offering a wide range of undergraduate and graduate programs.



The university is the state's primary institution for graduate research and is classified as a doctoral/research intensive institution by the Carnegie Commission. The primary areas of statewide responsibility, at both undergraduate and graduate levels, are agriculture, architecture, engineering, forestry and wildlife, mining and metallurgy, foreign languages, and law.

The Moscow campus and adjacent farms cover almost 800 acres; other university lands, including the nearby university farms and experimental forest, exceed 10,000 acres. To assist with its statewide mission, the university maintains university centers in Coeur d'Alene, Boise, Idaho Falls, and Twin Falls; extension offices in 42 of Idaho's 44 counties; research and extension centers in Sandpoint, Moscow, Parma, Caldwell, Kimberly, Aberdeen, Salmon, Teton, and Dubois; and field stations at McCall, Point Springs, and the Taylor Ranch in central Idaho. The university operates a research park in Post Falls and a small-business incubator and specialty food processing facility in Caldwell and is a partner in a business incubator in Moscow.

The University of Idaho academic community includes nearly 13,000 students, some 550 faculty members in teaching and research, and 1,500 staff and professional personnel. In its 115-year history, the University of Idaho has granted nearly 90,000 degrees.

The resources of the University of Idaho are augmented by those of Washington State University located in Pullman, Washington, eight miles west of Moscow. The physical proximity, unique among the nation's land-grant institutions, allows opportunities for cooperation for both universities. Many University of Idaho and Washington State University courses in a variety of disciplines are cross-listed so that students of both universities can register locally, pay resident fees, and attend classes on either campus.

Background

University of Idaho participation in housing research through the Coalition for Advanced Housing and Forest Products Research is primarily conducted within the Department of Forest Products, located on the University of Idaho campus. Additional research is conducted in collaboration with personnel and facilities of the Wood Materials and Engineering Laboratory (WMEL) at Washington State University in Pullman.

Our specific research is focused on the enhancement of basic wood biomaterials for use in housing applications and covers



three areas: small-diameter round timber (SDRT) utilization, wood quality, and wood composites.

Structurally graded round logs are cheaper to process than sawn products, may have high economic value, and can carry more load than an "equivalent" rectangular member. New visual and mechanical grading systems are being developed to maximize the potential use of SDRTs as structural members.

Development and application of new wood products from alternative, or underutilized, species require better knowledge of their characteristic qualities. This information can then be applied to a wide range of applications, including development of design values for lumber and timber, enhancement of wood properties for specific end-uses,



and preparation of woody biomass for the production of composites, including wood-plastic composites.



Composites offer the opportunity to create engineered wood-based components with properties and characteristics optimized for specific end uses.

Durability, strength, or other properties may be enhanced to meet application needs.

Existing Programs

Department of Forest Products, University of Idaho

Research in the Department of Forest Products on small-diameter round timber, wood quality, and composites is supported by mechanical testing, chemical and x-ray analysis, and laboratory-scale processing of wood composites, lumber, and other value-enhanced wood products. The Forest Products Department occupies 5,760 square feet of space in the College of Natural Resources Building. This includes 3,725 square feet of wood shop, laboratory space, and wet chemistry laboratory; 730 square feet of conditioning chambers and graduate student offices; and 995 square feet of faculty offices.

Equipment and facilities specific to our housing-related research include the following:

- Machine and wood shops for preparation of wood samples, fixtures, and test setup components
- 500-board-foot capacity dry kiln with high temperature (>100°C) capabilities
- Two environmental chambers and two cold rooms (2°C and -8°C) for conditioning specimens
- Universal testing machine (Instron 5500R) with Bluehill software package
- Gas chromatography–mass spectrometer (GC–MS) (Finnigan PolarisQ)
- Laboratory hot presses (30 by 30 cm and 60 by 60 cm)
- Solvent extractors (heterogeneous phase) and ultra-filtration (Millipore) equipment
- Fourier transform infrared spectrometer (FTIR) (Thermo Nicolet Avatar370)
- General wet chemistry laboratory plus balances, mills, ovens, furnaces, and vacuum oven
- Polarized light/fluorescence microscope with digital capture
- X-ray tree ring analyzer (Quintek Measurement Systems)

Wood Materials and Engineering Laboratory, Washington State University

The Wood Materials and Engineering Laboratory (WMEL) is an interdisciplinary research facility administered through the College of Engineering and Architecture at Washington State University in Pullman, Washington. For over five decades, the WMEL has conducted research in collaboration with industry, government agencies, and other universities. The WMEL focuses on new building materials from a range of recycled and virgin resources and develops innovative structural systems to effectively utilize new materials while maintaining economic viability and public safety.

Specific equipment and facilities at the WMEL include the following:

- 35-mm, 55-mm, and 86-mm conical twin screw extruders (Cincinnati Milacron)
- 25-mm single-screw extruder
- Two profile cooling units (ConAir and Rollepaal–USA)

- HPL/LPL resin impregnator and development system
- X-ray vertical density profiler (Quintec QDP01X)
- Computer-controlled hydraulic presses with oil-heated platens (4 by 8 ft, 3 by 3 ft)
- Servo-hydraulic actuators with 22-, 56-, and 220-kip capacities (MTS)
- Servo-hydraulic axle test frames with 22- and 56-kip capacities with computer control and data acquisition (MTS)
- 200-kip tension-testing machine
- 500-kip reaction floor with two 7.5-ton overhead cranes
- Shake table (to simulate seismic loading)
- 120 constant-load test frames (for time-dependent behavior)
- 2- and 30-kip electromechanical universal test machines with computer control and data acquisition

Outreach activities involve short courses and seminars, publications, and news releases.

Links

Department of Forest Products: <http://www.cnr.uidaho.edu/forp/>

University of Idaho: <http://www.uihome.uidaho.edu/uihome/>

Washington State University Wood Materials and Engineering Laboratory: <http://www.wmel.wsu.edu/>

Staff and Contact Information

Department of Forest Products, University of Idaho

Dr. Thomas Gorman (tgorman@uidaho.edu), testing and evaluation of wood components, physical and mechanical properties of wood-based materials

Dr. Armando McDonald (armandm@uidaho.edu), polymer chemistry, wood composites

Dr. Steven Shook (shook@uidaho.edu), marketing, material substitution

Dr. Francis Wagner (fwagner@uidaho.edu), primary manufacturing, anatomical characteristics of woody materials

Wood Materials and Engineering Laboratory, Washington State University

Dr. Don Bender (bender@wsu.edu), wood engineering, nondestructive testing

Dr. Michael Wolcott (wolcott@wsu.edu), wood composites, polymer science