PROFESSOR BARRY S. GOODELL, Ph.D.

2009

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www.woodscience.umaine.edu/goodell/

- •Professor, Wood Science and Technology
- •National Coordinator, Wood Utilization Research (WUR) Centers
- • Project Director, WUR Center – UMaine
- •President-Elect 2009-2010, Forest Products Society
- • Professor, Advanced Engineered Wood Composites Center and Forest Operations Science.
- • Cooperating Professor, Biological & Chemical Engineering; and Microbial Ecology, and Environmental Microbiology.

EXPERIENCE SUMMARY:

•Elected Vice President > President-Elect of the Forest Products Society - the leading Professional international technical society focused on wood science and forest products research.
•Leadership of two National research programs.
•Leadership on the International Executive Boards of two Professional Societies.
•Experience in working with Congressional offices, staffers and lobbyists to successfully bring funding to Academic units.
•Management experience in both academic and professional organizations.
•Award winning academic Teaching and Research experience.
•Patenting experience and first hand experience with intellectual property and patenting issues.
•Public and Private Support: Extensive grant and contract experience with successful funding support obtained from: National Science Foundation, USDA, Department of Transportation, Department of Defense Agencies, and Industrial sources.
•Strong International Experience in Asia, Europe and South America.
•Budget management experience with multi-million dollar research contracts for large multidisciplinary projects.

EDUCATION:

Ph.D – 1983: Wood Science. Wood Science and Engineering, Oregon State University.
Minors: Biochemistry/Biophysics; Plant Pathology
M.S – 1980: Wood Science. Wood Science and Engineering, Oregon State University.
B.S – 1976: University of New Hampshire.

CAREER TRACK:

Professor, Wood Science and Technology/Forest Products Laboratory, University of Maine, Orono, (1995-present). Research and teaching specialization: Wood and Biomaterials biodeterioration, bioconversion and bioprocessing, Carbon nanotube synthesis from wood and plant biomaterials, Wood composites and FRP composites fabrication, Wood protection.

Vice President > President-Elect > President, Forest Products Society. 2008 – 2011. Elected by the membership of FPS, an international technical association that disseminates knowledge and fosters innovation and research focusing on the environmentally sound processing of wood and fiber.

National Coordinator, Wood Utilization Research (WUR) National Centers Program. 2007-present. This Special Grant for Wood Utilization Research (WUR) is focused on science, technology and management approaches, and business practices that enhance the domestic and global

competitiveness of the broad U.S. wood products industry. Thirteen states are currently involved. Our goal is to find better ways to efficiently use renewable wood-based materials for the benefit of Americans. See www.woodutilization.org

Scientific Coordinator, Hatch-Multistate Research Programs NE506 and NE1521. 2007-present. *Wood Utilization Research on US Biofuels, Bioproducts, Hybrid Biomaterials Composites Production, and Traditional Forest Products*. See http://nimss.umd.edu/homepages/home.cfm?trackID=9736

Project Director, Wood Utilization Research (WUR) Center. University of Maine, Orono. 1993-1994, 2006-present. The WUR Center is part of a 13-state Congressional initiative to create and disseminate knowledge of wood use and innovations that strengthen America's competitiveness and extend our natural resources. See http://woodscience.umaine.edu/UMWUR/

One of four founding faculty members of the AEWC - Advanced Structures and Composites (Advanced Engineered Wood Composites) Center, a world-class, ISO & IAS accredited facility for research on composites and bio-based composites. UMaine, 1996 - present. See http://www.aewc.umaine.edu/

Head of Forest Products Laboratory, UMaine 1990-1996: Coordinate the teaching, research and public service efforts of the University of Maine's Forest Products Lab/ Wood Science and Technology faculty. Wood Science and Technology Program Leader - 1990-1996, 2004-2007.

Project Leader: NSF/EPSCoR Wood Sciences and Engineering Research Cluster at UMaine 1991-1995.

Director, Wood Sciences and Engineering Institute, University of Maine, Orono. 1991-1993. Responsible for coordination of cross-disciplinary activities of 16 faculty in the sciences and engineering fields who work on projects ranging from timber design and engineering, to pulp and paper chemistry, to the pharmaceutical uses of extracts from tree bark.

Associate Professor and Head of Forest Products Laboratory, UMaine 1990-1995.

Assistant Professor, Wood Science and Technology, Univ. of Maine, Orono, 1983 - 1989.

Cooperating Professor, Chemical Engineering Department, Pulp and Paper. University of Maine (1996-present).

Cooperating Professor, Microbial Ecology and Environmental Microbiology (MEEM). University of Maine. 2000-present.

Cooperating Professor, Forest Operations Science Program. University of Maine. 1999-present.

International Experience (Sabbatical Research, Teaching and Administration):

1) Forestry and Forest Products Research Institute, Tsukuba, Japan, 12/90 - 6/91.
2) Swedish University of Agricultural Science, Uppsala, Sweden 9/95 -1/96.
3) Biotechnology Center. Centro de Biotecnologia, Laboratorio de Recursos Renovables Facultad de Ciencias Forestales,Universidad de Concepción, Chile 8/07 – 10/07.
4) Burckhardt Institut der Universität Göttingen. Abteilung Holzbiologie und Holzprodukte, Göttingen, Deutschland (Germany). 10/07 – 1/08.
5) Additional travel includes invited research and speaking engagements in China, Russia, and several European countries.

NSERC Postdoctoral Research Associate, Université Laval, Canada. Faculté de Foresterie et de Géomatique, 1983.

Project Researcher, Pesticides Control Division, State of New Hampshire. Training, Testing,

Evaluation & Field Certification of Commercial PCO's and Agricultural Pesticide Users. 1976-1977.

PROFESSIONAL AWARDS AND ACTIVITIES:

Teaching:

College of Forest Resources "Distinguished Forest Resources Professor Award" 1987-1988, for excellence in teaching and student interaction.

Service (National – International):

Oustanding Alumnus 2007 – College of Forestry, Oregon State University.

Gottschalk Award - Forest Products Society. 2006. "The purpose of this prestigious Award is to bestow the Society's highest level of recognition on an individual that has served the Society with great distinction and dedication."

Board of Directors (International Executive Board member) for ***both*** the Forest Products Society, and the Society of Wood Science and Technology.

Selected author for five entries in separate materials science encyclopedias (Pergamon press, John Wiley &Sons) on the subjects of Wood Decay/Biodegradation, Biotechnology in the Forest Products Industry, and Insect and Marine Borer Deterioration of Wood.

Service on six review panels for **NSF** (International Programs; and Materials Processing and Manufacturing, Engineering Directorate), **USDA-NRI, and SBIR** grants.

Review team member for CSREES and SAF/SWST Wood Science programs reviews of:
-Virginia Tech (1994), and
-Clemson University (1992)

Co-Chair, 48th Annual Forest Products Society. Recognition Award. 1994.

"**Outstanding Leadership**" Recognition Award. Forest Products Research Society. 1990-1991. Northeast Region Board. Chair, Northeast Section.

Commemoration Award. Lecture tour of Korean Forest Products programs at Chungbuk University, Seoul National University, and Chonnam National University. 1991.

Society of Wood Science and Technology:
-**Chair, Education Committee**, 2006-2008. Ex-officio 2009.
-Communications Committee, 1997-98
-Director, SWST International Executive Board. 1994-95
-Visiting Scientist Committee. 1994-95
-**Chair, Accreditation Committee, 1991- 93. Ex-officio as Executive Board Director, 1994-95**
-Chair, Critical Matters Committee, 1990
-Chair, Symposium Committee, 1987- 91 & 1988-89
-Nominating Committee, 1987-88

Forest Products Society:
-**President-Elect**, International FPS, 2009-2010, **President**, 2010-2011.

- **Chair**, "Wood Award" selection committee, 2002-2003.
-Publications committee 1997-98**.**
-Field Editor**, Wood Preservation, 1994-1998.**
-Treated Wood Technical Interest Group, **Vice-Chair, 1993-1994, Chair 1994-1997**
-Co-Chair, 1994 National Annual Meeting
-**Executive Board Member National FPS, NE Board Member, 1990-91**
-NE Section **Chair**, 1988-1989
-NE Section **Vice-Chair**, 1987-1988

National Planning Committee (NPC) on Forest Products Research (USDA Forest Service)
-**Northeast Region Representative,** 1991-1994.
-National Co-Chair, 1993.

TAPPI - Technical Association of the Pulp and Paper Industry:
-**Co-Chair of TAPPI Biotechnology in the Pulp and Paper Industry Symposium sessions.** November 1998. San Francisco.

International Research Group on Wood Preservation:
-**Remedial Treatments Chair,** 1993.

Research:

•**"Outstanding Researcher Award"** 2004-05: College NSFA. Univ. of Maine

•**"Outstanding Researcher in Forest Resources Award":** College of Natural Sciences, Forestry and Agriculture. G. Peirce and Florence Pitts Weber Award 2000-2001.

•**Over 100 journal publications** in the field of Forest Products, Wood Protection and Degradation and FRP Composites Production.

•My collaborative research funding exceeds **$24 million** over the last 20 years.

•**Three patents. One patent pending. One trade-mark (ComPRIS)**

•Symposia (2) **Co-Chair, "**Recent Developments in the Chemistry of Wood Degradation and Preservation" A multi-session, two-day symposium. American Chemical Society. San Diego, CA. 2001. and "Health, Environment and Efficacy Issues in the Development of Commercial Wood Protection Systems"2005. A 5-day multi-session American Chemical Society Symposium, San Diego, CA.

•**Conference Coordinator -** First International Conference on Advanced Engineered Wood Composites. July 1999. Bar Harbor, Maine.

•**The Wood Award** - to Dr. Yuhui Qian, 2009. Dr. Qian was my PhD student and received this award for our joint research. "The Wood Award, honors the most outstanding research in the field of wood and wood products conducted by graduate students."

Institutional Development:

•Obtained UMaine Board of Trustee approval for the formation of the Wood Sciences and Engineering Institute, a 16 faculty member, cross-disciplinary administrative unit. 1991.

•One of four founding faculty members of the UMaine, Advanced Engineered Wood Composites Center (**AEWC**), a World Class facility for education and research.

•Obtained federal support in 1993 through the State Congressional delegation for a multidisciplinary wood utilization grant (initially known as FORTEC, and now the New England Wood Utilization Research -WUR- grant program) for the long-term funding of wood research in Maine, New Hampshire and Vermont.

International:

•Invited visits to Japan (sabbatical), Sweden (sabbatical), Gernany (sabattical) Chile, Austria, Korea and China for extended research/lecture visits.

•Conducting collaborative research currently with scientists in Sweden, Australia, Chile and Japan as well as other institutions in the US.

•Part of the Host Team for the Maine International Trade Center and UM International Programs office sponsored visit of Guests from Aomori Prefecture of Japan. Two visits 1996 and 2002.

•International Search Committee – Endowed Professorhsip in Wood Technology. Swedish University of Agricultural Science. Upsalla, Sweden. 2009.

Hosted sabbatical leaves at UMaine for:

Dr. Masaya Nakamura, Head of Microbial Bioprocessing Section. Forestry and Forest Products Research Institute. Tsukuba, Japan. 1999-2000.

Dr. Akio Enoki, Professor and Head of Agricultural Chemistry, Kin-ki University, Nara, Japan. 1993.

Dr. Geoffrey Daniel, Sveriges Lantbruksuniversitet, Dept. of Forest Products, Swedish University of Agricultural Science, Uppsala, Sweden - 1987, 1988, 1994.

Dr. Yoon Soo Kim, Dept. of Forest Products and Technology, Chonnam University, Kwangju, Korea - 1988-1989.

PATENTS AND PATENTS PENDING:

Patent pending: Goodell, B., X. Xie, Y. Qian, D. Zhang, M. Peterson and J. Jellison. ***Method of producing carbon nanotubes using natural fiber as the starting substrate.*** USPTO Serial Number 60/898,884. February 1, 2008.

Patent: Goodell, B., J. Jellison, J. Liu and S. Krishnamurthy. ***Degradation and protection of organic compounds mediated by low molecular weight chelators.*** Patent #6,046,375 awarded April 4, 2000.

Patent: Goodell, B. and J. Jellison. ***Oxidation using a non-enzymatic free radical system mediated by redox cycling chelators.*** Filing date Sept 2003.

Patent : Goodell, B., R. Lopez-Anido and B. Herzog. ***Composites Pressure Resin Infusion System (ComPRIS) to produce Fiber Reinforced Polymer Composite Laminates and other Hybrid Composite Products.*** 2007. Patent 017625-000500US

Pre-Patent Disclosure: Jellison, J., V. Chandhoke, B. Goodell and F. Fekete. 1990. ***Biological control of microorganisms in wood and soil by siderophores produced by basidiomycetous fungi and/or by modification of transition metal concentrations.***

Pre-Patent Disclosure: Jellison, J., F. Fekete, V. Chandhoke and B. Goodell. 1989. ***Use of biological chelators for biological pulping and biological bleaching of wood pulp chips.***

Trademark: ***ComPRIS.*** United States Patent and Trademark. SERIAL NO: 78/337521. 2004.

PROFESSIONAL AFFILIATIONS / ORGANIZATIONS :

- •American Chemical Society
- •International Biodeterioration and Biodegradation Society
- •International Association of Wood Anatomists
- •Forest Products (Research) Society
- •International Research Group on Wood Protection
- •National Planning Committee (NPC) on Forest Products Research (USDA Forest Service)
- •Sigma XI - Scientific Research Society
- •Society of Wood Science and Technology (SWST)
- •TAPPI - Technical Association of the Pulp and Paper Industry
- •Xi Sigma Pi - Honorary Scholastic Forest Society

TEACHING:

Wood Science and Technology I. WSC 212. Introductory course, 15 - 25 students/ semester, 3-credit course. 1984-present.

Wood Deterioration and Protection. WSC 319. Undergraduate course, 8-16 students/semester, 3 credits. 1993-present.

Advanced Wood Deterioration and Protection. WSC 519. Graduate course. 3-5 students/semester. 3 credits. 1997-present.

Wood Science Seminar. WSC 630. Graduate level course. 12-15/semester. 1 credit, jointly taught. 1996-present.

Wood Physics. (graduate level course, approx. 6 students/semester, 4-credit course with laboratory).1983-1991.

Wood Drying and Preservation. (Includes wood deterioration and protection). 4-credit course with laboratory.1991-1992.

Wood Identification Laboratory. Oregon State University. 1982-1983.

SELECTED RESEARCH GRANTS AND OTHER SUPPORT (From 1985): Extensive experience in obtaining funding from diverse competitive public and private sources. Total support obtained exceeds <u>$24 Million</u>. My ability to obtain and manage large grants and contracts and to collaborate nationally and internationally is documented below.

2009-2011. Goodell, B., Cole, B., Jellison, J., Dagher, H., and R. Rice, S. Shaler. USDA-WUR. Wood Utilization Research. B. Goodell Project Director for the University of Maine WUR Center. $475,611.

2008-2010. Goodell, B., Cole, B., Jellison, J., Dagher, H., and R. Rice, S. Shaler. USDA-WUR. Wood Utilization Research. B. Goodell Project Director for the University of Maine WUR Center. $526,460.

2007-2009. Goodell, B. Wood Utilization Research on US Biofuels, Bioproducts, Hybrid Biomaterials Composites Production, and Traditional Forest Products. Initiation and Coordination for the University of Maine of a 14-State, Hatch Experiment Station Multistate Project. $750,000 (UMaine component only.)

2006-2008. Goodell, B., Qian, . Peterson, M., Jellison, J., Lopez-Anido, R., Daniel, G., Thompson L., and X. Xie. Office of Naval Research.- BAA06-001. A Novel Process to Produce Multi-walled Carbon Nanotubes from Natural Cellulosic Materials. $151,113.

2006-2009. Goodell, B., Cole, B., Jellison, J., Dagher, H., and R. Rice, and S. Shaler. USDA-WUR. Wood Utilization Research. Research Task: Goodell, Qian. A Novel Process to Produce Multi-walled Carbon Nanotubes from Natural Cellulosic Materials. $728,545.

2006-2009. Frazier, C., Goodell, B., and J. Jellison. Novel rheological tools for xylem structure property determination and formation. USDA-NRI. $400,000.

2006-2007. Qian,Y., Goodell, B., Peterson,, M., and J. Jellison. Novel Processes to Prepare and Utilize Carbon Nanotubes from Cellulosic Materials. Maine Technology Institute. Seed Grant. $10,000.

2005-2006. Qian,Y., Goodell, B., Peterson, M. and J. Jellison. A Novel Process to Produce Multi-walled Carbon Nanotubes from Natural Cellulosic Materials. Maine Technology Institute. Seed Grant. $10,000.

2005-2008. Shaler, S., Goodell, B., Cole, B., Jellison, J., Dagher, H., and R. Rice. USDA-WUR. Wood Utilization Research. Research Task: Goodell, Qian. Fenton chemistry-wood decay mechanisms and their potential applications in biomimetic processes for wood protection and hazardous waste remediation. $716,952.

2004-2007. Shaler, S., Goodell, B., Cole, B., Jellison, J., Dagher, H., and R. Rice. USDA-WUR. Wood Utilization Research. Research Task: Goodell, Peterson, Qian. The Composites Pressure Resin Infusion System (ComPRIS).$736,009

2003-2006. Shaler, S., Goodell, B., Cole, B., Jellison, J., Dagher, H., and R. Rice. USDA-WUR. Wood Utilization Research. Research Task: Goodell, Qian. Basic Decay Mechanisms: Detection of Oxygen Based Free Radicals by Chemiluminescence and Scintillation

Measurement. $807,486.

2002-2005. Shaler S., Goodell, B. et al. New England Wood Utilization Research. Research task: USDA-WUR. Goodell. Improved Fluid Penetration in Impermeable Northeastern Woods and Composites. $807,486.

2001-2004. Shaler, S., Goodell, B. et al. New England Wood Utilization Research. Research task: USDA-WUR. Goodell. Autoactivation of lignocellulose for bonding using free radical systems. Also: J. Jellison , B. Goodell and A. Armirbahman. Metal transport and toxicity in the brown rot fungi. $824,066.

2000-2003. Jellison, J. and B. Goodell. USDA Competitive Grant, Wood Utilization. Wood Modification by Brown Rot Fungi. Improved Utilization of Wood and Wood Fiber Programs. NRICGP. $176,000.

2000-2003. Shaler, S., Goodell, B. et al. New England Wood Utilization Research. Research task: USDA – WUR. Goodell, Amirbahman. Mechanisms involved in non-enzymatic free radical production in brown rot fungi. $731,860.

2000-2003. Dagher, H., Lopez-Anido, R., Goodell, B., Gardner, D., Landis, E. and W. Davids. Federal Highway Administration. FRP-Reinforced Glulams. $1,485,000.

1999-2001. Shaler, S., Goodell, B. et al. New England Wood Utilization Research. USDA-WUR. Goodell. Research task: Performance of Wood-Fiber Reinforced Composite Products Treated with Wood Preservatives. $824,233.

1998-1999 . Dagher, H., Shaler, S., Goodell, B., and E. Landis. NSF. Major Research Initiative. Equipment. Advanced Engineered Wood Composites Center Instrumentation. $280,000.

1998-2000. Goodell, B. and J. Jellison. Clariant Corp. Non-enzymatic generation of oxygen radicals - Applications for pulp and paper and bioremediation of wastes. $100,000.

1998-2000. Landis, E., Dagher, H. Shaler, S. and B. Goodell. Undergraduate Research Experience in Advanced Engineered Wood Composites. NSF (REU). $148,402.

1998. Shaler, S., Goodell, B. et al. 1998-2000. USDA-CREES- WUR. Research task: Goodell. Ultrastructural investigations of wood in early degradation stages by wood decay fungi. $801,000.

1997-2000. H. Dagher, Goodell, B., Landis, E. and S. Shaler. Acquisition of Advanced Engineered Wood Composites Manufacturing & Science Laboratory. NSF (3 years). $1,113,816 + $700,000.

1997-2000. Dagher, H., Goodell, B., Shaler, S. and E. Landis. Composite Reinforced Wood Hybrids for Civil Infrastructure Systems. National Science Foundation (through Maine Science and Technology Foundation). $3,189,906.

1997-1999. Shaler, S., Goodell, B. et al. New England Wood Research. USDA-WUR. Research task: Goodell, Czerwinski. Bioremediation of xenobiotics in the environment with wood

degrading fungi. $703,915.

1996-1998. Shaler, S., Goodell, B. et al. New England Wood Research. USDA-WUR . Research task: B. Goodell, A. Paszczynski, K. Czerwinski, J. Liu. Wood deterioration studies: Lignocellulose degradation by oxygen radicals, and metal binding/reduction mediated by low molecular weight compounds for wood decay fungi. $751,937.

1996. Dagher, H., Goodell, B. Shaler, S and E. Landis. National Science Foundation. EPSCoR. Fiber Reinforced Polymer Laminate / Wood Composites. Awarded from NSF with Non-Federal Match from State/University and Industry sources. $3.36 million from NSF with $1.+ million industrial match.

1996. Daniel, G. Henningsson, B., T. Nilson, and B. Goodell, and J. Jellison Broderna Edlunds Donationfund. Understanding the mechanisms required for function and control of brown-rot decay in wood 112,000 SEK (Swedish Kronar).

1995-1997. Shaler, S. Goodell, B. et al. New England Wood Research. USDA-WUR. Research task: Goodell. Electrochemical Analysis of Fungal Biochelator Chemistry and Analysis of Cellulosic Breakdown Products. Also Research task: Jellison, Goodell, Kropp. Novel technology for the detection of wood degrading fungi . Also: Goodell, Cole, Jellison-Equipment Grant: Purchase of GC/Mass Spectrometer.$795,482.

1995. Dagher, H. Shaler, S. and B. Goodell. USDA-CSRS.WUR. Fiber Reinforced Polymer / Wood Composites. $91,979.

1994-1996. Shaler, S., Goodell, B. et al. New England Wood Research. USDA-WUR. Research Task: Goodell et al. Oxidative degradation of lignocellulose by chelators. Also, Research Task: Jellison, Goodell, Fekete. Biological degradation of wood by brown rot fungi. $839,764.

1993. Dagher, H.. Caccese, V., Shaler, S., and Goodell. Maine Department of Transportation. Glulam Bridges Using Hemlock, Red Pine, and Red Maple. $71,984.

1993. Shaler, S. Goodell, B. and R. Rice. NSF-Engineering. Renovation of a Wood Science and Processing Facility. $191,980. (Match funds from State and non-federal sources obtained 1997). $383,960.

1993. Goodell, B., Jellison, J. and F. Fekete. USDA-NRI Competitive grant. The role of biological chelators produced by fungi in lignocellulose degradation. $68,940.

1993. Goodell, B. Lecture-Research tour in Japan. One month visit to Nara and Tsukuba Science City. Japanese funding from Kin-ki University. Lecturing and research on wood deterioration and protection. $4,000.

1993. Goodell, B. USDA-CSRS. The Forest Products Research and Technology Transfer Center (FORTEC) Wood Utilization Research (WUR) grant: Improved Utilization of Northeastern Wood Species. Developed with the Board of the Wood Sciences and Engineering Institute in cooperation with the Maine Science and Technology Commission; and with the Forest Products laboratory and extension groups in Maine, New Hampshire and Vermont. $616,478.

1992. Dagher, H., Caccese, V. and B. Goodell. Timber Bridge Research. Coordinated efforts with state agencies and congressional representatives for support of proposal on timber bridge research. National competitive/discretionary support of timber bridge development. $173,553.

1991. Goodell, B., Dagher, H., Jellison, J. and B. Cole. National Science Foundation. Maine EPSCoR grant. Wood Science and Engineering Research Cluster. $1.1 million.

1990. Goodell, B. National Science Foundation/Science and Technology Association of Japan. Award to conduct research in Japan. Six-month funding for research on wood deterioration. ~$20,000.

1990. Goodell, B., Jellison, J. and F. Fekete. NRI- USDA Competitive grant. Fungal siderophores and their role in wood biodegradation. $52,000.

1989.Goodell, B. Faculty Research Funds, UM. Support for immuno-TEM research of decay in wood/Visiting Korean Scientist. $4,000.

1988. Goodell. B. Organization for Econ. Co-Operation and Development (OECD) grant. Support for Visiting Scientist from Sweden. $1,240.

1988.Goodell, B. Electric Power Research Institute, Palo Alto, CA. Formulation and testing of a long-term fumigant release system for the remedial preservative treatment of utility poles. (EPRI RFP2881-1). (3-yr. funds awarded, first year funds only expended). $804,857.

1985-90. Goodell, B. Electrical Utility Consortium in the Northeastern United States. Preservative treatment of northeastern timber species. $350,000.

1987. Goodell, B. Distinguished Visitor Committee funds. Support for visit of Dr. Geoffrey Daniel, Swedish Univ. of Agricultural Sciences, Forest Products Dept., for 3-1/2 weeks in Oct., Nov., 1987. $800.

1985. Goodell, B., Jellison, J. and T. Huang. NRI-USDA. Competitive Research Grants - Enzymatic wood degradation by hymenomycetous decay fungi: Immunochemical and physico-chemical investigations. $182,830.

PUBLICATIONS: Excellent skills in written and oral communications as documented below. Total publications exceed 100. *(* = Refereed publication. # = Presentation given in addition to publication)*

Books:

*Schultz, T., H. Militz, M. Freeman, D., B. Goodell and D. Nicholas 2008. Development of Commercial Wood Preservative Systems: Efficacy, Environmental and Health Issues. American Chemical Society Series 982. Oxford University Press. Textbook. 540 pp.

*Goodell, B., D. Nicholas, and T. Schultz. 2003.Wood Deterioration and Preservation: Advances in Our Changing World. American Chemical Society Series. Oxford University Press. Textbook. 465p.

Invited Book Chapters, Encyclopedia Entries:

*#Goodell, B. 2008. Fungal Decay of Wood: Soft rot – Brown rot – White rot. (Eds.) Schultz, T., H. Militz, M. Freeman, D. D. Nicholas and B. Goodell. 2008. Development of Commercial Wood Preservative Systems: Efficacy, Environmental and Health Issues. American Chemical Society Series 982. Oxford University Press. Textbook. 540 pp.

*Jellison, J, Goodell, B. and Y. Qian. 2007. Methods useful in assessing biological and chemical activity of low-molecular-weight brown rot fungal metabolites. Chpt. 91. Manual of Environmental Microbiology. 3rd Edition. Editor C. J. Hurst. ASM Press Section title Biotransformation and Biodegradation. p.1122-1128.

*Jellison, J. B. Goodell and G. Daniel. 2007. Molds and the indoor environment: Biology and microscopy. (Eds.) Schultz, T., H. Militz, M. Freeman, D. D. Nicholas and B. Goodell. 2008. Development of Commercial Wood Preservative Systems: Efficacy, Environmental and Health Issues. American Chemical Society Series 982. Oxford University Press. Textbook. 540 pp.

*#Goodell, B. 2003. Brown rot degradation of wood: Our evolving view. (Eds): Goodell, B., D. Nicholas, and T. Schultz. Wood Deterioration and Preservation: Advances in Our Changing World. American Chemical Society Series. Oxford University Press. Textbook. pp. 97-118.

*Goodell, B. 2001. Wood products: Deterioration by insects and marine organisms. (Ed.) F. Beal. Encyclopedia entry for Encyclopedia of Materials: Science and Technology. Elsevier Science Ltd. 6 pp.

*Jellison, J., B. Goodell, J. Connolly, and A. Ostrofsky. 2000. Wood decay. *in* The Encyclopedia of Plant Pathology John Wiley and Sons, N.Y. Eds. O. C. Maloy and T.D. Murray. Invited submission. pp.1201 -1204.

*Goodell, B. and J. Jellison. 1990. Immunological characterization of fungal enzymes and biological chelators involved in lignocellulose degradation. Book chapter. Biodeterioration Research 3. 361-375. Plenum Publishing.

*Goodell, B. 1989. The potential of biotechnology applications in the forest products industry. In: Advances in Materials Science and Engineering, Encyclopedia of Wood and Wood-Based Materials. Invited chapter. A. Schniewind, editor.

*Goodell, B., and J. Jellison.1998. Role of biological metal chelators in wood biodeterioration. (Eds.) A. Bruce and J. Palfreyman. Forest Products Biotechnology. Taylor and Francis Publishers. London. pp. 235-250.

PUBLICATIONS cont.

Journals and other Papers: *(* = Refereed publication. # = Presentation given in addition to publication)*

*Arantes, V., Y. Qian, S. Kelley, A. Milagres, T. Filley, J. Jellison, and B. Goodell, 2009. Biomimetic oxidative treatment of spruce wood studied by pyrolysis-MBMS coupled with multivariate analysis and ^{13} C-labeled TMAH thermochemolysis: Implications for fungal degradation of wood. International Biodeterioration and Biodegradation. Accepted.

*Arantes, V., Y. Qian, A. Milagres, J. Jellison and B. Goodell. 2009. Effect of pH and oxalic acid on Fe+3 desorption/adsorption onto wood: Implications for brown rot decay. International Biodeterioration and Biodegradation. 63:478-483.

*Howell, C. A. C. Hastrup, B. Goodell and J. Jellison. 2009. Temporal changes in wood crystalline cellulose during degradation by brown rot fungi. International Biodeterioration and Biodegradation In press.

*Xie, X., B. Goodell, Y. Qian, G. Daniel, D. Zhang, D. Nagle, M. Peterson and J. Jellison. 2009. A method of producing carbon nanotubes directly from plant materials. Forest Products Journal 59:26-28.

*Xinfeng Xie, Barry Goodell, Dajie Zhang et al. 2008. Characterization of carbons derived from cellulose and lignin and their oxidative behavior. Bioresource Technology. 100:1797-1802.

*Howell, C. A. C. Hastrup, B. Goodell and J. Jellison. 2008. Temporal changes in wood crystalline cellulose during degradation by brown rot fungi. Accepted. International Journal of Biodegradation and Biodeterioration.

*Xie, X., B. Goodell, Y. Qian, M. Peterson and J. Jellison. 2008. Significance of the heating rate on the physical properties of carbonized maple wood. Holzforschung. 62, 591-596.

#Xie, X., B. Goodell, Y. Qian and G. Daniel. 2008. Heat treatment, thermal degradation of wood, carbon nanotubes and Damascus steel swords. What do they all have in common? . International Research Group on Wood Protection. Series document. IRG 08-40399.

*Goodell, B, Xie, X., Qian, Y., Daniel, G., Peterson, M., and J. Jellison. 2008. Carbon nanotubes produced from natural cellulosic materials. Journal of Nanoscience and nanotechnology. Vol 8, 2472-2474.

#Goodell, B., G. Daniel, J. Jellison and Y. Qian. 2007. Chelator-Mediated Fenton Chemistry in Wood Degraded by Fungi. International Research Group on Wood Protection. Series document. IRG 07-10618.

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*Goodell, B. 1981. A note on the toxicity of chloropicrin vapors to *Gloeophyllum saepiarium* and *Poria* sp. in wood. Wood and Fiber 13(2):138-143.

*Goodell, B., R.D. Graham, and R.L. Krahmer. 1980. Chloropicrin movement and fungitoxicity in a decaying southern pine laminated timber. Forest Products Journal 30(2):39-43

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*Refereed publication. # = Presentation given as well as publication.

PRESENTATIONS: Oral presentations to professional, governmental and general audiences are documented below. (Several of the publications listed above also were given as talks but are not double listed below as presentations)**:**

2008. Xie, X., Goodell, B., Qian, Y., Daniel, G. Heat treatment, thermal degradation of wood, carbon nanotubes and Damascus steel swords, what do they all have in common. The 39th Annual Meeting of the International Research Group on Wood Protection. Istanbul, Turkey, May 25-29, 2008.

2008. Xie, X., Goodell, B., Qian, Y., Daniel, G., Zhang, D., Peterson, M., Jellison, J. Carbonization of wood, the production of carbon nanotubes and the durability of historic artifacts. The 14th International Biodeterioration and Biodegradation Symposium. S. Alessio Siculo, Messina, Italy, October 6-11, 2008.

2008. Jellison, J., J. Oliver and B. Goodell. The role of fungal metabolites in lignocellulose biodegradation. The 14th International Biodegradation and Biodeterioration meetings October 6-11, Messina, Italy.

2008. Goodell, B. Invited seminar and mission participant. Forest Products Research Opportunities. BioIndustrial Delegation Mission coordinated through the US State Department, Cooperative Threat Reduction Office at the Department of State and the CRDF. Moscow and Kirov, Russia. March 24 – April 1, 2008.

2008. Xie, X., B. Goodell, Y. Qian, J. Daniel, M. Peterson and J. Jellison. A novel method for carbon nanotube production and the mechanisms involved. TAPPI 2008 International Conference on Nanotechnology for the Forest Products Industry. St. Louis, Missouri, USA

2008. Goodell, B. Invited seminar and mission participant. Forest Products Research Opportunities. BioIndustrial Delegation Mission coordinated through the US State Department, Cooperative Threat Reduction Office at the Department of State and the CRDF. Moscow and Kirov, Russia. March 24 – April 1, 2008.

2007. Goodell, B., G. Daniel, J. Jellison and Y. Qian. Chelator-Mediated Fenton Chemistry in Wood Degraded by Fungi. International Research Group on Wood Protection. Series document. IRG 07-10618.

2007. Xie, X., Goodell, B., Zhang, D., Nagle, D. Mechanical Properties of Carbonized Medium Density Fiberboard/Polymer Composites. Carbon 2007 Proceedings (CD). The American Carbon Society, International Conference on Carbon, Seattle, WA, USA, July 15-20.

2007. Xie, X, Goodell, B., Nagle, D., Zhang, D., Qian, Y., Peterson, M., Jellison, J. Fabrication and Mechanical Properties of Carbonized Medium Density Fiberboard (CMDF)/Polymer Composites. Biographies & Abstracts, p35. Forest Products Society 61st International Convention. Knoxville, TN, USA, June 10-13.

2007. Goodell, B., Xie, X., Qian, Y., Daniel, J., Peterson, M., Jellison, J. Multi-Walled Carbon Nanotubes (MWNTs) Produced from Natural Cellulosic Materials. Abstract Book, p22. TAPPI 2007 International Conference on Nanotechnology for the Forest Products Industry. Knoxville,

TN, USA, June 13-15.

2007. Perry, S., A. Prentiss, Y. Qian, B. Herzog, and B. Goodell. ComPRIS: The Composites Pressure Resin Infusion System. Wood-Based Composites Center Fall 2007 Industry Advisory Board Meeting, Orono, ME, October 3-4.

2007. Invited seminars: Burckhardt Institut der Universität Göttingen. Abteilung Holzbiologie und Holzprodukte, Göttingen, Deutschland (Germany). 10/15/07 – 1/20/08.
1) Goodell, B. An Overview of the Wood Utilization Research (WUR) Center Research at the University of Maine.
2) Goodell, B. and J. Jellison. Fungal Degradation of Wood by Brown rot, White rot and Molds
3) Goodell, B. ComPRIS^{TM} – The composites pressure resin infusion system.
4) Goodell, B. Carbon nanotubes (CNTs) produced from natural cellulosic materials.
5) Goodell also taught three courses to graduate students of the Institute during this period.

2007. Invited seminars: Wood Science and Technology. University of Applied Science, Eberswalde, Germany. December 6 and 7, 2007.
1) Goodell, B. Wood Utilization Research at the University of Maine.
2) Goodell, B. Fungal Degradation of Wood
3) Goodell, B. A new understanding of the nanoarchitecture of wood and plant cell walls: Crystalline and amorphous cellulose and elementary fibril arrangement.

2007. Goodell, B. Invited seminar: The production of carbon nanotubes from wood and plant fiber. Bundesanstalt für Materialforschung und Prüfung (BAM). Berlin, Germany. December 4 and 5, 2007.

2007. Invited seminars: Chinese Academy of Forestry. Beijing, China. March 5, 2007
1) Goodell, B. UMaine - Wood Utilization Research. An overview.
2) Goodell, B. Fungal degradation and bioprocessing of wood – an overview.

2007. Invited seminars: Beijing Forestry University. Beijing, China. March 6, 2007.
1) Goodell, B. UMaine Wood Utilization Research - overview.
2) Goodell, B. Characterization of Fiber Reinforced Polymer (FRP) composite materials and adhesive bondlines fabricated by the Composites Pressure Resin Infusion System (ComPRIS).

2007. Invited Seminars. Central-South University of Forest Science and Technology (CSUFT). Changsha, Hunan, China. March 8, 2007.
1) Goodell, B. Fungal degradation and bioprocessing of wood – an overview.
2) Goodell, B. The UMaine "Wood Utilization Research Center".
3) Xie, X., B. Goodell. Production of carbon nanotubes from plant/wood cell walls.

2006. Goodell, B., S.Quarles. The largest mold litigation case in the country. Was it Mold? Forest Products Society International Convention, Newport Beach, CA, USA. June 25-28, 2006. Abstr

2006. Goodell, B., Y. Qian, D. Gardner and C. Tascioglu. Enhancing composite durability by understanding biocides and adhesive-biocide interactions. Presented at the Conference on Wood Protection, Forest Products Society, New Orleans, LA, March 21-23, 2006.

2005. Qian, Y., B. Goodell and J. Jellison. "Basic wood decay mechanisms and their application to the remediation of environmental contamination." Forest Products Society International Convention, Quebec City, Canada June 19-22, 2005. Abstr.

2005. Ostrofsky, A., J. Jellison and B. Goodell. "Decay of oak, pine and COMPRIS composites by eight brown-rot fungi". Annual American Phytopathological Society, Austin, Texas, August. Abstr.

2004. Goodell, B., Herzog, B., and R. Lopez-Anido. "The Composites Pressure Resin Infusion System (ComPRIS)", 2004 Northeast Composites Conference. American Composites Manufacturers Association. Portland, ME, June 21-22, 2004.

2004. Goodell, B. Herzog, B., Lopez-Anido, R., and J. Jellison. "ComPRIS: A Method of Fabricating, Reinforcing, and Protecting Wood Composites," Session 15: Preservative Treatments for Structural Panels. Forest Products Society, 58th Annual Meeting. Grand Rapids, MI, June 27-30, 2004.

2004. Goodell, B. Herzog, B., Lopez-Anido, R. and D. Gardner. "Durability and Shear Strength of Adhesive Bondlines Fabricated using the Composites Pressure Resin Infusion System (ComPRIS)," Forest Products Society, 58th Annual Meeting. Grand Rapids, MI, June 27-30, 2004.

2004. Goodell, B. Y. Qian, and J. Jellison. Brown-rot Degradation of Wood: Non-Enzymatic Mechanisms, and Potential Applications. Invited Presentation. Universidad de Concepción. Chile. March 14 – 20, 2004.

2004. Goodell, B., B. Herzog, and C. Tascioglu. Effects of Preservative Treatment and Exposure to Wood Degrading Fungi on Fiber Reinforced Polymer (FRP) materials Used for Structural Wood Reinforcement. Invited Presentation. Universidad de Concepción. Chile. March 14 – 20, 2004.

2004. Goodell, B., R. Lopez-Anido and B. Herzog. ComPRIS: The composites pressure resin infusion system. Invited Presentation. Universidad de Concepción. Chile. March 14 – 20, 2004.

2004.Jellison, J and B. Goodell. Biological Degradation of Wood. Invited Seminar Oregon State University. March 3, 2004.

2004. Lopez-Anido, R., B. Goodell, H. Dagher, and B. Herzog. Performance-Based Material Specifications for Reinforced Glulam Bridges. Transportation Research Board 83rd Annual Meeting, Washington D.C., Jan. 11-15, 2004.

Schmutzer, M., J. Jellison, and B. Goodell. 2004. Biodegradation of lignocellulose fiber. The Fiber Society Annual meeting, Cornell University October 10-12, 2004. Abstr.

2003. Filley, T., J. Jellison, B. Goodell, S. Kelley and M. Davis. Formation of dissolved organic matter from the microbial decomposition of woody tissue. American Geophysical Union National Meeting-San Francisco, Jan. 2003. Biogeosciences division.

2003. Goodell, B., R. Lopez-Anido, and B. Herzog. The Composites Pressure Resin Infusion

System (ComPRIS). Forest Products Society 57th Annual Meeting, Bellevue, WA, Jun. 22-25, 2003.

2003. Herzog, B., B. Goodell, R. Lopez-Anido, D. Gardner, and L. Muszyñski. Evaluation of Preservative Treatments on Mechanical Properties of Wood-FRP Composite Materials. Session11: Durability Issues: Challenges and Opportunities, Forest Products Society, 57th Annual Meeting, Bellevue, WA, Jun. 22 - 25, 2003.

2003. Herzog, B., B. Goodell, R. Lopez-Anido, L. Muszyñski, D. Gardner, W. Halteman, and Y. Qian. The Effect of Creosote and Copper Naphthanate Preservative Systems on the Adhesive Bondlines of FRP/Glulam Composite Beams. Forest Products Society 57th Annual Meeting, Bellevue, WA, Jun. 22-25, 2003.

2002. Filley, T.R., J. Jellison, B. Goodell, S. Kelley and M. Davis. Production of dissolved organic matter during fungal wood decay. 2002 ACS meeting, San Francisco. Eco. Trans AGU 83(47) Fall Meeting Suppl. B51C040925.

2001. Lopez-Anido, R., L. Muszyñski, D. Gardner, and B. Goodell. Performance-Based Material Evaluation Methodology for FRP-Glulam Beams. 55th Annual Meeting of the Forest Products Society, Baltimore, MD, Jun. 24-27. Poster.

2001. Tascioglu, C., B. Goodell, and R. Lopez-Anido. The Effects of Preservative Treatment and Exposure to Wood Degrading Fungi on Fiber Reinforced Polymer (FRP) Materials Used for Structural Wood Reinforcement. The International Research Group on Wood Preservation, 32nd Annual Meeting, 9 pp., Nara, Japan, May 20-25, 2001.

2001. Tascioglu, C., B. Goodell, R. Lopez-Anido, and M. Peterson. Biodegradation and Fungal Growth on Fiber Reinforced Polymer (FRP) Composites. 55th Annual Meeting of the Forest Products Society, Baltimore, MD, Jun. 24-27, 2001.

2001. Tascioglu, C., B. Goodell, R. Lopez-Anido, and M. Peterson. Degradation of E-Glass / Phenolic Pultruded Composite by Wood Decay Fungi. In Proceedings of Second International Conference on Advanced Engineered Wood Composites, Bethel, Maine, Aug. 14-16, 10 pp.

2001. Goodell, B. Overview of brown rots and non-enzymatic mechanisms. American Chemical Society National Meeting San Diego, CA April 1-5, 2001. Abstr. Invited symposium paper.

2001. Jellison, J, B. Goodell, J. Connolly, W. Shortle, C. Fuller, A. Ostrofsky. A. Amirbahman, T. Filley and S. Kelley. 2001. Fungal biodegradation of wood in soil contact. American Chemical Society National Meeting San Diego, CA April 1-5, 2001. Abstr. Invited symposium paper.

2001. Tascioglu, C., B. Goodell, and R. Lopez-Anido. 2001. Monitoring Fungal Decay in Fiber Glass Reinforced Polymer (GFRP) Composites for Wood Reinforcement. Invited presentation. Forest Products Society.

2001. Kelley, S., J. Jellison, B. Goodell. 2001. Use of NIR and MBMS for detecting the

chemical changes associated with brown-rot biodegradation of spruce wood. American Chemical Society National Meeting San Diego, CA April 1-5, 2001. Abstr.

2001. Cody, G. D., B. Goodell, J. Jellison and T. Filley. 2001. Molecular spectroscopic investigations into microbial degradation of plants. American Chemical Society National Meeting San Diego, CA April 1-5, 2001. Abstr. Invited symposium paper.

2001. Filley, T., G. Cody, and B. Goodell. Degradation of lignin in gymnosperm woods by wood-rot fungi as observed by 13C-labelled TMAH thermochemolysis. ACS National Meetings. Geochemistry Division April 1-5. San Diego.

2001. Goodell, B., Y. Qian, J. Jellison, M. Richard and W. Qi. Proposed mechanism of oxidation by low molecular weight binding compounds isolated from wood degrading fungi and potential application. International Conference on Biotechnology for the Pulp and Paper Industry. Finland, June 4-8, 2001. Abstr.

2001. Interview March Issue. Water Environment Federation. Industrial Wastewater Magazine. Alexandria, Va.,

2000. Oct. Interview. Maine Public Radio. Research on a new method related to our patent on effluent treatment in waste water.

2000. November. Interview. Maine Perspective. Campus Newsletter. Research on a new method related to our patent on effluent treatment in waste water.

2000. Yelle, D., B. Goodell, D. Gardner, and J. Jellison. Bonding of wood fibers by lignin activation using free radical generating systems. University of Maine. Presentations to visiting Maine legislature, Nutting Hall, March, 2000 (Poster)

2000. Yelle, D., B. Goodell, D. Gardner, and J. Jellison. Lignin activation using chelator-mediated mechanisms. University of Maine, AEWC Center Grand Opening, June 3-5, 2000 (Poster)

2000. Tascioglu, C., B. Goodell, R. Lopez, and B. Magid. Effects of Preservative Treatments on FRP Reinforcement for Wood. Forest Products Society and Society of Wood Science and Technology, 2000 Annual Meetings, June 17-21, South Lake Tahoe, Nevada.

2000. Tascioglu, C. B. Goodell, R. Lopez. The Treatment of Fiber Reinforced Wood with Preservative Chemicals. Advanced Engineered Wood Composite Center (AEWC) Grand Opening Ceremony and Guided Public Tours, June 1-3, 2000, Orono, Maine.

2000. Tascioglu, C. B. Goodell, R. Lopez. " FRP Reinforcement of Pressure Treated Wood." 31st. Annual Meeting of International Research Group on Wood Preservation, May 14-19, Kona, Hawaii.

2000. Tascioglu, C. B. Goodell, R. Lopez. " FRP Reinforcement of Pressure Treated Wood." College of Natural Sciences, Forestry, and Agriculture Student Poster Competition and Exhibition to the State Maine Legislative. April 2000, Orono and Augusta, Maine. (Awarded with 3rd. place in the competition).

1999. Qian, Y., and B. Goodell. The Effect of Low Molecular Weight Chelators on Iron Chelation and Free Radical Generation as Studied by ESR Measurement. International Research Group on Wood Preservation. 31st Annual meeting held May 14-19, 2000, at Kona Surf, Hawaii, USA.

1999. Tascioglu, C., B. Goodell, R. Lopez, and B. Magid. "FRP Reinforcement of Pressure Treated Wood: Preservative Compatibility and Durability" Forest Products Society, 1999 Annual Meeting, June 27-30, Boise, Idaho.

1999. Tascioglu, C., B. Goodell, R. Anido-Lopez, B. Abdel-Magid. Surface Characterization of Preservative Treated FRP and Wood. Forest Products Society, Annual Meeting. Boise Idaho.

1999. Tascioglu, C., B. Goodell, R. Anido-Lopez, B. Abdel-Magid. Effects of Preservative Treatment on FRP Reinforcement for Wood. The Proceedings of First International Conference on Advanced Engineered Wood Composites, Bar Harbor, Maine July 5-8, 1999.

1999. Goodell, B, and J. Jellison. Brown rot biodegradation of wood. International Society of Biodegradation and Biodeterioration. Washington, D.C. Aug 8-12.

1999. Yelle, Y. and B. Goodell. Bonding of wood fibers by lignin activation using free radical generating systems. CONFOR, Bar Harbor, Maine, 5-6 February 1999.
(Abstract).

1999. Goodell, B., J. Jellison, and Y. Qian. Understanding how structural timbers decay: Mechanisms involved in the brown rot decay process. First International Conference on Advanced Engineered Wood Composites. Bar Harbor, Maine. July 5-8, 1999.

1999. Goodell, B., J. Jellison, Y. Qian, J. Connolly and A. Paszczynski. Chelating phenolates and the generation of oxygen radicals in brown rot wood decay. FPS 1999 Annual Meeting held June 27-30, 1999, at the Grove Hotel & Boise Centre, Boise, Idaho.

1998. Goodell, B. Wood degradation and protection. Presentation to NSF REU students, University of Maine. July 1998.

1997. Jellison, J., J. Connolly, and B. Goodell. Basic mechanisms involved in wood fiber biomodification by brown rot fungi. TAPPI Biological Sciences Symposia. San Francisco. Abst.

1997. Jellison, J. J. Connolly, and B. Goodell. Non-enzymatic degradation of wood by the brown rot fungus. Annual meeting of the American Phytopathological Society. Rochester, NY Abst.

1997. Goodell, B. and J. Jellison. Wood degradation mechanisms. The 28th Annual Meeting of the International Research Group on Wood Preservation . Whistler, BC Canada. Abst.

1996. Jellison, J, J. Liu, and B. Goodell. Non-enzymatic biodegradation of cellulose by the brown-rot fungus *Gloeophyllum trabeum*. Annual meeting of the American Phytopathological

Society. Indianapolis, IN. Abst.

1996. Goodell, B. Development and Significance of Attack by *Lasioldiplodia theobromae* (Pat.) Griff. & Maubl. in Caribbean Pine Wood and Some Other Wood Species. Presentation as 'Opponent' of the thesis of Osvaldo Encinas, Doctoral Candidate, Swedish University of Agricultural Sciences. Uppsala, Sweden. November 22, 1996. Invited Opponent Presentation.

1996. Goodell, B. Cheltors isolated from wood degrading fungi; their role in the breakdown of cellulosic compounds and potential in bioprocessing. Distinguished Lecturer Series. Chemical Engineering Department, University of Maine. November 1, 1996. Invited lecture.

1996. Goodell, B. Low molecular weight, metal-binding phenolic compounds isolated from wood decay fungi and their role in the oxidation of phenolic and cellulosic materials. Institute of Paper Science and Technology. Atanta, Georgia. August 19, 1996. Invited Presentation.

1996. Krishnamurthy, S. and B. Goodell. Biodegradation of pentachlorophenol mediated by chelators secreted by the wood-rot fungus *Gloeophyllum trabeum*. 1996 Annual Meeting, Forest Products Society. Minneapolis, Minnesota. June 23-26.

1995. Goodell, B. Oxygen radicals, chelators, and volcanoes: Their effect on wood. Department of Forest Products. Sveriges Lantbruksuniversitet. December 15, 1995. Uppsala, Sweden.

1995. Goodell, B. Protection of Fiber Reinforced Polymer (FRP) Laminates from deterioration. September. NSF/UMaine review panel. University of Maine.

1995. Goodell, B., J. Liu, J. Jellison, A. Bruce, M. Bruce, and A. Paszczynski. Radical production and redox chemistry associated with biochelators produced by the wood decay fungus *Gloeophyllum trabeum*. Mokuzai Gaikai, Japan.

1995. Goodell, B. Current status of wood preservation in the United States. Mokuzai Gaikai, Japan. Invited Presentation.

1995. Jellison, J., Y. Chen, J. Connolly, B. Goodell, and F. Fekete. 1995. Physiological factors influencing hyphal sheath formation and bio-chelator production by degradative fungi. Sixth International Conference on Biotechnology in the Pulp and Paper Industry. Vienna, Austria, June 11-15.

1995. Goodell, B., J. Liu, J. Jellison, J. Lu, and A. Paszczynski. 1995. Chelation activity and hydroxyl radical production mediated by low molecular weight phenolate compounds isolated from *Gloeophyllum trabeum*, Sixth International Conference on Biotechnology in the Pulp and Paper Industry, Vienna, Austria, June 11-15.

1994. Lu, J., B. Goodell, J. Liu, A. Enoki, J. Jellison, and F. Fekete. The role of oxygen and oxygen radicals in one-electron oxidation reactions mediated by low-molecular weight compounds isolated from *Gloeophyllum trabeum*. Presented at the 48th Annual Forest Products Society Meeting, June 26-29, 1994, Portland, Maine.

1994. Goodell, B., J. Jellison, A. Enoki, J. Liu, and J. Lu. Redox reactions associated with

oxidative degradation mediated by fungal biochelators from *Gloeophyllum trabeum*. Presented at the 48th Annual Forest Products Society Meeting, June 26-29, 1994, Portland, Maine.

1994. Easwaran, V., J. Jellison, B. Goodell and J. Liu. Partial characterization of phenolate compounds produced by the wood decay fungus *Gloeophyllum trabeum* under conditions of iron stress. Presented at the 48th Annual Forest Products Society Meeting, June 26-29, 1994, Portland, Maine.

1994. Goodell, B., K.Yamamoto, J. Jellison, M. Nakamura, T. Fujii, K. Takabe, and N. Hayashi. Laccase immunolabelling and microanalytical analysis of wood degraded by *Lentinus edoides*. Presented at the 48th Annual Forest Products Society Meeting, June 26-29, 1994, Portland, Maine.

1994. Goodell, B., J. Liu and J. Slahor. Evaluating diffusible wood preservatives in an accelerated field simulator. Presented at the 48th Annual Forest Products Society Meeting, June 26-29, 1994, Portland, Maine.

1994. Goodell, B., K. Yamamoto, J. Jellison, M. Nakamura, T. Fuji, N. Hayashi, and K. Takabe. Laccase immunolabelling and microanalytical analysis of wood degraded by *Lentinus edoides*. Wood Preservation, Savannah, Georgia, Sept. 26-28, 1994.

1993. Goodell, B. Wood Protection and Deterioration Research at the University of Maine: 1) The role of metal chelators in the decay of wood by fungi. 2) Modelling of fumigant behavior in wood poles. 3) Chemical ring stain of Mnt. St. Helens volcano damaged wood. Invited lecture. Kin-ki University. Nara, Japan. 3/93.

1993. Jellison, J. and B. Goodell. Microbial degradation of wood. Invited presentation, Dept. of Agricultural Chemistry, Kinki University, Nara, Japan

1993. Jellison, J., A. Enoki, B. Goodell, M. Ishihara, N. Hayashi, and H. Tanaka. Iron II and iron III chelators produced by the brown-rot fungus *Gloeophyllum trabeum*. American Phytopathological Society/Society of Nematologists Joint Meeting Nov. 6-10, 1993. Nashville, TN. Abstr.

1993. Goodell, B., and J. Howe. Introduction of the 1994 Forest Products Society Annual Meeting in Portland, Maine. Clearwater Beach, FL. 6/93.

1993. Goodell, B. Co-Chairs Welcome to the National Planning Committees', Forest Products Research Conference. 'Sustainable Economies and Sustainable Resources -- Roles for Forest Products Research.' Invited presentation. Sept 27-29, 1993. FPL Madison, Wisconsin

1992. Goodell, B. Enhancing Maine's research competitiveness. Presented at 1992 Maine EPSCoR Conference, "The Wood Sciences and Engineering Research Cluster at UMaine", Portland, ME.

1992. Goodell, B., H. Dagher and V. Caccesse. The timber bridge program in Maine: preservative treatment of Maine's native timber species. Two talks at RC&D sponsored "Timber Bridge Conference" at the University of Maine at Farmington and Portland, ME.

1992. Jellison, J., B. Goodell, V. Easwaran, Y. Chen, V. Chandhoke, F. Fekete, M. Ishihara, and N. Hayashi. Transition metals and their role in fungal biodegradation. Northeastern Regional Phytopathological Society meetings, Oct. 28-30, 1992. Portland, ME. Abstr.

1992. Goodell, B. The current status of wood protection and preservation research in the United States. Invited talk at the Dundee Institute of Technology, Dundee, Tayside, Scotland, UK.Invited presentation.

1992. Goodell, B. New developments in our understanding of wood deterioration. Presented at Forest Products Research Society meeting, Charleston, SC. Chaired: "Wood Deterioration" Plenary Session.

1992. Goodell, B. Status of the northern timber-utility pole development project. Presented to the New England Utility Company Consortium, Portsmouth, NH.

1992. Goodell, B., J. Jellison, V. Chandhoke, F. Fekete, K. Yamamoto, and N. Hayashi. The role of iron and iron-chelating compounds isolated from decay fungi in biological degradation. Presented at the annual Forest Products Research Society meeting, Charleston, SC.

1992. Goodell, B. Tales of wood decay, and other stories from the Far East. Presented at Forestry Noon-Time Seminar, University of Maine, Orono, ME.

1991. Goodell, B. Advances in our understanding of wood deterioration with regard to future developments in bioprocessing and wood protection. Chunbuk University, S. Korea. 3/28/91; and Hokkaido University, Sapporo, Japan. 6/3/91.

1991. Goodell, B. Analysis of methods to improve the preservative penetration of *Picea rubrum* timber. Mokuzai Gakkaishi. Journal of the Japan Wood Research Society 37(2)A44. Presented in Matsue, Japan. 4/2/91.

1991. Goodell, B. Fungal biodeterioration and its preservation in wood. Hokkaido Forest Products Laboratory. Asahigawa, Hokkaido, Japan. 6/6/91.

1991. Goodell, B. Isolation of newly identified metabolites from decay fungi, and their potential role in bioprocessing. Soule National University. Soule, Korea. 3/27/91.

1991. Goodell, B. Lignocellulose biodegradation by decay fungi: Chemical and immunochemical analyses. Chonnom University, Kwangju, Korea. 3/25/91.

1991. Goodell, B. Wood preservation and deterioration research in North America. Forest Research Laboratory, Soule, Korea. 3/29/91.

1991. Goodell, B. Wood decay is initiated by siderophores in some brown-rot fungi. Forest Products Research Society Meeting, 45th Annual New Orleans, LA.

1991. Goodell, B. Wood preservation and deterioration research at the University of Maine. Jan. 23, 1991. Forestry and Forest Products Research Institute. Tsukuba, Japan.

1991. Goodell, B., J. Jellison, F. Fekete, V. Chandhoke, K. Yamamoto, and N. Hayashi. The

role of iron and iron-chelating compounds isolated from decay fungi in biological degradation. Proceedings of Applications of Biotechnology to Tree Culture, Protection and Utilization. August 5-8, 1991. USFS, Columbus, Ohio. p. 106.

1991. Goodell, B., J. Jellison, V. Chandhoke, and F. Fekete. Degradation of cellulosic substrates by low molecular weight chelators isolated from the brown-rot fungus *Gloeophyllum trabeum*. In: Proceedings of the Symposium on Cellulose and Lignocellulosics Chemistry, May, 1991, Guangzhou, China.

1990. Goodell, B., H. Dagher, J. Jellison, and B. Cole. A proposed Wood Sciences and Engineering Cluster for Maine's EPSCoR Program. Two presentations to the Maine Research Excellence Partnership. Augusta and Rockport, Maine.

1990. Goodell, B., V. Chandhoke, J. Jellison, and F. Fekete. Action of siderophores from *Gloeophyllum trabeum* on 2-keto-r-thiomethylbutyric acid and cellulose-azure substrates. Presented N.E. American Phytopathological Division meetings. Oct. 31-Nov. 2, Cromwell, CT.

1990. Chandhoke, V., B. Goodell, F. Fekete and J. Jellison. The role of siderophores in wood degradation. 44th Annual Meeting Forest Products Research Society (June 24-27), Salt Lake City, UT.

1990. Goodell, B., and A. J. Pendlebury. Preservative treatment and field test monitoring of spruce pole stock: Pressure and diffusible chemical treatments. The International Biodeterioration and Biodegradation Symposium (August 26-31), Windsor, Ontario.

1990. Jellison, J., V. Chandhoke, Goodell, B., and F. Fekete). Biological chelators produced by wood decay fungi. Eighth International Biodeterioration and Biodegradation Symposium (August 26-31), Windsor, ONT.

1989. Daniel, G. and B. Goodell. Cell wall microdistribution of chloropicrin and methylisothiocyanate in treated spruce, 20th Annual Meeting of the International Research Group on Wood Preservation (May 22-26), Lappeenranta, Finland.

1989. Goodell, B., J. Jellison and G. Daniel. Probing peroxidase activity in *Phanerochaete chrysosporium* degraded birch wood. 4th International Conference on Biotechnology in the Pulp and Paper Industry (May 16-19), Raleigh, NC.

l989. Jellison, J. and B. Goodell. Detection and quantification of biodegradation in wood. Presented at Pan American Biodegradation Society, Aug. 3-6., Washington, DC. Invited plenary talk.

1989. Goodell, B., J. Jellison and G. Daniel. Immunological techniques for elucidation of the mechanism of wood biodeterioration. The 3rd Pan-American Biodeterioration Society Meeting (Aug. 3-6), George Washington University, Washington, DC. Invited plenary talk.

1989. Kim, Y-S., J. Jellison, and V. Tracy, and B. Goodell. The use of ELISA and immuno-TEM for the detection of microanalysis of white- and brown-rot decayed wood. 4th International Conference on Biotechnology in the Pulp and Paper Industry (May 16-19),

Raleigh, NC.

1989. Goodell, B., and J. Pendlebury. Treatability of red spruce timber with waterborne and diffusible preservative systems for use as utility poles in the Northeast. 43rd Annual Meeting of the Forest Products Research Society (FPRS) (June 25-29), Reno, NV.

1988. Huang, T., B. Goodell, and and J. Jellison. ^{13}CP/MAS nuclear magnetic resonance of white-and brown-rot decayed wood. Forest Products Research Society Annual Meeting, June 19-22, Quebec City, Canada. Abstr.

1988. Goodell, B., S. Carlson and J. Jellison. Parameters affecting the treatment of mill run red spruce timber. Forest Products Research Society Annual Meeting, June 19-22, Quebec City, Canada. Abstr.

1988. Goodell, B., G. Daniel, J. Jellison and T. Nilsson. Immuno-electron microscopy and fluorescent antibody microscopy of *Poria placenta* (brown-rot) infected wood. Forest Products Research Society Annual Meeting, June 19-22, Quebec City, Canada. Abstr.

1988. Jellison, J., B. Goodell, G. Daniel and T. Nilsson. Immunological characterization of wood decay. Forest Products Research Society Annual Meeting, June 19-22, Quebec City, Canada. Abstr.

1988. Goodell, B. Evaluation of encapsulated and gelled chloropicrin formulations for use in wood poles. Forest Products Research Society Annual Meeting, June 19-22, Quebec City, Canada. Abst.

1987. Goodell, B. Biotechnology Applications in the Pulp and Paper Industry. Presented at S.D. Warren Research, Westbrook, ME. January, 1987. Invited presentation.

1987. Flynn, K. and B. Goodell. Computer process control of a pilot scale pressure retort. 83rd Annual Meeting of the American Wood Preservers' Association, Toronto, Ontario, Canada. Vol. 83, p. 177.

1987. Goodell, B. Formulation and testing of a long-term fumigant release system for the remedial preservative treatment of utility poles. New York State Electric and Gas Headquarters, New York, NY. February, 1987. *Invited presentation for EPRI*.

1987. Jellison, J., and B. Goodell. Immunochemical characterization of lignocellulose degradation. Presented July 9, l987. 3rd Annual Northeast Symposium on Forest Products and Wood Science, Biotechnology for the Forest Based Industry. Invited paper.

1987. Goodell, B. Biotechnology for the forest-based industry. Presented at the 3rd Annual Northeast Symposium on Forest Products and Wood Science, Biotechnology for the Forest Based Industry. July 9, University of Maine, Orono, ME.

1987. Goodell, B. Wood Protection and Degradation Research at the University of Maine. Fortieth Annual Forest Products Research Society Meeting. Louisville, Kentucky, 6/87.

1987. Goodell, B. Wood Preservation Research at the University of Maine. 83rd Annual

Meeting of the American Wood-Preservers Association Annual Meeting, Toronto, Canada. Vol. 83, p.174.

1987. Jellison, J., and B. Goodell. Preparation and use of antibody probes for wood decay fungi. Poster presentation, International Research Group on Wood Preservation, May 18-22nd, Ontario, Canada. IRG WP 1306.

1987. Goodell, B., and J. Jellison. Enzymatic degradation. Presented Feb. 4, 1987, TAPPI Technical Association of the Pulp and Paper Institute, N.E. Section. Invited paper.

1986. Jellison, J., and B. Goodell. Identification of wood rotting fungi and probes for enzyme activity. Presented Nov. 18, 1986, 2nd Ann. Biofor Meeting, Biotech. Network for the Canadian Forest Based Industries. Victoria, B.C. Invited paper.

1986. Goodell, B., and J. Jellison. Antibody production to fungal extra-cellular enzymes. American Institute of Chemical Engineers, 1986, National Meeting, Boston, MA., Aug. 25. Tech Program Summary. Invited paper.

1986. Jellison, J. and B. Goodell. Serological detection of *Poria placenta* (Fr.) Cke. using ELISA. APS NE Divisional Meeting Oct. 1985, Newport, R.I. Abstr.

1986. Jellison, J. and B. Goodell. Identification of wood rotting fungi and probes for enzyme activity. Presented Nov. 18, 1986, Second Annual Biofor Meeting, Biotechnology Network for the Canadian Forest Based Industries. Victoria, B.C. Invited paper**.**

1986. Goodell, B. Detection of decay in wood using enzyme- and fluorescent-linked serological assays. For. Prod. Res. Soc., 40th Annual Meeting, June. Spokane, WA.

1986. Goodell, B. Immunological characterization of wood decay fungi. The 36th Ann. Pulp and Paper Open House. April. University of Maine, Orono, ME.

1985. Goodell, B. Fumigation of impermeable heartwood species for preservative treatment. The 1st Ann. Northeast Symp. on For. Products and Wood Sci.: Proc., Univ. of Maine at Orono. May 29.

1985. Goodell, B. Pulsation process treatment of spruce with CCA. The 1st Ann. Northeast Symp. on For. Prod. and Wood Sci.: Proc., Univ. of Maine at Orono. May 29.

1985. Goodell, B. Serological detection of wood decay fungi. For. Prod. Res. Soc., 39th Ann. Meeting, June. Orlando, FL

1985. Goodell, B., M. Hunter, and A. Kimball. Application of wood science to the creation and maintenance of wildlife habitat. Northeast Section of the Soc. of Amer. Foresters, April. Portland, ME. Proc. Joint NE Chpt. Soc. of Amer. Foresters/Maine WIldlife Soc./Atlantic Chapt. Amer. Soc. of Fisheries meetings: Is Good Forestry Good Wildlife Management? Ed. by J. Bisso

1985. Jellison, J., and B. Goodell. Serological detection of *Poria placenta* (Fr) Cke. using ELISA. NE Amer. Phytopath. Soc. Meetings. November. Newport, RI. Abstract.

PRESENTATIONS cont.

Phytopathology 76(7).

1984. Goodell, B. Prevention and control of fungal decay and marine borer damage in wooden waterfront structures on the coast of Maine. Sea Grant Advisory Council. October. Castine, ME. *Invited presentation for Sea Grant*.

1984. Goodell, B. Residue retention and fungal invasion of chloropicrin treated Douglas-fir. For. Prod. Res. Soc., 38th Ann. Meeting, June. St. Louis, MO.

1983. Goodell, B. Observations of Douglas-fir trees injected with the fumigant chloropicrin. NE Amer. Phytopath. Soc. Meeting, August. Quebec, Canada. Abstract, Can. J. Plant Path. 6(3):83.

1982. Goodell, B. Detecting incipient decay. For. Prod. Res. Soc., Pacific Northwest Section. Fall. Weyerhaeuser Tech. Center, Federal Way, WA. Invited talk.

1982. Goodell, B. Residue retention and fungal invasion of Douglas-fir treated with chloropicrin vapor. The Coop. Pole Research Prog. Bonneville Power Administration, Vancouver, WA.

1981. Goodell, B. Diffusion of fungitoxic chloropicrin vapors in the heartwood of living trees. The Coop. Pole Research Prog., Oregon State Univ., Corvallis, OR1981. Goodell, B. The use of neutron activation analysis for detection of residues in wood. Seminar, Spring. For. Prod. Dept., Oregon State University, Corvallis, OR.

CONTRACT REPORTS/ INDUSTRIAL PARTNERSHIPS:

Annual progress reports on the research project "Preservative Treatment of Spruce Timber in the Northeastern United States." Submitted from the College of Forest Resources, University of Maine to Northeast Utilities Co. and Central Maine Power Co. 12/86, 2 pp; 12/87, 24 pp; 1/89, 32 pp; and 1/90 40 pp.

Interim progress reports on the research project "Preservative Treatment of Spruce Timber in the Northeastern United States." Submitted from the College of Forest Resources, University of Maine to Northeast Utilities Co. and Central Maine Power Co. 5/87, 5 pp; 9/86, 3 pp.

Semi-annual progress reports on the research project "Preservative Treatment of Spruce Timber in the Northeastern United States." Submitted from the College of Forest Resources, University of Maine to Northeast Utilities Co. and Central Maine Power Co. 3/86, 15 pp; 8/87, 24 pp; 8/88, 35 pp; 8/89, 26 pp; 8/90; 17 pp.

Project Summary: Preservative treatment of spruce timber in the Northeastern United States." Submitted to the Electric Council of New England (ECNE, CT-3 Committee) November, 1986. 8 pp.

Annual Progress Report on the research project: "Improving the effectiveness of groundline treatments for utility poles." Submitted from the University of Maine, College of Forest Resources to Northeast Utilities Co. and Central Maine Power Co., December 22, 1986.18 pp.

Interim Report to Northeast Utilities Company and Central Maine Power Co. on Wood Pole Preservation Progress. Submitted from the University of Maine, College of Forest Resources. May 8, 1987. 5 pp.

SYMPOSIA/MEETINGS CHAIR:

2005. American Chemical Society. American Chemical Society; Symposium Co-Chair, “Health, environment and efficacy issues in the development of commercial wood protection systems”, A two day symposium with Schultz, Militz, Freeman, and Nicholas. San Diego, CA. 2005

2001. American Chemical Society. American Chemical Society; Symposium Co-Chair, “Recent Developments in the Chemistry of Wood Degradation and Preservation”, a two day symposium with Nicholas and Shultz. San Diego, CA. 2001

1997. TAPPI Biological Sciences Symposium: Biotechnology in the Pulp and Paper Industry. With R. Farrel, G. Daniel, T. Jeffries, and A. Ragauskas.

1995. Wood Deterioration Plenary Session. Session organized and Chaired for the 49th Annual Forest Products Society Meeting, June 1995, Portland, Oregon.

1994 National Annual Meeting, Co-Chair, Forest Products Society.

1993. The International Research Group on Wood Preservation. Session Chair on Remedial Wood Treatments. Orlando, Florida.

1992. Forest Products Research Society meeting, Charleston, SC. Chaired: "Wood Deterioration" Plenary Session.

1991. Chair of session on “Biotechnology”. Symposium on Cellulose and Lignocellulosics Chemistry, May, 1991, Guangzhou, China.

1988. Forest Management Practice and Forest Products Manufacture: Working Toward a Common Goal. Nutting Hall, Univ. of Maine, Orono, ME. 39 pp. With M. Cyr.

1987. 3rd Annual Northeast Symposium on Forest Products and Wood Science. "Biotechnology for the Forest Based Industry." July 9 & 10, Nutting Hall, Univ. of Maine, Orono, ME. Published as one issue, Biomass J. 15(2). With M. Cyr and C. Murdoch.

1987. Proceedings of the 2nd Annual Northeast Symposium on Forest Products and Wood Science. "Wood Residue Processing: From Forest to the Boiler." May 12-13th, 1986. Nutting Hall, Univ. of Maine, Orono, ME. 39 pp. With M. Cyr.

1986. Proceedings: The Northeast Symposium on Forest Products and Wood Science. "Value Added in the Forest Products Industries." May 29, 1985. Nutting Hall, Univ. of Maine, Orono, ME. With M. Cyr.

PERSONAL:

Citizenship: U.S.A. Birthplace. Hartford, Connecticut.

Married (with adult children): Wife – Professor Jody Jellison (Goodell);