PROFESSOR BARRY S. GOODELL, Ph.D.

Department of Microbiology, University of Massachusetts

Address: 102 Morrill Science Center IV-N, University of Massachusetts, Amherst, MA 01003
Telephone: 559-426-6620 **Email**: BGoodell@UMass.edu
Home Address: 55 Cherry Lane, Amherst, MA 01002
https://barrygoodell.wixsite.com/goodelllab

- Professor, Department of Microbiology, University of Massachusetts. 2017 – present.
- Leading expert on fungal decay of wood and lignocellulose materials. Materials expertise with bio-based materials and wood materials. Woody biomass decay and biomass conversion to bio-based products and platform chemicals. Biocatalytic chemistries related to bioconversion applications, Catalytic chemistries related to cryptococcal neuropathology and neuropathology, Biodegradation mechanisms. Research on nanocellulose applications.

PRIOR EXPERIENCE SUMMARY:

- Professor, Department of Sustainable Biomaterials, Virginia Polytechnic Institute and State University (Virginia Tech). Blacksburg, Virginia, USA. Adjunct Faculty Member: School of Neuroscience. Virginia Tech; Faculty member of the Macromolecules Innovation Institute. With laboratory in the Institute of Critical Technology and Applied Science (ICTAS).
- Professor, Wood Science, University of Maine. Orono, Maine. USA. Cooperating Professor, Biological & Chemical Engineering, and co-founding faculty member. Advanced Structures and Composites Center – UMaine. USA
- Over 130 Refereed, Peer-reviewed scientific and engineering publications – From the journal *Science,* to the *Journal of Nanoscience & Nanotechnology*, and from *Composites Part A* to the *Journal of Polymers and the Environment*.
- Strong International Experience and Collaborations in Asia, Europe and South America.
- Budget management experience with multi-million dollar research contracts for large multidisciplinary projects.
- Leadership in a dynamic department in the field of sustainable biomaterials.
  As Department Head at Virginia Tech, lead educational changes in departmental branding and the development of two new degrees to enhance, to quintupling of student enrollment to secure departmental viability.
- Research institute faculty appointments have included Virginia Tech's: Macromolecules and Interfaces Institute (MII), the Bio-based Materials Center (BBMC), and Virginia Tech's Institute for Critical Technology and Applied Science (ICTAS).
- Elected President (current past-President) of the Forest Products Society - the leading Professional international technical society focused on wood science and forest products research.
- Leadership of three National (USA) research programs: 1) Wood Utilization Research [WUR] Centers. 2) National Planning Committee on Forest Products Research [USDA-FS] 3) Hatch Multistate WUR.
- Leadership on the International Executive Boards of two Professional Societies: Forest Products Society, and the Society of Wood Science and Technology
- Experience in working with Congressional offices, staffers and lobbyists to successfully bring funding to biobased oriented academic units.
- Management experience in both academic and professional organizations.
- Award winning academic Teaching and Research experience: In academia - Elected Distinguished Forest Resources Professor, UMaine by student vote.

•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. Over $24 million in grant funds.

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, Microbiology Department, University of Massachusetts. Amherst, MA. 2017-current.

Professor, Department of Sustainable Biomaterials. Virginia Tech, Blacksburg, VA. 2012-2017:
Research specializations: Catalytic chemistries of *Cryptococcus* spp. leading to neuropathologies. Bioconversion of lignocellulose to feedstock chemicals. Biosynthesis of platform chemicals from lignin using engineered *Pseudomonas* spp. Mesoporous and CNT nanostructured carbon materials from biomass sources. Fungal biodeterioration mechanisms. Biocatalysis using chelator-mediated Fenton (CMF) chemistries.
Teaching: Experience teaching courses in: "Biodeterioration, Bioconversion and Bioenergy" and "Biomaterials Science".
Lab Structure for Research: Currently I have one Visiting Scholar (visiting Professor), and a Post-Doctoral researcher in my laboratory. I work primarily with undergraduate students but have supervised ~ 30 MS and PhD students in my labs.

Professor and Head (prior experience at Virginia Tech): Department of Sustainable Biomaterials. Blacksburg, VA. Providing vision and leadership to advance the learning, discovery, and engagement mission of the Department of Sustainable Biomaterials. The change to the current Department name, and additional educational restructuring of the department to develop two new degrees in "Sustainable Biomaterials", and "Packaging Systems and Design" occurred under Dr. Goodell's leadership at Virginia Tech. This resulted in a quintupling of undergraduate student enrollment in the department, which was essential for departmental viability. Providing vision and leadership to advance the learning, discovery, and engagement mission of the Department of Sustainable Biomaterials. The Department remains broadly focused on education, research and outreach related to renewable biomaterials with education on biobased, lignocellulosic and woody materials for uses ranging from advanced structural composites, to bioenergy and renewable nanomaterial applications.

Professor, Wood Science and Technology/Forest Products Laboratory, University of Maine, Orono, (1995-2011). **Research and teaching specialization:** Wood and Biomaterials biodeterioration, bioconversion and bioprocessing, Carbon nanotube synthesis from wood and plant biomaterials, Wood and biomaterial hybrid composites, and FRP composites fabrication, Wood protection.

Vice President > President Elect > President, Forest Products Society. 2008 – 2012. 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. 2007-2012. This Special Grant for Wood Utilization Research (WUR) was 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 with thirteen states other states involved. Goal: 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. 2007-2011. *Wood Utilization Research on US Biofuels, Bioproducts, Hybrid Biomaterials Composites Production, and Traditional Forest Products.*

Project Director, Wood Utilization Research (WUR) Center. University of Maine. 1993-1994, 2006-2010. The WUR Center was 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.

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

Head of Forest Products Laboratory, UMaine 1990-1996: Coordinated 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, UMaine, 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, UMaine, Orono, 1983 - 1989.

Cooperating Professor, Chemical Engineering Department, Pulp and Paper. UMaine (1996-present).

Cooperating Professor, Microbial Ecology and Environmental Microbiology (MEEM). UMaine. 2000-2010.

Cooperating Professor, Forest Operations Science Program. UMaine. 1999-2010.

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 profession travel includes invited research and speaking engagements in China, Russia, and several European and Scandanavian 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 Awards:

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

Research Awards/Highlights:

2016. **August-Wilhelm Scheer Visiting Professor**. Technische Univesität München (TUM), Munich Germany.

Virginia Tech: **Scholar of the Week**. April 10, 2014

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.

Member of Virginia Tech Institutes 2012-present**:**

- •Macromolecules and Interfaces Institute (MII)
- •Bio-based Materials Center (BBMC)
- •Institute for Critical Technology and Applied Science (ICTAS – Institute where my laboratory and office are located).

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

International Research Highlights:

- •Invited Keynote Speaker on 5 continents in the last 3 years.
- •Invited visits to Japan (sabbatical), Sweden (sabbatical), Germany (sabatical) Chile (sabbatical), Austria, S. Korea, Latvia, Canada, Tanzania, and China for extended research/lecture visits.
- •Conducting collaborative research currently with scientists in Sweden, Norway, Brazil, Denmark, Canada, Germany, Chile and Japan as well as other institutions in the US.
- •Hosted Delegations from Chile (2014) and S. Korea (2013) including the Vice Chancellor for Research at Univ. Concepcion, Chile, and the President of Chonnam National University, S. Korea.
- •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 Committees
  - -Endowed Professorship in Wood Technology. Swedish University of Agricultural Science. Upsalla, Sweden - 2009.
  - -Alto University, Professorship. Helsinki, Finland - 2014

"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 130 journal publications in the field of Bioconversion, Composites, Carbon materials, Lignocellulose, Fungal Biodegradation, Wood Products, Platform Chemical Biosynthesis

•My collaborative research funding exceeds **$24 million** over the last 25 years.

•Four patents. One trademark (ComPRIS)

Service Awards/Activities (National – International):

International Committee of International Association of Wood Products Societies (IAWPS). 2015. Tokyo, Japan.

Elected Fellow 2014 – Society of Wood Science and Technology

Elected Fellow 2012 – International Academy of Wood Scientists

Outstanding 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.

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.
-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, 2010-2011.
-Vice President, President-Elect, **President, Past-President** International FPS, 2008-2012,
- **Chair**, "Wood Award" selection committee, 2002-2003.
-Publications committee 1997-98**.**

-Field Editor**, Wood Preservation, 1994-1998.**
-Treated Wood Technical Interest Group: **Chair 1994-1997, Vice-Chair, 1993-1994**
-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, 1993-1994.

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.

•**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.

•Awarded the **"Wood Award" - to Dr. Yuhui Qian, 2009**. Dr. Qian was my PhD student and received this award for his thesis, and 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:
Lead the restructuring of the Department of Sustainable Biomaterials, with associated rebranding and also the implementation of new degree programs. The newly rebranded Sustainable Biomaterials Department (from Wood Science and Forest Products) was constituted in January 2012, with new degree programs "Sustainable Biomaterials" and "Packaging Systems and Design" approved by Virginia Tech University Governance in 2013. This resulted in a quintupling of undergraduate student enrollment over a three-year period in the department.

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. Goodell's leadership of the WUR national program from

2007 - 2011 included coordination of 13 states and liaison with Congressional offices of several states including Maine's Congressional delegation.

Hosted sabbatical leaves at Virginia Tech and UMaine for:

Dr. Professor Makoto Yoshida, Tokyo University of Agriculture and Technology. Tokyo, Japan 2014-2016.
Mr. Yuan Zhu, Beijing Forestry University. 2014-2016
Dr. Professor Tomonori Sonoki, Faculty of Agriculture & Life Science, Hirosaki University. Aomori, Japan. 2014-2015.
Dr. Gry Alfredsen, Research Team Leader, Norsk Institutt for Skog og Landskap, Ås, Norway. 2013.
Dr. Yuichiro Otsuka, Senior researcher, Department of Biomass Chemistry, Forestry and Forest Products Research Institute. Tsukuba, Japan. 2013 – 2014.
Dr. S. Nami Kartal, Professor and School Director, Division of Forest Industry Engineering. Istanbul University. Turkey. 2013.
Dr. Omar Noriega Uyarte, Researcher, Departamento de Biotecnologia, Escola de Engenharia de Lorena. Universidade de São Paulo, São Paulo, Brazil. 2013-2014.
Dr. Fangli Sun. Professor Wood Science and Technology, Zhejiang Agriculture and Forestry University. Zhejiang, China. 2013.
Dr. V. Arantes, Post-doctoral Research Associate. University of British Columbia. 2007.
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 TRADEMARK:

•Jellison, J., F. Fekete, V. Chandhoke and B. Goodell. 1989. Use of biological chelators for biological pulping and biological bleaching of wood pulp chips. (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).

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

•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

•Patent: Oxidation using a non-enzymatic free radical system mediated by redox cycling chelators (Goodell, B. and J. Jellison) Application #10/360,052 filed 2/5/03. Claims group 1 elected and approved 1/12/06. Provisional USPTO 60/898884 Feb 1, 2007. Patent #7396974 awarded July 8, 2008.
[Industry Support for this IP: Clariant Corp. http://www.clariant.com provided $100,000 in funding for research to develop a successful pretreatment procedure, but it was not further

developed by Clariant after successful trials. Successful Mill trials at Twin Rivers Technologies, Inc. and Butterfield Environmental Corp./Aries Chemical, also showed the effectiveness of the treatment technology in mill waste stream remediation.]

•Patent: "Process for producing carbon nanotubes and carbon nanotubes produced thereby. 2014. Goodell, B., X. Xie, Y. Qian, D. Zhang, M. Peterson and J. Jellison. USPTO Patent 8,632,744: awarded Dec. 20, 2014. (Divisional application of patent #8,080,227 "Method of producing carbon nanotubes using natural fiber as the starting substrate". Filed June 29, 2011, amendment filed Feb. 15, 2013.

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:

Biodeterioration, Bioconversion and Bioenergy. MICROBIOL 444. 3-credits. University of Massachusetts. 2018-present.

Biodeterioration, Bioconversion and Bioenergy. SBIO 3114. 3-credits. Virginia Tech. 2016-present.

Biomaterials Science. SBIO 5124. 3-credits – co-taught. Virginia Tech. 2014 – 2016.

Chemistry and Conversion of Sustainable Biomaterials. SBIO 3434. 60% co-taught. 3-credit course. Virginia Tech. 2013

Graduate Seminar-Sustainable Biomaterials Department. SBIO 5004. 1-credit course. Virginia Tech. 2013.

Independent Study-Honors Course Generating Carbon Nanotubes from Wood Fiber. SBIO 2974. 4-credits. Virginia Tech. 2013.

Wood Science and Technology I. WSC 212. Introductory, 3-credit course. UMaine 1984-2010.

Wood Deterioration and Protection. WSC 319. Undergraduate course, 3 credits. UMaine 1993-2010.

Advanced Wood Deterioration and Protection. WSC 519. Graduate course. 3 credits. UMaine 1997-2010.

Wood Science Seminar. WSC 630. Graduate level course. 1 credit, jointly taught. UMaine 1996-2010.

Wood Physics. (graduate level course, approx. 4-credit course with laboratory). UMaine1983-

1991.

Wood Drying and Preservation. (Includes wood deterioration and protection). 4-credit course with laboratory. UMaine 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 $24 Million. My ability to obtain and manage grants and contracts and to collaborate nationally and internationally is documented below.

Proposals Funded:

2018. Goodell, B. US $11,700. "Cryptococcal Disease – A New Mechanistic Understanding Leading to Therapeutic Treatment". Gift for support of undergraduate student research and lab supplies for the study of *Cryptococcus* disease mechanisms in the Goodell Lab. Fungal Infection Trust, Cheshire, UK. January-December 2018.

2015-2018. Alfredsen, G., Eijsink, V. Felby, Goodell, B., et al. "Advancing biomass technology – a biomimetic approach (BioMim)". Application no. ES533160. (Utlysning av midler fra BIONÆR for forskerprosjekt og kompetanseprosjekt for næringslivet (KPN) med oppstart i 2015)." BIONÆR for forskerprosjekt/KPN – Research Council of Norway – NOR 27,246,000 kr (US $3.6 million), plus industry match.

2015-2016: Jakes, J., B. Goodell, J. Jellison, S. Zelinka, G. Kirker B. Understanding non-enzymatic fungal decay mechanisms for lignocellulose deconstruction. XANES beamtime at the Advanced Photon Source. Argonne National Laboratories - GUP-42022.

2015. Goodell, B., Jellison, J., Eijsink, V., Yoshida, M., Alfredsen, G., Arantes, V., Pingali. V., O'Neil, H., Langan, P. Unraveling brown rot fungal cellulose degradation mechanisms for bioprocessing applications. Beam time request for Bio-SANS at Oak Ridge National Laboratory. Oak Ridge, TN. ORNL Neutron Sciences Beam Time Funded.

2015. Goodell, B., Renneckar, S., Kim, Y. "Nanocellulose Aerogel Foams in Lightweight, Biodegradable Packaging for Sensitive Munitions and Systems." US Army Armament Research, Development and Engineering Center (ARDEC). $62,600.

2015. Yoshida, M., Goodell, B. Support for Japanese Researcher to Conduct Sabbatical Leave in the USA in 2015. "JSPS Exchange Programs Between Two Countries to Jointly Study". Japan Society for the Promotion of Science (JSPS). Travel and Housing Support for Dr. Makoto Yoshida (TUAT) to conduct research in Goodell's laboratory. Approx. US $50,000.

2014. Goodell, B. ICTAS Seed Funding: Development of a Metal Bath Reactor for Biopolymer Production; and Nanocharaterization and Fabrication Laboratory (NCFL) support for Analysis of CNTs from Biofiber in Steel. $10,000.

2014. Jakes, J. and Goodell, B. "Understanding non-enzymatic mechanisms for lignocellulose deconstruction: X-ray fluorescence mapping of physiologically relevant ions in fungal decay in wood". Argonne National Labs – Advanced Photon Source. Beam Time Proposal Funded.

2014-2016. Seidel, G., and B. Goodell. Composite Delamination Prevention and Detection via Sustainable, Tough and Smart Nanocellulose/Carbon Nanotube Fibers – SmartPinZ. VT-ICTAS JFC – Seed Funding. $60,000.

2010-2013. Cragg, S., B. Goodell, J. Jellison, X. Xie, S. McQueen-Mason, R. Murphy. New insights from shared expertise in wood-degrading animals and fungi into lignocellulose degradation mechanisms for biofuel applications. Biotechnology and Biological Sciences

Research Council (BBSRC), Sustainable Bioenergy Centre. BBSRC United States Partnering Award (USPA). Approx. US $50,000.

2010-2011. Xie, X., Goodell, B., Perkins, B., Jellison, J., LeBlanc, L., Rubin, J., Hunt, G., and Wilson, W. DOE/USDA Planning Proposal. Growth of microalgae on lignocellulose biomass sugars for enhanced bio-oil and food supplement production. $50,000.

2010-2012. Goodell, B., Cole, B., Jellison, J., Dagher, H., R. Rice ad S. Shaler. USDA-WUR. Wood Utilization Research. B. Goodell served as Project Director for the University of Maine WUR Center responsible for bringing in these funds. $525,430.

2009-2010. Xie, X., B. Goodell, M. Peterson, and S. Crawford. Microalgae oil recovery system design: Harvesting and oil extraction. Bureau of Indian Affairs. Washington DC, DOI $15,000.

2009-2011. Goodell, B., Cole, B., Jellison, J., Dagher, H., R. Rice, and 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., R. Rice, and 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., 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; & EDA, Dept. Commerce $2.2 million.

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.

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$1.+ million industrial match.

1996. Daniel, G. Henningsson, B., T. Nilson, and B. Goodell, and J. Jellison Broderna Edlunds Donation fund. 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.

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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

PUBLICATIONS: Excellent skills in written and oral communications as documented below. *(* = Refereed publication. # = Presentation given in addition to publication)*: For a listing of Publications/Patents (Total 160) on Google Scholar see: http://scholar.google.com/citations?user=BD1FWWIAAAAJ&hl=en&oi=ao

Books:

*Nicholas, D. D, B. Goodell, and T. Schultz. 2014. Deterioration and Protection of Sustainable Biomaterials. American Chemical Society Series. Oxford University Press. ACS Symp. Ser. 1158. 397p. Online version: http://pubs.acs.org/isbn/9780841230040

*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.

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Invited Book Chapters, Encyclopedia Entries:

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*Xie, X., and B. Goodell. 2014. Thermal Degradation and Conversion of Plant Biomass into High Value Carbon Products. *In:* Nicholas, D. D, B. Goodell, and T. Schultz. *Eds.* Deterioration and Protection of Sustainable Biomaterials. Oxford University Press. ACS Symp. Ser. 1158. Peer Reviewed Book Chapter. pp. 147-158. http://pubs.acs.org/doi/abs/10.1021/bk-2014-1158.ch008

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*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.

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*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.

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* Tamaru, Y., M. Yoshida, L.D. Eltis, and B. Goodell. 2019. Multiple iron reduction by methoxylated phenolic lignin structures and the generation of reactive oxygen species by lignocellulose surfaces, International Journal of Biological Macromolecules, https://doi.org/10.1016/j.ijbiomac.2019.01.149

* Hegnar, O. A., B. Goodell, C. Felby, L. Johansson, N. Labbé, K. Kim, V. G. H. Eijsink, G. Alfredsen, A. Várnai. 2019. Challenges and opportunities in mimicking non-enzymatic brown-rot decay mechanisms for pretreatment of Norway spruce. Wood Sci Technol (2019). https://doi.org/10.1007/s00226-019-01076-1

*Prosper, N., Zhang, S., Wu, H., Yang, S., Li, S., Sun, F., and Goodell, B. 2018. Enzymatic biocatalysis of bamboo chemical constituents to impart anti-mold properties. Wood Sci. Technol. https://doi.org/10.1007/s00226-018-0987-0

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#Goodell, B., Nakamura, M., J. Jellison. 2014. "The Chelator Mediated Fenton System in the Brown Rot Fungi: Details of the Mechanism, and Reasons Why it has Been Ineffective as a Biomimetic Treatment in Some Biomass Applications: A Review." 8 pages. St. George, Utah IRG Meetings. Presented also as a Plenary Session Paper. May 2014. 2014 - IRG/WP 14-10828.

*Maschek, D., B. Goodell, H. Militz, M. Lessard, J. Jellison 2013. New approach for the study of the chemical composition of bordered pit membranes: 4Pi and confocal laser scanning microscopy. Amer. J. Bot. 100(9): 1–6 (Cover Article).

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2017. "Non-enzymatic Redox Mechanisms in Fungal Degradation and Pathogenesis". Invited by and presented to: The Five College Biophysics Network Colloquium. November 16, 2017**.**

2017. 2017-12-12. Fugal Extracellular Biodegradation Mechanisms and Changes in Lignin and Cellulose Nanostructure During Fungal Attack. Sveriges lantbruksuniversitet. The Swedish University of Agricultural Sciences.

2017. Brown rot fungal degradation of wood and the chelator-mediated Fenton (CMF) system. BioMim Conference - Oslo, Norway, Oslo, Norway. 6/12/2017.

2017 Catalytic chemistries and the evolution of a non-enzymatic ROS generating system in Basidiomycota fungi: From (1) wood decay to (2) neuropathogenesis. Univ. Massachusetts, Microbiology Departmental Seminar. April 29, 2017.

2016. Derrien D., Bédu H., Buée M., Goodell B., Fontaine S., Gelhaye E. "Energy balance associated with the degradation of lignocellulosic material by white rot and brown rot fungi". SOMmic - Global Soil Diversity Initiative. Leipzig, Germany. Nov. 9-11, 2016. https://www.uni-trier.de/index.php?id=59365

2016. Barry Goodell, Daniel Eastwood, Seong Kim, Yuan Zhu, Kabindra Kafle, Geoffrey Daniel, Jody Jellison, Makoto Yoshida, Sai Venkatesh Pingali, Hugh O'Neil. "Catalytic chemistries and the evolution of a non-enzymatic lignocellulose deconstruction system in wood degrading fungi". LignoBiotech IV: Symposium on Biotechnology Applied to Lignocellulose. Madrid, Spain. June 19-23, 2016. (Goodell also serves on the Scientific Organizing Committee.)

2016. Barry Goodell. Advances in Biorefinery Application of the Chelator-mediated Fenton (CMF) System. BioMim Project Symposium. Oslo, Norway. June 16-17.

2016. Goodell, B. "Brown rot fungal degradation of wood and the chelator-mediated Fenton (CMF) system". August-Wilhelm Scheer Professor Lecture. Technische Univesität München (TUM), Munich Germany. June 2016.

2016. Liangpeng Zhuang, Weihua Guo, Makoto Yoshida, Xueyang Feng, Yuan Zhu, and Barry Goodell. "Molecular Pathways in the Brown Rot Fungus Gloeophyllum trabeum in Oxalate Production". International Research Group on Wood Protection Symposium. Annual 47th Symposium. Lisbon, Portugal, May 15-19, 2016

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Humanity: An Interdisciplinary Approach to Sustainable Development". 21-23 March. Eskisehir, Turkey.

2015. Goodell, B. Decomposition of lignocellulose by the chelator-mediated Fenton (CMF) system in brown rot fungi, and the role these fungi play in carbon sequestration and cycling. The Université de Lorraine and the Institut National de la Recherche Agronomique (INRA), and the Laboratory of Excellence. Champenoux, France. May 25, 2015.

2015. Goodell, B.**,** Arante, V. Jellison, J., Howell, C. Fungal degradation mechanisms: The role of brown rot chemistries in the deconstruction of biomass. Laboratoire d'Étude et de Recherche sur le Matériau Bois École Nationale Supérieure des Technologies et Industries du Bois. Nancy, France May 27, 2015.

2015. Goodell. Decay of Wood – Its Control and Ways to Harness it for Useful Purposes. École Nationale Supérieure des Technologies et Industries du Bois in Épinal Cedex, France. June 3, 2015.

2015. Barry Goodell, Jody Jellison, Yuan Zhu, Liangpeng Zhuang, Vincent Eijsink, Makoto Yoshida, Gry Alfredsen, Valdeir Arantes, Sai Venkatesh Pingali, Hugh O'Neill. Unraveling brown rot fungal cellulose degradation mechanisms for bioprocessing applications. 6th Congress of the Federation of European Microbiologists. June 7-11. Maastricht, The Netherlands.

2015. Barry Goodell, Valdeir Arantes, Jody Jellison, Yuan Zhu. The chelator mediated Fenton system in the brown rot fungi: Details of the mechanism, and reasons why it has been ineffective as a biomimetic treatment in some biomass applications. BioMim – Norwegian Funded Research on Biorefinery Research: Advancing biomass technology – a biomimetic approach. Kickoff Meetings: Utilization of Woody Biomass. June 17th 2015. Ås, Norway.

2014. Goodell, B., Arantes, V., Jellison, J. Non-enzymatic lignocellulose deconstruction systems in the brown rot fungi. Invited Keynote Presentation. LignoBiotech III. Concepcion, Chile. Oct 28, 2014. (Goodell also serves on the Scientific Organizing Committee.)

2014. Kängsepp, K. , Larnøy, E. , Militz, H., Goodell, B. & Salbu, B, The Mode of Action of Electro Osmotic Pulsing Against Wood Decay Fungi. Northern European Network For Wood Science And Engineering (WSE). Edinburgh, Scotland.

2014. Goodell, B., Arantes, V., Jellison, J., Kelly, S. Non-enzymatic deconstruction systems in the brown rot fungi. Society of Wood Science and Technology – 2014 Annual Convention. Zvolen, Slovakia. June 2014. Goodell also co-Chaired the session on: Lignocellulosic Material Science at these meetings.

2014. Goodell, B. Non-enzymatic mechanisms of wood deconstruction by brown rot fungi; and bacterial bioconversion of lignin aromatics to platform chemicals. Presented to: Fraunhofer-Institut für Holzforschung, WKI. Braunschweig, Germany. June 2014.

2014. Goodell, B. Presentations at Georg August University, Göttingen, Germany. June 2014.
1) Resin infusion in hybrid composites; and bioconversion from lignin to bioplastics.
2) Bacterial bioconversion of lignin aromatics to platform chemicals – A brief introduction to the use of molecular biology for biomass conversion.

3) Conversion of Wood Lignin to Bioplastics – An Introduction to Molecular Biology Techniques Useful in the Bacterial Conversion of Lignin Aromatics to Platform Chemicals.
4) Structural Biodegradation and Detection.

2014. Goodell, B. Nakamura, M., Jellison, J. The Chelator-Mediated Fenton System in the Brown Rot Fungi: Details of the Mechanism, and Reasons Why it has Been Ineffective as a Biomimetic Treatment in Some Biomass Applications: A Review. 45th Annual Conference of the International Research Group-WP, St. George, Utah. USA. 11-15 May 2014

2014. 1) Biosynthesis of new platform chemicals from waste lignin for new biopolymers. 2) Carbon nanotubes produced from biofiber and potential applications in metal matrix composites. Presentations to Phoenix Packaging Co.. Virginia Tech. April 2014.

2014. Sonoki, T., Ito, Y., Oguchi, T., Iimura, Y., Jellison, J., Goodell, B. Expression of laccase fused with cellulose-binding domain to increase saccharification efficiency of lignocellulosic materials. 5th The Earth Day global Poster Session, Atlanta, Georgia, USA, Apr. 22th, 2014

2014. Goodell, B. "Urban Wood and Biofiber: Use and Re-use - How Wood as a Biomaterial can Contribute to a Sustainable New York City." Invited Featured Speaker. The Parsons New School. Event: Re-thinking the Urban Forest: Putting New York City's Wood to Use. April 17, 2014.

2014. Goodell, B., Arantes, V., Jellison, J., Howell, C. Non-enzymatic decomposition of lignocellulose by brown rot fungi and the role it plays in carbon sequestration and cycling. Special Symposium: "Changing Atmospheric Chemistry: Environmental implications of land-air interactions." American Chemical Society Meetings. Dallas, TX. Invited Presentation by ACS President Shakhashiri. March 2014.

2014. Qian, Y., Otsuka, Y., Mukhopadhyay, B., Goodell, B. "Conversion of Kraft Lignin Extract to PDC as a Platform Chemical by *Pseudomonas putida* PpY1100/pDVZ21X." 2014 Spring ICTAS Scholar Poster Session, Virginia Tech.

2014. Seidel, G., Goodell, B., Kapania, R., Philen, M., Renneckar, S. Nanoscience and Nanotechnology at Virginia Tech: Applications of Cellulose Nanocrystals and Carbon Nanotubes in Hybrid Nanofibers for Improving Damage Tolerance and Damage Detection in Aerospace Composites. National Institute of Aerospace. Nanotechnology Workshop. Hampton Virginia. February 2014.

2014. Goodell, B. Nanocellulose in Aerospace Composites - Overview. National Institute of Aerospace. Nanotechnology Workshop. Hampton Virginia. February 2014.

2014. Qian, Y., Otsuka, Y., Mukhopadhyay, B., Goodell, B. "Production of Low Molecular Weight Platform Chemical from Lignin via Bacterial Biosynthesis." 2014 Bio-Based Materials Center – Eastman Co. Cooperative Symposium. Virginia Tech. February 2014.

2014. Goodell, B. Bioconversion of lignocellulose by fungi, focusing on a unique non-enzymatic degradation mechanism with application in feedstock bioprocessing. Virginia Tech – ICTAS. Bio-based Materials Center lecture. January 2014.

2013. Goodell, B. Sustainable Growth in Education in the Field of Sustainable Biomaterials – Greener Academics. Invited Presentation as the Auburn University's Weaver Lecturer for 2013. November 20, 2013. School of Forestry and Wildlife Sciences. Auburn University.
• Goodell also lectured to Auburn University Forestry students on the topic: "Biodeterioration, Bioconversion and Bioenergy and How They All Relate". November 21, 2013.

2013. Otsuka, Y., Goodell, B. Qian, Y. 2-Pyrone-4,6-Dicarboxyllic Acid as a Platform Chemical by *Pseudomonas putida* PpY1100/pDVZ21X." Graduate Symposium, Virginia Tech. MII Conference Attendance and Coordination of Poster Presentation from my Lab. November 2013. Poster Session, Virginia Tech.

2013. Goodell. The Future of Sustainable Biomaterials: How Wood and other Biomaterials will Contribute in a Sustainable World. Invited Keynote Presentation. Delivered at the 2013 International Conference on Resource Efficiency in Interorganizational Networks. Göttingen, Germany. November 13-14, 2013
- Goodell also lectured to students and faculty members at the University of Göttingen on the topic: *Fungal Degradation Mechanisms focused on Brown Rot Bioconversion of Lignocellulose*. November 15, 2013.

2013. Goodell, B., D. Maschek, V. Arantes, J. Jellison, M. Lessard, H. Militz, Y. Qian. New anatomical findings on the structure of wood, and an overview of a non-enzymatic deconstruction system by brown rot fungi. Invited speaker. International Conference on Lignocellulose Degradation Mechanisms from Across the Tree of Life. The Linnaean Society of London Library. London, England. September 10-13. Goodell also Chaired the Session on "Lignocellulose Breakdown from the Molecular Perspective"

2013. Jellison, J., B. Goodell, G. Alfredsen, D. Eastwood, G. Daniel, S. M. Cragg, J. K. Grace. Detection, identification and enhanced understanding of lignocellulose degrading fungi. Lignocellulose. Invited Speaker. International Conference on Lignocellulose Degradation Mechanisms from Across the Tree of Life. The Linnaean Society of London Library. London, England. September 10-13.

2013. Kimmerly, V. and Giesy, B. (Scieneering Students w/ B. Goodell). "Exploring the Secret of How Carbon Nanotubes formed in Ancient Damascus Steel Swords" Presented at the VT Undergraduate Student Research Symposium. August 2013.

2013. Kimmerly, V., Giesy, B., Goodell, B., Drushitz, A., and S. Renneckar. A Modern Approach to Fabricating Damascus Steel: In-Situ Formation of Carbon Nanotubes in a Steel Metal Matrix. July 31, 2013. Virginia Tech Summer Research Symposium. Featuring the research of VT undergraduate "Scieneering" and other undergraduate researchers.

2013. Goodell, B. New Findings about Old Mysteries: The Nanostructure of "Bordered Pits", and how that Nano-biostructure was Manipulated to Create Legendary, Ancient Damascus Steel Swords. Departmental Seminar – Fralin Hall, Virginia Tech. March 8, 2013

2013. Andrew Christovich. Dr. Barry Goodell, Dr. Scott Renneckar, Dr. Alan Druschitz, Dr. Xinfeng Xie. The Secret of Damascus Steel: Can we Incorporate Aligned Carbon Nanotubes

from Wood and Biofiber into Steel? Poster Presentation. Forest Products Society – Austin, TX. 2013.

2013. Daniela Maschek, Barry Goodell, Holger Militz, Jody Jellison, Mark Lessard. Nanostructure and chemical distribution in the bordered pit membrane. 19th Penn State Plant Biology Symposium: Cellulose synthesis, structure, matrix interactions and technology. An international conference at Penn State University, University Park, PA, May 16-18,

2013. Christovich, A. B. Goodell, S. Renneckar, A. Druschitz, X. Xie. Rediscovering the Secret of Damascus Steel: A proposed method for incorporating aligned carbon nanotubes into steel. Undergraduate Research Forum - Presentation by Honors Student Andrew Christovich. Virginia Tech. April 19, 2013.

2013. Goodell. The Future of Wood and Biofiber: How Wood as a Biomaterial Contributes to a Sustainable World. Invited Keynote speaker. World Wood Day Conference. Dar Es Salaam, Tanzania, Africa Week of March 21st 2013. Goodell, also chaired and moderated a meeting session on "Conservation and Plantation" and served as a judge in the African wood carving competition at the meetings.

2012. Goodell in cooperation with the Society of Wood Science and Technology. Keynote Speaker: The Redesign of Wood Science and Technology Academic Programs in America "The 2nd International Conference on Processing Technologies for the Forest and Bio-based Products Industries". St. Simons, Georgia November 6-7, 2012. Goodell also chaired a session on "*Industrial Processes*" at the "Frontiers in Biorefining - Chemicals and Products from Renewable Carbon" meetings. St. Simons, Georgia. October 28-Nov.1, 2012.

2012. Goodell and Jellison. Fungal Biodegradation of Lignin and Cellulose: An overview of Brown- and White-rot Mechanisms Comparing Biomimetic and In-vivo Degradation Patterns. Invited Presentation: Eastman Chemical Company. Kingsport, TN. November 9, 2012.

2012. Mascheck, Goodell Militz, Lessard, and Jellison. Bordered Pit Imaging using 4Pi and Confocal microscopy. Invited Presentation: Eastman Chemical Company. Kingsport, TN. November 9,

2012. Goodell. Invited Keynote Presentation: BioCOMP 2012. Shizuoka, Japan. November 28.

1. Directions for Sustainable Biomaterials, Biocomposites and Nanomaterials - Education and Research
2. An Overview of Wood-based and Sustainable Nano-composites Research in the US and Canada
3. Research on Polymer Matrix Composites and Metal Matrix Composites using wood and bio-fiber.
    a. The Composites Pressure Resin Infusion System (ComPRIS)
    b. The Inclusion of carbon nanomaterials from wood and biofiber for the incorporation of carbon nanotubes in steel and other metals

2012. Goodell. Invited Presentation: Japan Wood Protection Association. November 30, 2012

1. Daniela Maschek, Barry Goodell, Holger Militz, Mark Lessard, Jody Jellison. Bordered Pit Imaging using 4Pi and Confocal microscopy.

2. Goodell. Fungal Biodegradation of Lignin and Cellulose: An overview of Brown- and White-rot Mechanisms Comparing Biomimetic and In-vivo Degradation Patterns

2012. Goodell. Invited Presentation: Chonnam National University, Gwangju, S. Korea. December 3.

1. Goodell. Fungal Biodegradation of Lignin and Cellulose: An overview of Brown- and White-rot Mechanisms Comparing Biomimetic and In-vivo Degradation Patterns
2. Daniela Maschek, Barry Goodell, Holger Militz, Mark Lessard, Jody Jellison. Bordered Pit Imaging using 4Pi and Confocal microscopy.

2012. Goodell. Invited Presentation: SK Chemicals. Seoul. S. Korea. December 4.

1. Goodell. Integrating Nanomaterial Applications in the field of Sustainable Biomaterials
2. Goodell. Research on Polymer Matrix Composites and Metal Matrix Composites using wood and bio-fiber.

2012. Maschek, D., B. Goodell, H. Militz, M. Lessard, J. Jellison. Bordered Pit Imaging using 4Pi and Confocal microscopy. Presented to the 66th International Convention of the Forest Products Society In Washington, DC. USA. June 5, 2012

2010. Presentation on Goodell Laboratory Overview to the Wallenburg Wood Science Center. Visitors from Chalmers and KTH Universities in Sweden at UMaine. 2-2010

2010. Presentation to Representaive Chellie Pingree in support of the UMaine Wood Utilization Research (WUR) Center. (Video presentation with the support of the UMaine WUR co-PIs and UMaine Public Affairs office). 2-2010.

2009. Joint presentation to US House and Senate Staffers on Capitol Hill with the Wood Utilization Research Centers visiting Team, in support of WUR Research. 6-2009.

2009. Howell, C. A.,A-C Hastrop, B. Goodell and J. Jellison. Characterizing changes incrystalline cellulose nanostructures in biodegraded wood. FEMS 2009 3rd Congress of European Microbiologists. June 28-July 2, 2009. Goteborg, Sweden.

2009. Hastrop, A-C.,C. Howell,B. Goodell, B. Jensen and J. Jellison. 2009. The influence of wood crystallinity and d-spacing bybrown and white rot fungi. FEMS 2009 3rd Congress of European Microbiologists.June 28-July 2, 2009. Goteborg, Sweden.

2009. Invited seminar: Hunan Academy of Forestry. Changsha, China. December 17, 2009**.** Xie, X., and Goodell, B. An Overview of Wood Utilization Research Programs at University of Maine.

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. 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™ – 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. Invited Paper.

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 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 Annual Pulp and Paper Open House. April. University of Maine, Orono, ME.

1985. Goodell, B. Fumigation of impermeable heartwood species for preservative treatment. The 1st Annual Northeast Symposium on Forest Products and Wood Science. Proceedings: Univ. of Maine at Orono. May 29.

1985. Goodell, B. Pulsation process treatment of spruce with CCA. The 1st Ann. Northeast Symp. on Forest Products and Wood Science: Proceedings: 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. Bissonette.

1985. Jellison, J., and B. Goodell. Serological detection of *Poria placenta* (Fr) Cke. using

ELISA. NE Amer. Phytopath. Soc. Meetings. November. Newport, RI. Abstract. 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 Program. 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 COORDINATED (INCLUDING CHAIR/BOARD SERVICE):

2014. Lignobiotech III. 3rd Lignobiotech Symposium on Biotechnology Applied to Lignocelluloses. Concepcion, Chile. October 26-29, 2014. Scientific Committee Member. (Chair – Dr. Jaime Rodriguez). http://www.lignobiotech.cl/

2014. World Wood Day. March 21, 2014. Washington, DC. Board Member. (Chair – Michael Hou). http://www.worldwoodday.org/2014/#

2014. Industry visits to campus that I organized or coordinated with others for group meetings or the arrangement seminars included meetings with:

- Verso Paper,
- Nissus Corporation
- Phoenix Packaging
- Lockheed Martin

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 two adult children): Wife – Professor Jody Jellison (Goodell).