

2022 International Conference



Program & Agenda

June 13-16, 2022

Madison, Wisconsin, USA

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**Forest Products
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The International Conference welcomes industry professionals from the private and public sectors of the market as well as undergraduate and graduate educators, manufacturers, and students.

The annual Forest Products Society International Conference promotes discussions on the state of forest products research and provides continued education about innovations by leading industry experts.

The FPS 2022 IC is dedicated to encouraging and facilitating the development and application of technical knowledge that will enable its attendees to derive maximum benefit from renewable wood-based materials and forest products.

Thank you for joining us for the 2022 International Conference!



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Forest Products Society

The Forest Products Society is an international not-for-profit technical association founded in 1947 to provide an information network for all segments of the forest products industry. Membership is open to all interested individuals and organizations. The Forest Products Society is an international leader for advancing the sustainable use of renewable cellulosic resources through science and technology.

PO Box 932 | LaGrange, GA 30241 | USA
www.forestprod.org | 706-443-1337

International Conference Committee

Conference Chair



Justin Price
FPS President-Elect
Evergreen Engineering

Organizing Committee

Joseph Jakes
Technical Chair
USDA Forest Service, Forest Products
Laboratory

Bob Breyer
Awards Chair
Georgia-Pacific Chemicals

Terry Liles
Huber Engineered Woods

Jesse Paris
Willamette Valley Company

Leandro Passarini
CCNB-INNOV

**On behalf of the IC Planning Committee, thank you for
joining us and we look forward to seeing you again in
June 5-8, 2023, in Morgantown, West Virginia!**

Schedule at a Glance (Program Subject to Change)

Monday, June 13

2:30 PM Tour at the Forest Products Lab

Tuesday, June 14

7:30 AM Registration & Breakfast Opens
 8:30 AM General Session
 10:30 AM Concurrent Sessions (*Mass Timber, Characterization*)
 12:00 PM Lunch & Wood Bowl
 1:30 PM Concurrent Sessions (*Bio Economy and Circular Forest Products Industry I, Adhesives and Composites I*)
 3:30 PM Concurrent Sessions (*Bio Economy and Circular Forest Products Industry II, Adhesives and Composites II*)
 5:30 PM Poster Reception
 7:00 PM Pub Crawl

Wednesday, June 15

7:30 AM Registration & Breakfast Opens
 8:30 AM General Session
 10:30 AM Concurrent Sessions (*Life Cycle Analysis & Biochemicals, Wood Materials, and Wood Identification I*)
 12:00 PM Awards Lunch & Officer Transition
 1:30 PM Concurrent Sessions (*Sustainable Agriculture Through the Expansion of Forest Bioeconomy I, New Developments in Wood Production I, and Wood Identification II*)
 3:30 PM Concurrent Sessions (*Sustainable Agriculture Through the Expansion of Forest Bioeconomy II, New Developments in Wood Production II*)
 5:30 PM Happy Hour with Posters
 7:00 PM Paul Bunyan Dinner & 75th Celebration

Thursday, June 16

7:30 AM Registration & Breakfast Opens
 8:30 AM General Session
 10:30 AM Concurrent Sessions (*Fundamentals to Advance Applications of Nano-cellulosic Materials, Education, Perception & Processing*)
 12:00 PM Conference Adjournment

Venue Information

Madison Marriott West – Madison, WI
 1313 John Q Hammons Dr., Middleton, WI, 53562, USA
 608-831-2000

Nearby Restaurants

Falling Water Cafe
 1313 John Q Hammons Dr.
 0.1 mi from hotel

Tiffany Grille
 1313 John Q Hammons Dr.
 0.1 mi from hotel

Dickey's BBQ Pit
 8225 Greenway Blvd.,
 Suite 200
 0.2 mi from hotel

Freska
 8310 Greenway Blvd.,
 Suite 104
 0.2 mi from hotel

Milio's Sub Sandwiches
 8333 Greenway Blvd.,
 Suite 120
 0.3 mi from hotel

Tanners Bar & Grill
 1611 Deming Way
 0.3 mi from hotel

Café Zupas
 8310 Greenway Blvd.
 0.3 mi from hotel

Biaggi's Ristorante Italiano
 (Located in Greenway
 Station shopping center)
 1611 Aspen Commons
 0.4 mi from hotel



Full Agenda (Program Subject to Change)

Bold Names Indicate Invited Session Speakers

Monday, June 13

2:30 PM Tour at the Forest Products Lab
Bus loads at the host hotel at 1:45 PM and departs at 2:00 PM.

Tuesday, June 14

7:30 AM Registration & Breakfast Opens

8:30 AM General Session

Keynote Presentations

Mark Tibbetts | President, APA Wood | Trends in Wood Products in an Evolving and Shifting Market

Keynote Panel | Celebrating the Past & Building the Future

Bob Breyer | Senior Technology Manager for Wood Adhesives, Gorgia-Pacific Chemicals, LLC

Terry Liles | Director of Raw Materials at Huber Engineered Woods, LLC

Eddie Price

Justin Price | Principal, Evergreen Engineering

Nicole Stark | Project Leader, USDA Forest Products Laboratory

10:00 AM Morning Break

10:30 AM Concurrent Sessions (*Mass Timber and Characterization*)

Session 1.1 - Mass Timber

Moderator: Rick Bergman – USDA Forest Service, Forest Products Laboratory

Archie Landreman | Mass Timber Construction Comes of Age- Again!

Mahboobeh Hemmati | Life Cycle Assessment of Construction Process in Mass Timber Structure

Mahboobeh Hemmati | LCA Comparison of a Mass Timber Building with an Equivalent Steel Alternative

Kenneth Udele | Performance Characterization of Mass Ply Panels

Session 1.2 – Characterization

Moderator: Daniel Yelle – USDA Forest Service, Forest Products Laboratory

Nayomi Plaza | Assessing the effects of degradation in wood using X-ray and Neutron Scattering

Xavier Arzola | Wood cell wall moisture-induced swelling study using Micro X-Ray Computed Tomography

Joseph Jakes | Best Practices for Berkovich Nanoindentation in Wood and Forest Products

Marly Gabriela Carmona Uzcategui | Assessment of 2 × 6 Southern Pine Mechanical Properties with Nondestructive Techniques

12:00 PM Lunch & Wood Bowl

1:30 PM Concurrent Sessions (*Bio Economy & Circular Forest Products Industry I, and Adhesives & Composites I*)

Session 2.1 - Bio Economy and Circular Forest Products Industry I

Moderator: Hui Wan – Southwest Forestry University

Iris Montague | From refuse to reuse: How do consumers feel about reclaimed lumber

Donald Rockwood | Biochar Production and Carbon Sequestration from SRWC Eucalypts in Florida, USA

Session 2.2 - Adhesives and Composites I

Moderator: Brian Via – Auburn University

Christopher Hunt | Variability due to lathe checks in ABES adhesive testing, ASTM D7998

Chinmoyee Das | Newly Developed Biocarbon to Increase Conductivity in Sustainable Polyamide 12 Composites

Armando McDonald | Extrudable Wood Fiber - Thermoset Resin Mixtures as a Candidate for Additive Manufacturing of Wood Composites

Christopher Hunt | Associations between soy proteins greatly influence adhesive wet strength

3:00 PM Afternoon Break

3:30 PM Concurrent Sessions (*Bio Economy & Circular Forest Products Industry II, and Adhesives & Composites II*)

Session 3.1 - Bio Economy and Circular Forest Products Industry II

Moderator: Hui Wan – Southwest Forestry University

Hui Wan | Development of Circular Forest Products

Javier Hernandez | Modeling degradation rates of loblolly pine from downed timber in South Alabama by NIR and acoustics as rapid evaluation tools

Round Table Discussion

Session 3.2 - Adhesives and Composites II

Moderator: Xavier Arzola – University of Wisconsin Madison

Scott Hamel | Polyurethane Structural Insulated Panels (SIPs), Undiscovered Miracle Product?

Abiodun Alawode | Effect of Biodegradable Fillers on Bonding Performance of Plywood

Christopher Hunt | Relations between soy adhesive mechanical properties and plywood performance

Brian Via | Lignocellulosic Compounds in Bio-based Resin Formulations for Engineered Wood Composites (EWC) Applications.

5:30 PM Poster Reception & Networking

7:00 PM Madison Pub Crawl

Wednesday, June 15

7:30 AM Registration & Breakfast Opens

8:30 AM General Session

Keynote Presentations

Justin Price | Principal, Evergreen Engineering | Industry 4.0

FPS Today | How FPS is Evolving to Meet the Needs of a Changing Industry

Publication Update | Brian Via

Technical Interest Groups | Joseph Jakes

10:00 AM Morning Break

10:30 AM Concurrent Sessions (*Life Cycle Analysis & Biochemicals, Wood Materials, and Wood Identification I*)

Session 4.1 - Life Cycle Analysis and Biochemicals

Moderator: Iris Montague – USDA Forest Service, Forest Products Laboratory

Poonam Khatri | Dynamic accounting of embodied carbon and carbon storage for harvest wood products in Pacific Northwest, USA

Kamalakanta Sahoo | Life-cycle assessment of redwood lumber products in the United States

Osei Asibe Asafu-Adjaye | Dewatering Black Liquor and Lignin with Supercritical CO₂

Seyed Hashem Mousavi-Avval | Dynamic life-cycle global warming impact of sustainable aviation fuel production from forest residues

Session 4.2 - Wood Materials

Moderator: Nayomi Plaza – USDA Forest Service, Forest Products Laboratory

Brunela Pollastreli Rodrigues | Effect of the site on anatomical indexes of eucalypt wood for papermaking

Kunlin Song | Structure-property relationships of hydro-thermo-mechanically modified wood

Peng Quan | Natural wood-based metamaterials for highly efficient microwave absorption

Wanhe Hu | Combustion characteristics and energy properties of torrefied and untorrefied post-harvested Red Oak (*Quercus rubra*) logging residues

Session 4.3 - Wood Identification I

Moderators: Adriana Costa & Adam Wade – Mississippi State University

Alex Wiedenhoeft | Combating fraud and misrepresentation in US consumer forest products: on the potential role of emerging wood identification technologies and the need for certification of reliable human wood identification expertise.

Prabu Ravindran | Machine learning for wood identification: A buyer's guide

Adam Wade | Using computer-vision models for wood identification: representative images vs. non-representative images

12:00 PM Awards Lunch & Officer Transition

1:30 PM Concurrent Sessions (*Sustainable Agriculture Through the Expansion of Forest Bioeconomy I, New Developments in Wood Production I, and Wood Identification II*)

Session 5.1 - Sustainable Agriculture through the Expansion of Forest Bioeconomy I

Moderator: Debbie Page-Dumroese – USDA Forest Service, Rocky Mountain Research Station

Donghoon Shin | Biochar and syngas co-production technology using flameless combustion

Nathaniel Anderson | The economics of biochar production from forest biomass

Francis Asare | An industrial collaboration towards improving advanced technologies for sustainable charcoal and biochar production in developing countries

MinJun Kim | Coicis Semen decreases persister cell formation of *Staphylococcus aureus* by membrane disruption

Session 5.2 - New Developments in Wood Protection I

Moderators: Rachel Arango & Katie Ohno – Forest Products Laboratory

Danixa Rodriguez-Melendez | Environmentally-Benign and Water-Based Polyelectrolyte Complex Coating for Self-Extinguishing Wood

Lili Cai | Potential bio-based preservatives as sustainable alternatives for wood protection

Grant Kirker | Looking through the trees: Revisiting extractives as an alternative form of wood utilization

Katie Ohno | Siderophore production from brown-rot decay fungi

Session 5.3 - Wood Identification II

Moderators: Adam Wade & Arianna Costa – Mississippi State University

Frank Owens | Online Techniques for Teaching Wood Anatomy and Identification

Michael Wiemann | Oligocene Fossil Woods of Chilga, Ethiopia

Adriana Costa | The Future of the David A. Kribs Wood Collection

3:00 PM Afternoon Break

3:30 PM Concurrent Sessions (*Sustainable Agriculture Through the Expansion of Forest Bioeconomy II, New Developments in Wood Production II*)

Session 6.1 - Sustainable Agriculture through the Expansion of Forest Bioeconomy II

Moderator: Nathaniel Anderson – USDA Forest Service, Rocky Mountain Research Station

Janet Williams | Sawdust and cattle health

Deborah Page-Dumroese | Benefits of biochar in sustainable agricultural operations

Harry Groot | Biochar Use in Viticulture and with Livestock

Han-Sup Han | Sawdust to Fertilizer: Integrating economic and environmental benefits for forestry and agriculture in South Korea

Session 6.2 - New Developments in Wood Protection II

Moderators: Katie Ohno & Rachel Arango – Forest Products Laboratory

Beth Stokes | Leaching of CCA From Coated and Uncoated Pilings

Munkaila Musah | Salvaging Storm Damage Trees through the use of Acoustics and NIR Technologies

Tamara Franca | Natural resistance of African mahogany to termite attack

Bryan Cortes | The Resistance of Some Commercially Thermally Modified American Hardwoods to Termites and Fung

Gerald Presley | Performance of 4,5-dichloro-2-n-octyl-4-isothiazoli-3-one (DCOI) against decay fungi in different solvent systems

5:30 PM Happy Hour with Posters

7:00 PM Paul Bunyan Dinner & 75th Celebration

Thursday, June 16

7:30 AM Registration & Breakfast Opens

8:30 AM General Session

Keynote Presentations

Alicia Cramer | Senior Vice President, U.S. Endowment for Forestry and Communities | Inclusion: What is it time for now?

Tamara Franca | Assistant Professor, Department of Sustainable Bioproducts, Mississippi State University | Thinking Together – The Power of Diversity and Collaboration

10:00 AM Morning Break

10:30 AM Concurrent Sessions (*Fundamentals to Advance Applications of Nano-cellulosic Materials, and Education, Perception & Processing*)

Session 7.1 - Fundamental to Advance Applications of Nano-cellulosic Materials

Moderator: Nicole Stark – Forest Products Laboratory & Dilpreet Bajwa – Montana University

Yucheng Peng | Fracture toughness of spray-dried cellulose nanocrystal reinforced polypropylene composites: characterized by the essential work of fracture method

Saptarni Chanda | Nano Boron Oxide Incorporation to Cellulose Nanocrystals and Lignin containing Cellulose Nanocrystals to Improve the Thermal, Mechanical and Flammability Properties of high density polyethylene polymer

Mark Dietersberger | Durability Tests for Wood-Plastic Composites Containing Fire Retardants

Ling Li | Performance of moisture selective CNC/PDMS hybrid membranes for air dehumidification at elevated temperatures and relative humidities

Session 7.2 - Education, Perception, and Processing

Moderator: Joseph Jakes – USDA Forest Service, Forest Products Laboratory

Iris Montague | Why Not Forestry or Wood Products?: A Look at the Reasons Why Students May Not Choose These Majors

Moein Hemmati | Comparative Analysis of Thermal Comfort Performance of wood, brick, and concrete

Ondrej Dvoracek | Multiparametric Cutting Force Prediction Model for Various Wood Species

Tobias Schauerte | Production Technology in the Wooden Single-Family House Industry – A Case of Reasoning against Automation

12:00 PM Conference Adjournment



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Poster Presentations

**Denotes Student Poster*

Francis Asare

**An industrial collaboration towards improving advanced technologies for sustainable charcoal and biochar production in developing countries*

Suharsha Baskarla

**Non-destructive method for Predicting the Carbon Content in Wood Samples Using Near Infrared Spectroscopy and Elemental Analysis*

Brian Bond

Mechanical Properties of Thermally Modified Red Oak and Cherry

Dan Bollock

A quantitative study of skill decay for e-learning and in-person safety training methods for table saws.

Saptaparni Chanda

**Amine Compatibilization of Cellulose Nanocrystals to Improve Dispersion and Physico-mechanical properties in high density polyethylene polymer*

Saptaparni Chanda

**Nano Zinc Oxide Incorporation to Cellulose Nanocrystals and Lignin containing Cellulose Nanocrystals to Improve the Thermal, Mechanical and Flammability Properties of high density polyethylene polymer*

Thomas Gorman

Reducing checking potential in glulam members during winter construction in the inland Northwest

Mahboobeh Hemmati

**Life Cycle Analysis (LCA) for Transportation of Cross-Laminated Timber (CLT) Panels from Three Origin Points of Supply*

Hyoung Jin Kim

The Accessibility Improvement of Alkali-treated Cellulosic Fibers for a Highly Absorbent Materials

Hyoung Jin Kim

The Barrier Properties of Cellulosic Paper Coated with Biodegradable Polyester for Packing Application

Keonho Kim

Influence of self-tapping screw's shape on bearing capacity of structural lumber

Hak Lae Lee

Application of Nanocellulose-based Hybrid in Salt Hydrate Phase Change Materials for Thermal Energy Storage

Jue Mo

**Performance Testing of Hybrid CLT Panels*

Nkechi Helen Okoye

The Thermal and Electrical Conductivity Characteristics Of Fifty – Three Nigerian Timber Species

Dikshya Pokhrel

**Characterization of wood fibers obtained generated from downed timber for wood polymer composite manufacturing*

Robert Smith

A Visual Inspection of Cross Laminated Timber Buildings in Austria

Ting-Ho Tsai

**Wooden Rehabilitation Exercise Equipment for Elderly and People with Disabilities*

Kenneth Udele

**Laboratory Evaluation of Fungal Decay in Mass Timber Elements*

Charles Warner

**Dataset of US Central Hardwood Bark Images*

Fanyou Wu

Approaches to training and evaluating of deep learning models in wood identification

Daniel Yelle

Detecting differences in wood chemistry throughout a single tree using open-source 2D NMR chemometric tools

Keynote Speaker Information



Alicia Cramer
Senior Vice President, U.S. Endowment of Forestry and Communities

As Senior Vice President at the Endowment, Alicia's primary focus is program oversight and development. She began working with the Endowment first in 2015 as a volunteer member of the Board of Directors and then transitioned to become a full-time member of the leadership team in 2017. Her more than 30 years of professional experience includes roles in packaging engineering and supply chain analysis to product development positions in the forestry sector, all of which contribute to her current role. Before joining the Endowment, Alicia worked for more than two decades for the Westervelt Company, formerly known as Gulf States Paper Corporation, located in Alabama. There she held key management positions in product development before progressing to Vice

President of Business Development, an executive role which encompassed global leadership accountability for Westervelt Ecological Services, Westervelt Renewable Energy, and the company's recreation and agricultural assets in New Zealand. Alicia received bachelor's degrees in Chemistry and Sociology from Thiel College in Greenville, Pennsylvania. She also completed The Fuqua School Executive program at Duke University. Most importantly, she loves to hike, fish, and spend time with her family.



Tamara França
Department of Sustainable Bioproducts, Mississippi State University

Tâmara França is an Assistant Professor at the Department of Sustainable Bioproducts, Mississippi State University. Originally from Brazil, she holds a PhD in Forest Resources, Mississippi State University, a M.Sc. degree in Forest Science, Federal University of Espírito Santo, Brazil, and two bachelor degrees, one in Wood Technology (Para State University, Brazil) and Business Administration (Metropolitana College, Brazil). Dr. França teaches several courses and is currently serving as board member of the

Forest Products Society (FPS) and Society of Wood Science and Technology (SWST). She also serves as advisor of the SWST/FPS Student Chapter. Her research areas include durability and protection of wood and wood products, effects of degradation on wood properties, durability issues associated with mass timber products, and assessment of incipient decay on wood.



Mark Tibbets
President, APA Wood

Mark became APA's twelfth President on July 1, 2020. Mark brings 20 plus years of experience in association management, environmental policy, and program development to APA. Mark's prior work includes serving as President of the Tag and Label Manufacturers Institute (TLMI). For over seven years, Mark led the Thermostat Recycling Corporation (TRC), one of three national product stewardship organizations operating in the United States. During his tenure, Mark implemented state-mandated programs in over ten states, doubled program participation, and achieved record collections of waste thermostats. Previous association work includes leadership and management positions at the Air Conditioning Contractors of America, the National Electrical Manufacturers Association, and the American Public Works Association. Mark holds his bachelor's and master's degrees from the University of Maine. He

currently resides in Gig Harbor, Washington, with his wife and three children.

Celebrating the Past & Building the Future – Keynote Panel



Bob Breyer
Senior Technology Manager Wood Adhesives, Georgia-Pacific Chemicals, LLC

Bob Breyer is one of the Georgia-Pacific Chemicals representatives for the Wood-Based Composites Center. He has worked for Georgia-Pacific Chemicals for 28 years and is currently R&D Manager for its Thermosetting Team.



Terry Liles

Director of Raw Materials, Huber Engineered Woods, LLC

Terry Liles is currently the Director of Adhesives Technology at Huber Engineered Woods at the Innovation Center in Commerce, GA. He is also an adjunct professor at the University of Tennessee. Prior to that he served as Technology Manager and Group Leader at Georgia-Pacific Chemicals and as a Senior Chemist at BASF. He is the Vice President of the Forest Products Society and Chair of ASTM D14 committee on Adhesives. He has been awarded four patents. He received his Ph.D. in Chemistry at the University of Southern Mississippi and a BS in Chemistry at the University of

South Alabama.



Eddie Price

Before retiring in 2011, Dr. Eddie W Price taught at the University of Illinois, served as a Research Engineer for the Corp of Engineers while In the Army, spent 14 years as a Research Scientist for the US Forestry Service, and was employed by Georgia-Pacific Wood Products LLC (GP) for 24 years. While with GP, he began his career as a Scientist but was promoted to Manager of GP's Wood Products Service Group and then Director of Wood Products Technical Service. His duties included the supervision of wood products technical staff that included engineers, scientists, and technicians, represented the company on associational technical committees related to wood products, performed due diligence for acquisitions and new products manufactured or distributed by GP, and often was the company expert witness

in legal cases. He represented the company in developing or revising industry standards and national building codes. Many of the QC programs and audit processes used by GP wood product manufacturing facilities were developed under his leadership.

Ed has written over 50 technical papers, given presentations in several countries, and often advised graduate students as adjunct professor. During his employment with GP, he served as Chairperson of the Technical Committees for the CPA, APA-The Engineered Wood Association, and American Wood Council. He was the recipient of the APA's Bronson J. Lewis Award for leadership and outstanding service to the Plywood and Engineered Wood Products Industry. In addition to his industry duties, Ed was active in professional societies being President of the Forest Products Society and an executive board member of the Society of Wood Science and Technology.

Ed earned a PhD from the University of Illinois in Materials Engineering, a Master of Science Degree from the University of Washington in Wood Science, and a Bachelor of Science degree from Louisiana Tech University in Forest Products.



Justin Price
Principal, Evergreen Engineering

Justin Price has vast experience in engineering for the wood products industry and an innovative approach to engineering solutions. Justin's responsibilities include construction management; developing new or modified plant layouts; designing mechanical conveying systems, process equipment, and piping layouts; and preparing equipment specifications. Some of his major projects have been in the chemical, pulp & paper, and wood products industries. He is proficient in executing projects to satisfy client specifications and expectations and in meeting defined schedules, as well as cost and quality parameters.



Nicole Stark
Project Leader, Forest Biopolymer Science and Engineering, USDA Forest Products Laboratory

Nicole Stark is the Project Leader of the Forest Biopolymer Science and Engineering Group at the USDA Forest Products Laboratory (FPL) in Madison, Wisconsin, USA. Her research focus is to combine forest-based resources with other polymers to develop novel composite materials. Her program includes examining the influence of raw materials and additives on natural fiber-plastic composite performance with a specific focus on developing methods to improve composite durability and development of sustainable packaging materials containing cellulose nanomaterials. Nicole obtained her B.S. degree in Chemical Engineering and her M.S. degree in Mechanical Engineering from the University

of Wisconsin-Madison. She received her Ph.D. degree in Forest Science from Michigan Technological University.



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2023 Annual International Conference

June 5-8, 2023
**Morgantown Marriott at
Waterfront Place**



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Thank You for Attending!

