



2018 FPS International Convention Program

(subject to change)

Monday, June 11th

8:00 am - 3:15 pm - Intro to Wood Science Short Course and FPL Tour

4:00 pm - 5:30 pm

Opening Keynote

Driving the Automotive Industry Using Sustainable Materials

Alper Kiziltas, Ford Motor Company

5:30 pm - 7:00 pm - Welcome Reception (Joint with TAPPI Nano)

Tuesday, June 12th

8:30 am - 10:00 am

1 - Education Plenary Session

Session Chair: **Hui Wan**, Mississippi State University

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| 1.1 | Enrollment in Natural Resources Degree Programs in the U.S.: Trends, Drivers, and Implications for the Future of the Natural Resource Professions | Terry Sharik , Michigan Technological University |
| 1.2 | Capturing the Future of Wood Science and Forest Products Education in the United States | Bob Smith , Virginia Tech |

10:00 am - 10:30 am Coffee Break

10:30 am - 12:00 pm

2.1 Wood Fundamentals

Session Chair: **Bob Ross**, USDA Forest Products Laboratory

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| 2.1.1 | Statistical Distribution Models for MOE and MOR in Three Mill Run Lumber Populations | Frank Owens , Mississippi State University |
| 2.1.2 | Southern Pine Wood Variability: Extending Wood Quality Assessments Beyond Determinations of Specific Gravity | Thomas Eberhardt , USDA Forest Products Laboratory |
| 2.1.3 | Non-Destructive Techniques as Tools for Wood Quality Evaluation on Genetic Breeding Programs of Loblolly Pine in Brazil | Jorge Luis Monteiro de Matos , Federal University of Paraná |
| 2.1.4 | Effect of Rotation Age and Thinning Regime on Visual and Structural Lumber Grades of Douglas-fir Logs | Eini Lowell , USDA Forest Service PNW Research Station |

2.2 Social Influences

Session Chair: **Rich Vlosky**, Louisiana Forest Products Development Center

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|-------|---|---|
| 2.2.1 | Social Media Use in the Forest Products Industry: the Impact on the Consumer Purchasing Process | Iris Montague , USDA Forest Service |
| 2.2.2 | Executive Perceptions of Factors Influencing Pulp and Paper Industry | Alice Palmer , University of British Columbia |
| 2.2.3 | Attitudes and Perceptions of the Millennial Generation Surrounding Wood Products and the Wood Products Industry | Kassandra Stout , Mississippi State University |
| 2.2.4 | Identifying Market Mobility Barriers for Wooden Single-family House Producers to Enter the Multi-family Segment | Fredrik Lindblad , Linnaeus University |

2.3 Bioenergy

Session Chair: **Xinfeng Xie**, Michigan Tech University

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|-------|---|--|
| 2.3.1 | Advances in Biochar Products, Systems, and Processes | Thomas Miles , US Biochar Initiative |
| 2.3.2 | The Carbon Impacts of Heating with Wood at Harvest Forest | Maureen Puettmann , WoodLife Environmental |
| 2.3.3 | Theoretical Estimation of Silo Design Parameters for Loblolly Pine Grinds – Moisture Content and Particle Size Effects | Oluwatosin Oginni , West Virginia University |
| 2.3.4 | Economic Analysis of Forest Residues Logistics Options to Produce Quality Feedstocks | Kamalakanta Sahoo , USDA Forest Products Laboratory |
| 2.3.5 | Increasing the Economic and Operational Efficiencies of Forest Restoration and Biomass Utilization in Southwestern US Forests | Jeffrey Halbrook , Ecological Restoration Institute |

12:30 pm - 2:00 pm - Lunch and Wood Bowl

2:00 pm - 3:30 pm

3.1 Cross Laminated Timber

Session Chair: **Dave DeVallance**, *West Virginia University*

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|-------|---|---|
| 3.1.1 | Performance of CLT at Material Level: Mechanical Properties, Moisture Diffusion, and Creep Behavior | Kobir Hossain , <i>University of Alabama</i> |
| 3.1.2 | Structural Grade System for Yellow-poplar Classification to Produce CLT Panels | Rafael Azambuja , <i>West Virginia University</i> |
| 3.1.3 | Measurement of Shear Properties of Eastern Hemlock Using Two-Plate Shear Test | Alireza Bahmanzad , <i>University of Massachusetts</i> |
| 3.1.4 | Bonding Properties of Cross-Laminated Timber Made from Mixed Species | Munkaila Musah , <i>Michigan Tech University</i> |

3.2 Wood Modifications

Session Chair: **Xiaolin Cai**, *FPIInnovations*

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|-------|--|---|
| 3.2.1 | Effect of Alkali Treatment on Aspect Ratio and Tensile Properties of Grape Cane Fibers | Balkis Balkar , <i>Oregon State University</i> |
| 3.2.2 | Cellulose-Based Lateral Flow Devices for Low-Cost Point-of-Care Blood Coagulation Monitoring | Hua Li , <i>University of Cincinnati</i> |
| 3.2.3 | Influence of Thermal Modification on Selected Properties of Yellow-poplar | Brian Bond , <i>Virginia Tech</i> |

3.3 Poster Presentations (non-Students)

Session Chair: **Iris Montague**, *USDA Forest Service*

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|--------|--|--|
| 3.3.1 | Analyses of a Hydrophobin Protein, Hyd2, as a Wood Protection Agent | Lakshmi Narayanan , <i>Mississippi State</i> |
| 3.3.2 | Lateral Force Resistances of CLT Wall Panels Made of Small Square Timber Core and Plywood Crossband | Sang Sik Jang , <i>Chungnam National University</i> |
| 3.3.3 | Water Based Esterification of Cellulose Nanofibril for Wet Compounding with PLA | Ruth Lafia-Araga , <i>Federal University of Technology</i> |
| 3.3.4 | Outdoor Above-ground Wood Moisture Modeling in Relation to Microclimate | Patricia Lebow , <i>USDA Forest Service</i> |
| 3.3.5 | Seasonal Changes in Critical Thermal Minimum and Supercooling Point in Eastern Subterranean Termites (<i>Reticulitermes flavipes</i> (Kollar)) in Wisconsin | Rachel Arango , <i>USDA Forest Products Laboratory</i> |
| 3.3.6 | Investigation of Volatile Pyrolysis Products from Six Tropical Woods of Southeast Nigeria | Nkechi Okoye , <i>NnamdiAzikiwe University</i> |
| 3.3.7 | Biomass Derived Activated Carbon for Energy Storage Applications | Changle Jiang , <i>West Virginia University</i> |
| 3.3.8 | Flexural Properties of Visually Graded Southern Pine Structural Lumber | Tâmara Suely Figueira Amorim Franca , <i>Mississippi State University</i> |
| 3.3.9 | Studies of Carbon Dioxide Activated Eastern White Pine Carbon Used in Double-layer Supercapacitors | Nan Nan , <i>West Virginia University</i> |
| 3.3.10 | Sound Absorption Rate of CLT Wall Panels Composed of Larch Square Timber Core and Plywood Cross Band | Chun Won Kang , <i>Chonbuk National University</i> |
| 3.3.11 | High-Lignin-Content Rigid Polyurethane Foam from Unmodified Kraft Lignin Prepolymerized with Isocyanates | Xuefeng Zhang , <i>Mississippi State University</i> |
| 3.3.12 | The Properties of Particle Board Prepared with Light Colored Phenolic Resin Adhesive | Min Lee , <i>National Institute of Forest Science</i> |

3:30 pm - 4:00 pm Coffee Break



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4:00 pm - 5:30 pm

4.1 Wood Properties

Session Chair: **Joseph Jakes**, *USDA Forest Products Laboratory*

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|-------|--|---|
| 4.1.1 | Mechanical Properties of Bamboo from Atoms to Culms | Joseph Jakes , <i>USDA Forest Products Laboratory</i> |
| 4.1.2 | Mussel-inspired Polydopamine Modification of Bamboo Fiber and its Effect on the Properties of Bamboo Fiber/Polybutylene Succinate Composites | Wei Song , <i>Beijing Forestry University</i> |
| 4.1.3 | Wood Species Verification Using Anatomy, Physical Properties, and Mass Spectrometry | Michael Wiemann , <i>USDA Forest Products Laboratory</i> |
| 4.1.4 | Determination of Proportion of Juvenile Wood and Wood Quality in Loblolly Pine (<i>Pinus taeda</i> L.) Grown in Southern Brazil | Jorge Luis Monteiro de Matos , <i>Federal University of Parana</i> |

4.2 Wood Durability

Session Chair: **Glenn Larkin**, *Michigan Technological University*

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| 4.2.1 | Comparison of ACA and CCA Treated Solid Lumber and Plywood Composed of Refractory Wood Species at Field Sites in Mississippi and Wisconsin | Grant Kirker , <i>USDA Forest Products Laboratory</i> |
| 4.2.2 | Decay Resistance Performance of Recycled Creosote for Wood Preservations | Luxi Wang , <i>Michigan Technological University</i> |
| 4.2.3 | Non-pressure Preservative Options for Military Applications | Stan Lebow , <i>USDA Forest Products Laboratory</i> |
| 4.2.4 | Does Acetylation Stop Decay By Inhibiting Diffusion? | Christopher Hunt , <i>USDA Forest Products</i> |

4.3 Innovations in Building

Session Chair: **Paige McKinley**, *Boise Cascade*

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|-------|---|---|
| 4.3.1 | Production and Evaluation of Strength and Dimensional Properties of Bamboo - Cement Composites for Use as Low-Cost Building Component | Adeyinka Saheed Adesope , <i>Forestry Research Institute of Nigeria</i> |
| 4.3.2 | Evaluation of the Potential of White Birch Wood in Structures Assembled with Metal-Plate Connectors | Leandro Passarini , <i>Université du Québec en Abitibi-Témiscamingue</i> |
| 4.3.3 | Double Shear Connection of Shorea Compression Member Using Double Adhesive Tapes and Lag Screws | Bambang Suryoatmono , <i>Parahyangan Catholic University</i> |
| 4.3.4 | The Emergence of New Mass Timber Products in Oregon: Mass Plywood Panels | Byrne Miyamoto , <i>Oregon State University</i> |

5:30 pm - 7:30 pm

Poster Session and Student Poster Competition - Joint with Nano

Poster Competition Chair: **Iris Montague**, *USDA Forest Service*

7:30 pm - TBD Student Pub Crawl

Wednesday, June 13th

8:30 am - 10:00 am

5 - Forest Bioeconomy Plenary

Session Chair: **Richard Vlosky**, *Louisiana Forest Products Development Center*

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| 5.1 | NAFTA: the Stakes for Globalization and American Leadership | Matthew Rooney , <i>George W. Bush Institute</i> |
| 5.2 | The Emerging Forestry Bioeconomy: Fuels, Chemicals, Advanced Materials, and Carbon Management | Brendan Jordan , <i>Bioeconomy Coalition of Minnesota (Great Plains Institute)</i> |

10:00 am - 10:30 am Coffee Break

10:30 am - 12:00 pm

6.1 CORRIM

Session Chair: **Maureen Puettmann**, *WoodLife Environmental Consultants*

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| 6.1.1 | Production and Availability of Mill Residues for Use in a Biorefinery | Maureen Puettmann , <i>WoodLife Environmental</i> |
| 6.1.2 | Regional Variations in the Lifecycle Assessment of Softwood Residue Recovery for Biofuel Production for the Pacific Northwest and Northeast Regions of the USA | Elaine Oneil , <i>CORRIM</i> |
| 6.1.3 | LCA of Poplar to Ethanol Production Using Short Rotation Coppice Silviculture | Rodrigo Morales-Vera , <i>University of Washington & Catholic University of Maule</i> |
| 6.1.4 | Effects of Biomass Composition on the Economics and Life Cycle Impacts of Bio-oil Biorefinery | Steve Kelley , <i>North Carolina State University</i> |

6.2 Understanding Lignocellulose through Novel Methods

Session Chair: **Chris Hunt**, *USDA Forest Products Laboratory*

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| 6.2.1 | Cellulose-Based Material for Removal of Microcystin from Contaminated Water Sources | Diego Gómez Maldonado , <i>Auburn University</i> |
| 6.2.2 | Measurement of Moisture-Dependent Ion Diffusion Constants in Wood Cell Walls Using Time-Lapse Micro X-Ray Fluorescence Microscopy | Joseph Jakes , <i>USDA Forest Products Laboratory</i> |
| 6.2.3 | Using Neutron Scattering to Study Nanoscale – Wood-Water Interactions | Nayomi Plaza , <i>USDA Forest Products</i> |
| 6.2.4 | Application of Spin-coated Masterbatch Approach for Improving Dispersion of Cellulose Nanocrystals and Mechanical Properties of Poly(lactic acid) Nanocomposites | Jamileh Shojaeiarani , <i>North Dakota State University</i> |

6.3 Furniture and Sandwich Panels

Session Chair: **Dilpreet Bajwa**, *North Dakota State University*

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| 6.3.1 | Modeling and Designing of a Wood-Strand Sandwich Panel with a Bidirectional Corrugated Core | Mostafa Mohammadabadi , <i>Washington State University</i> |
| 6.3.2 | Three-point Flexural Failure Mechanism of Wooden Sandwich Construction with a Paper Honey-comb Core | Jinxin Hao , <i>Central South University of Forestry & Technology & West Virginia University</i> |
| 6.3.3 | Fabrication and Characterization of Emulsified and Freeze-dried Epoxy/CNF Nanocomposite Foam for Structural Insulated Panels | Jinghao Li , <i>USDA Forest Products Laboratory</i> |
| 6.3.4 | A Novel Method to Dynamically Identify and Measure Checking in Hardwood Plywood | Scott Leavengood , <i>Oregon State University</i> |
| 6.3.5 | Time-Dependent Behavior of Wood-Strand Sandwich Panels with 3-D Core | Mostafa Mohammadabadi , <i>Washington State University</i> |

12:00 pm - 2:00 pm Awards Lunch

2:00 pm - 3:30 pm

7.1 Nanocomposites

Session Chair: **Kristiina Oksman**, *Luleå University of Technology*

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| 7.1.1 | Aligned Poly(lactic acid) Based Nanocomposite Reinforced Using a Tiny Amount of Functionalized Cellulose Nanofibers | Shiyu Geng , <i>Luleå University of Technology</i> |
| 7.1.2 | Nanocellulose as a Filler in Films, Foams and Electrospun Fibers | Mikael Hedenqvist , <i>Royal Institute of</i> |
| 7.1.3 | Direct Ink Writing Cellulose Nanocrystal Composites | Gilberto Siqueira , <i>EMPA</i> |
| 7.1.4 | 3D Printed Hydrogel Scaffolds from Nanocellulose and Its Hybrids | Aji Mathew , <i>Stockholm University</i> |

7.2 Tools for Sustainability

Session Chair: **Hongmei Gu**, *USDA Forest Products Laboratory*

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| 7.2.1 | Balancing the Production Flow in Prefabrication of Wooden Houses | Tobias Schauerte , <i>Linnaeus University</i> |
| 7.2.2 | How Customized KPI Pools Could Help with Assessment of True Sustainability Performance? | Cagatay Tasdemir , <i>Purdue University</i> |
| 7.2.3 | A Model for Enterprise Development for Integrated Wood Manufacturing | Eni Lowell , <i>USDA Forest Service PNW</i> |
| 7.2.4 | High Performance Leadership in Forest Products Manufacturing | Dick Baldwin , <i>Oak Creek Investments LLC</i> |

7.3 Adhesives

Session Chair: **Mark Clark**, *Hexion*

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|-------|---|--|
| 7.3.1 | Adhesive Bonding of Wood and Steel | Milan Šernek , <i>University of Ljubljana</i> |
| 7.3.2 | Production of Plywood Panels Using Washed Cottonseed Meal as Bonding Reagents | Zhongqi He , <i>USDA-ARS</i> |
| 7.3.3 | Optimization of Novel Soybased Resin Curing Time for Commercial Acceptance | Dilpreet Bajwa , <i>North Dakota State University</i> |
| 7.3.4 | Sustainable Plywood Adhesive Created from Cotton Production Waste | Julianna Stratton , <i>Mississippi State University</i> |
| 7.3.5 | Influence of Molecular Weights of Urea-Formaldehyde Resins to Their Performance | Byung-Dae Park , <i>Kyungpook National University</i> |

3:30 pm - 4:00 pm Coffee Break

4:00 pm - 5:30 pm

8.1 Nanocomposites

Session Chair: **Nicole Stark**, *USDA Forest Products Laboratory*

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|-------|---|---|
| 8.1.1 | Evaluation of Super-Hydrophobicity for Nanocomposite-Coated Packaging Materials: Resisting Water Penetration Under Hydrostatic Pressure | Xue Zhang , <i>Monash University</i> |
| 8.1.2 | Synthesis and Characterization of Cellulose Nanofibril-Reinforced Polyurethane Foam | Weiqli Leng , <i>USDA Forest Products Laboratory</i> |
| 8.1.3 | Physical, Mechanical and Thermal Properties of Polymeric Nanocomposites Reinforced with Nanocellulose | George Cheng , <i>Auburn University</i> |
| 8.1.4 | Moisture/Oxygen Barrier Properties of Nanocellulose-Montmorillonite hybrid Films Enhanced with Cross-linking Additives | Ali H. Tayeb , <i>University of Maine</i> |

8.2 Wood Durability

Session Chair: **Beth Stokes**, *Mississippi State University*

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| 8.2.1 | Performance of Soy-based Adhesive OSB in Termite Choice Tests with Southern Yellow Pine | Juliet Tang , <i>USDA Forest Products Laboratory</i> |
| 8.2.2 | Combination of Fire-retardant and Antifungal Treatment of Wood with Nano-chitosan Particles as Wood Preservative | Laya KhademiBami , <i>Mississippi State University</i> |
| 8.2.3 | Application of Gamma Radiation for Controlling Wood Destroying Agents | Aparna Kalawate , <i>WRC, Zoological Survey of</i> |
| 8.2.4 | Chemical Modification with Epoxides to Improve the Moisture and Decay Resistance of Solid Wood and Fiber | Rebecca Ibach , <i>USDA Forest Products Laboratory</i> |

8.3 Poster Presentations (students)

Session Chair: **Byrne Miyamoto**, *Oregon State University*

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| 8.3.1 | Sustainable Development – International Framework – Overview and Analysis in the Context of Forests and Forest Products – From Forests to Competitive Sustainable Innovations in the Markets | Annika Hyytiä , <i>University of Helsinki</i> |
| 8.3.2 | Cell Wall Mechanical Properties of Genetically Modified Biomass by Atomic Force Microscopy | Yasar Selim Bostanci , <i>Michigan Technological University</i> |
| 8.3.3 | Life Cycle Analysis of Modular Partitions | Valéria Pazetto , <i>Instituto Federal de Brasília</i> |
| 8.3.4 | Characteristics of Short Rotation Woody Biomass Relative to Debarking | Azadwinder Chahal , <i>Pennsylvania State</i> |
| 8.3.5 | Cyclic and Static Load Capacities of Chair Frames Constructed of Rectangular Mortise and Tenon Joints Designed by Using Lower Tolerance Limits Method | Mesut Uysal , <i>Purdue University</i> |
| 8.3.6 | Phase-Contrast X-Ray µct Study of Moisture- and Mechanically-Induced Twist of Wood Sliver | Xavier Arzola-Villegas , <i>University of Wisconsin-Madison</i> |
| 8.3.7 | Composting of Cross Laminated Timber (CLT) Sawdust | Gulbahar Bahsi-Kaya , <i>Mississippi State</i> |
| 8.3.8 | Oriented Strand Board from Softwood: A Biorefinery Approach | Marina Hornus , <i>Auburn University</i> |
| 8.3.9 | Using Southern Yellow Pine Biochar to Remediate Poultry Litter | Maryam Mohammadi-Aragh , <i>Mississippi State</i> |
| 8.3.10 | Ecodesign and Economy: A Study About the Value Aggregation for Reuse of Wood Wastes | Keila Sanches , <i>Instituto Federal de Brasília</i> |
| 8.3.11 | Multiple Knots in Close Proximity on Southern Pine Lumber Properties | Marcela Cordeiro Barbosa , <i>Mississippi State</i> |
| 8.3.12 | Natural Wood Adhesives Prepared from Irvingia Gabonensis and Irvingia Wombolu Kernel Extracts to Reduce Formaldehyde Emissions | Abiodun Alawode , <i>Stellenbosch Univeristy</i> |
| 8.3.13 | Skateboards as a Sustainable Recyclable Material | Dylan Willard , <i>Virginia Tech</i> |
| 8.3.14 | Numerical Simulation of Acoustic Guided Waves in Trees | Fenglu Liu , <i>Beijing Forestry University</i> |



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5:30 pm - 6:30 pm - **President's Reception** (invitation only)

6:30 pm - 9:00 pm - **Paul Bunyan Reception**

Thursday, June 14th

8:30 am - 10:00 am

9 - Housing Plenary

Session Chair: **Dave DeVallance**, *West Virginia University*

- 9.1 Full Circle Urban Forest Management
- 9.2 Housing Reconsidered: The New Drivers of Wood Demand in North America and Asia

Dwayne Spurber, *Wudeward*
David Fell, *FPIInnovations*

10:00 am - 10:30 am **Coffee Break**

10:30 am - 12:00 pm

10.1 Mass Timber

Session Chair: **Lori Koch**, *American Wood Council*

- 10.1.1 Seismic Research on Cross Laminated Timber Buildings in North American: An Overview **Shiling Pei**, *Colorado School of Mines*
- 10.1.2 Life Cycle Cost Analysis of Mid-Rise Cross-Laminated Timber Building **Hongmei Gu**, *USDA Forest Products Laboratory*
- 10.1.3 What Do They Think? Public Perceptions of Tall Wood Buildings in the US Pacific Northwest **Pipiet Larasatie**, *Oregon State University*
- 10.1.4 Tensile Strength of Glulam Connection With Glued-in Rod **Bambang Suryoatmono**, *Parahyangan Catholic*

10.2 Measuring Properties (Non-Destructive)

Session Chair: **Xiping Wang**, *USDA Forest Products Laboratory*

- 10.2.1 Condition Assessment of Timber Bridge Components from U.S. Route 66 **Xiaoquan Yue**, *Fujian Agriculture and Forestry University*
- 10.2.2 Assessing Southern Pine 2X8 and 2X10 Lumber Quality Using Longitudinal and Transverse Vibration **Frederico Jose Nistal Franca**, *Mississippi State University*
- 10.2.3 Defect Classification of Bridge Timber Using Image Processing Algorithms Based on GPR Radargrams **Xi Wu**, *Jiangnan University*
- 10.2.4 Automatic multiple surface feature extraction from sawn board of fibre-managed plantation grown Eucalyptus in Tasmania, Australia **Kent Davis**, *University of Tasmania*
- 10.2.5 Automated Hardwood Lumber Grading: A Proof of Concept Study Grading KD, Rough Lumber **Logan Wells**, *Purdue University*

10.3 Fundamentals (Modeling/Predictive Analysis)

Session Chair: **Nayomi Plaza**, *USDA Forest Products Laboratory*

- 10.3.1 "PEK-a-boo, I See You": A Critical Reevaluation of the Parallel Exponential Kinetics (PEK) Model **Samuel Zelinka**, *USDA Forest Products Laboratory*
- 10.3.2 Numerical Simulation of Acoustic Guided Waves in Trees **Fenglu Liu**, *Beijing Forestry University*
- 10.3.3 Numerical Method: Moisture Absorption Prediction in Wood Pellets During Storage **Jamileh Shojaeiarani**, *North Dakota State University*
- 10.3.4 An Innovative Technology for In-Situ Wood Identification Based on Computer Vision and Machine Learning **Tuo He**, *Chinese Academy of Forestry*

12:00 pm - 12:30 pm - **Lunch on Your Own**

12:30 pm - 1:30 pm - **FPS BOD Wrap-Up**

12:30 pm - 5:30 pm - **Talesin Tour**

Posters (P)

* Also participating in a poster presentation session

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| P1 | High Bio-Content Polyurethane (PU) Foam Made From Bio-Polyol and Cellulose Nanocrystals (CNCS) via Microwave Liquefaction | Xingyan Huang , Louisiana State University |
| P2 | Lignin Containing Cellulose Nanofibrils (L-CNF) as an Additive in Drilling Fluids | Maria Soledad Peresin , Auburn University |
| P3 | Adsorption of Carbon Dioxide on Cellulose Nanofiber-Based Monolithic Cryogels Impregnated with Acetylated Cellulose Nanocrystals | Jiayun Wei , Luleå University of Technology |
| P4 | Automated Hardwood Lumber Grading with Purdue HardwoodGrader & Microtec Goldeneye300 Scanner: Lumber Defect Detection Capabilities and Performance Overview | Logan Wells , Purdue University |
| P5 | Evaluation of Adsorption Capability on Methylene Blue by Bamboo Charcoals Prepared from Sembilang and Moso Bamboo Species | Min Lee , National Institute of Forest Science |
| P6 | A Rational Approach to Estimate Reasonable Design Value of Dowel Joints for Frame Type Furniture Constructions | Mesut Uysal , Purdue University |
| P7 | Vacuum Drying Hardwoods in the U.S.: Large Scale Commercial Acceptance? | Brian Bond , Virginia Tech |
| P8 | A Pilot Study on the Effects of Casein from Milk on the Flame Properties of Some Tropical Woods | Nkechi Okoye , NnamdiAzikiwe University |
| P9 | Improvement of Storage Stability of Natural Adhesive for Wood Based Panels | Min Lee , National Institute of Forest Science |
| P10* | Water Based Esterification of Cellulose Nanofibril for Wet Compounding with PLA | Ruth Lafia-Araga , Federal University of Technology |
| P11 | Diversity of Bacteria Associated with Hindgut of Termite Reticulitermes virginicus | Beth Stokes , Mississippi State University |
| P12 | Physical and Chemical Effects of Cellulose Nanocrystals as Reinforcement of Electrospun Silk Fibroin | Maria Soledad Peresin , Auburn University |
| P13 | Timber Supply and Demand Issues and Management in Pakistan | Muhammad Zada , Northeast Forestry University |
| P14 | Characterization of Pyrolysis and Hydrothermal Liquefaction Bio-Oils From Loblolly Pine Biomass | Osei Asafu-Adjaye , Auburn University |
| P15 | Effects of Termite Collection Method, Geographic Location, Season Collected, Year, Laboratory Storage Time, and Average Termite Size on Termite Performance and the Variability of Control Samples Used in the | Rich Vlosky , Louisiana Forest Products Development Center |
| P16 | Adsorption of Pharmaceuticals Using Biomass Derived Activated Carbons | Oluwatosin Oginni , West Virginia University |
| P17 | Global Warming Mitigating Potential of Wood Products: A Temporal Radiative Forcing Analysis | Olivia Jacobs , University of Washington |
| P18 | Cross Laminated Timber Wall and Floor Assemblies for 2 Hours Fire Resistance | Sejong Kim , NIFoS |
| P19 | Eco-Efficient Production Route of Natural Nanofibers | Linn Berglund , Luleå University of Technology |
| P20 | Analysis of Hygrothermal Performance of Cross Laminated Timber (CLT) Frame Wall Depend on Layout | Sumin Kim , Soongsil University |
| P21 | Thermally Modified Short Rotation Willow for Use in Wood Plastics Composites | Dave DeVallance , West Virginia University |
| P22 | Defect Classification of Bridge Timber Using Image Processing Algorithms Based on GPR Radargrams | Xi Wu , Jiangnan University |
| P23* | Analyses of a Hydrophobin Protein, Hyd2, as a Wood Protection Agent | Lakshmi Narayanan , Mississippi State |
| P24* | Lateral Force Resistances of CLT Wall Panels Made of Small Square Timber Core and Plywood Crossband | Sang Sik Jang , Chungnam National University |
| P25* | Outdoor Above-ground Wood Moisture Modeling in Relation to Microclimate | Patricia Lebow , USDA Forest Service |
| P26* | Seasonal Changes in Critical Thermal Minimum and Supercooling Point in Eastern Subterranean Termites (Reticulitermes flavipes (Kollar)) in Wisconsin | Rachel Arango , USDA Forest Products Laboratory |
| P27* | Investigation of Volatile Pyrolysis Products from SixTropical woods of Southeast Nigeria | Nkechi Okoye , NnamdiAzikiwe University |
| P28* | Flexural Properties of Visually Graded Southern Pine Structural Lumber | Tâmara Suely Filgueira Amorim Franca , Mississippi State University |
| P29* | Studies of Carbon Dioxide Activated Eastern White Pine Carbon Used in Double-layer Supercapacitors | Nan Nan , West Virginia University |
| P30* | Sound Absorption Rate of CLT Wall Panels Composed of Larch Square Timber Core and Plywood Cross Band | Chun Won Kang , Chonbuk National University |

(subject to change)

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| P31* | The Properties of Particle Board Prepared with Light Colored Phenolic Resin Adhesive | Min Lee , <i>National Institute of Forest Science</i> |
| P32* | Numerical Simulation of Acoustic Guided Waves in Trees | Fenglu Liu , <i>Beijing Forestry University</i> |
| P33* | High-Lignin-Content Rigid Polyurethane Foam from Unmodified Kraft Lignin Prepolymerized with Isocyanates | Xuefeng Zhang , <i>Mississippi State University</i> |
| P34* | Sustainable Development – International Framework – Overview and Analysis in the Context of Forests and Forest Products – From Forests to Competitive Sustainable Innovations in the Markets | Annika Hyytiä , <i>University of Helsinki</i> |
| P35* | Cell Wall Mechanical Properties of Genetically Modified Biomass by Atomic Force Microscopy | Yasar Selim Bostanci , <i>Michigan Technological University</i> |
| P36* | Life Cycle Analysis of Modular Partitions | Valéria Pazetto , <i>Instituto Federal de Brasília</i> |
| P37* | Characteristics of Short Rotation Woody Biomass Relative to Debarking | Azadwinder Chahal , <i>Pennsylvania State University</i> |
| P38* | Cyclic and Static Load Capacities of Chair Frames Constructed of Rectangular Mortise and Tenon Joints Designed by Using Lower Tolerance Limits Method | Mesut Uysal , <i>Purdue University</i> |
| P39* | Phase-Contrast X-Ray µct Study of Moisture- and Mechanically-Induced Twist of Wood Sliver | Xavier Arzola-Villegas , <i>University of Wisconsin-Madison</i> |
| P40* | Composting of Cross Laminated Timber (CLT) Sawdust | Gulbahar Bahsi-Kaya , <i>Mississippi State University</i> |
| P41* | Oriented Strand Board from Softwood: A Biorefinery Approach | Marina Hornus , <i>Auburn University</i> |
| P42* | Using Southern Yellow Pine Biochar to Remediate Poultry Litter | Maryam Mohammadi-Aragh , <i>Mississippi State University</i> |
| P43* | Ecodesign and Economy: A Study About the Value Aggregation for Reuse of Wood Wastes | Keila Sanches , <i>Instituto Federal de Brasília</i> |
| P44* | Multiple Knots in Close Proximity on Southern Pine Lumber Properties | Marcela Cordeiro Barbosa , <i>Mississippi State University</i> |
| P45* | Natural Wood Adhesives Prepared from Irvingia Gabonensis and Irvingia Wombolu Kernel Extracts to Reduce Formaldehyde Emissions | Abiodun Alawode , <i>Stellenbosch University</i> |
| P46 | Sustainability Performance Improvements through Deployment of an Innovative Sustainability Benchmarking Tool | Cagatay Tasdemir , <i>Purdue University</i> |
| P47 | Hydrolysis of Urea Formaldehyde Resin Residues Using Acid Solutions | Hui Wan , <i>Mississippi State University</i> |
| P48 | Biomass Derived Activated Carbon for Energy Storage Applications | Changle Jiang , <i>West Virginia University</i> |
| P49* | Skateboards as a Sustainable Recycleable Material | Dylan Willard , <i>Virginia Tech</i> |

*** Also participating in a poster presentation session**