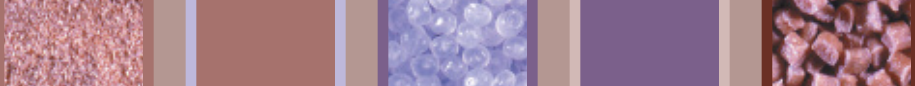


*10th International Conference on*

# **Wood & Biofiber Plastic Composites**

*& Cellulose Nanocomposites Symposium*



Hosted by USDA Forest Service, Forest Products  
Laboratory and Forest Products Society



*May 11-13, 2009*

Monona Terrace Community & Convention Center  
Madison, Wisconsin, USA



## Invitation

Members of the Conference Planning Committee would like to invite you to attend the 10th International Conference on Wood & Biofiber Plastic Composites & Cellulose Nanocomposites Symposium. The conference and symposium are hosted by the USDA Forest Service, Forest Products Laboratory and Forest Products Society. In cooperation with Luleå University of Technology; Michigan State University; University of Tennessee in conjunction with Oak Ridge National Laboratory; Washington State University; University of Toronto, Faculty of Forestry and Centre for Biocomposites & Biomaterials Processing; ACS Division of Cellulose & Renewable Materials; and IUFRO D5.05 Composite Division.

Since the first conference in 1991, the International Conference on Wood & Biofiber Plastic Composites has brought together international experts from the scientific, technical, and commercial communities to encourage the exchange and dissemination of information on the latest advances and future opportunities for these materials. Alternating years with its Canadian counterpart, this biennial spring conference has evolved into the largest of its kind. We will continue this tradition at the 10th International Conference on May 11-12, 2009, where a two-track format of formal presentations will explore the nature, structure, performance, markets and issues concerning wood/natural fiber-plastic composites. An evening reception on May 11 will feature poster presentations and industrial exhibits by researchers and suppliers of materials, equipment, products, and technical services.

In addition to the conference, a Cellulose Nanocomposites Symposium will be held on May 13, 2009. A select group of speakers will inform attendees on the latest research on these nanocomposites made from polymers and cellulose nanocrystals or nanofibrils. A mid-day poster session will provide an opportunity for networking about this new class of nano-materials.



## Who Should Attend

The conference will be of direct benefit to those involved in the growing wood and biofiber plastic composites industry including:

- Researchers and educators
- Suppliers of wood and biofiber plastic composites
- Suppliers of equipment and services
- Producers and potential producers
- Consultants and engineers



## Tote Bag Sponsor

**CreaFill Fibers** manufactures pulp cellulose fibers and powders for a wide range of plastics applications. Our products meet the needs of formulators looking for economical non-abrasive fibers that reduce density and polymer loading. CreaTech powders and fibers have a 99.6% alpha cellulose content that gives purity and color consistency with high temperature tolerance, excellent brightness, low density and great volumetric efficiency. CreaTech adds flexural and impact strength to almost any plastic application. CreaMix post-consumer fibers are an ultra GREEN, cost effective alternative for plastics applications that require reliable fiber reinforcement at lower cost and superior performance. In addition to our standard fiber products, we also offer a complete line of pre-pelletized fibers in a ultra-low moisture, densified form bound with a proprietary coupling and dispersant package. For more information, please visit CreaFill Fibers online at [www.creafill.com](http://www.creafill.com).



## Student Contest Sponsor

Wood flour supplier **Ontario Sawdust Supplies Ltd.**, is sponsoring the "Jerry Saeman Award of Student Achievement in WPC Research" for outstanding student presentations.



## Hosts



**USDA Forest Service, Forest Products Laboratory,**  
[www.fpl.fs.fed.us](http://www.fpl.fs.fed.us)



**Forest Products Society,**  
[www.forestprod.org](http://www.forestprod.org)



## In Cooperation with



**Luleå University of Technology,**  
[www.ltu.se](http://www.ltu.se)



**Michigan State University,**  
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**University of Tennessee in conjunction with Oak Ridge National Laboratory,**  
[www.utk.edu](http://www.utk.edu) and [www.ornl.gov](http://www.ornl.gov)



**Washington State University,**  
[www.wsu.edu](http://www.wsu.edu)



**University of Toronto, Faculty of Forestry and Centre for Biocomposites & Biomaterials Processing,** [www.forestry.utoronto.ca](http://www.forestry.utoronto.ca)



**ACS Division of Cellulose & Renewable Materials,** <http://membership.acs.org/C/Cell/default.htm>



**IUFRO D5.05 Composite Division,**  
[www.iufro.org/science/divisions/division-5/50000/50500/](http://www.iufro.org/science/divisions/division-5/50000/50500/)

## Conference Planning Committee

### CONFERENCE CHAIRS

**Craig M. Clemons**, Materials Research Engineer, USDA Forest Products Laboratory; **Nicole M. Stark**, Chemical Engineer, USDA Forest Products Laboratory

### PLANNING COMMITTEE MEMBERS

**Karl Englund**, Assistant Research Professor and Extension Specialist, Washington State University; **David P. Harper**, Assistant Professor, University of Tennessee; **John C. Hermanson**, Research Engineer, USDA Forest Products Laboratory; **Rebecca E. Ibach**, Research Chemist, USDA Forest Products Laboratory; **Laurent M. Matuana**, Associate Professor, Michigan State University; **Kristiina Oksman Niska**, Professor, Luleå University of Technology; **Jerrold E. Winandy**, Interim Executive Vice President, Forest Products Society





# Wood & Biofiber Plastic Composites Conference May 11-12, 2009

## — MONDAY MORNING, MAY 11 —

7:30 am – 8:30 am

Complimentary Continental Breakfast

### OPENING PLENARY SESSION

8:30 am – 8:45 am

Welcome *Craig M. Clemons* and *Chris D. Risbrudt*, USDA Forest Products Laboratory

8:45 am – 9:30 am

**Early History of Bio-based and Petroleum-based Polymers** *Tim A. Osswald*, University of Wisconsin-Madison

9:30 am – 10:15 am

**Wood-Plastic Composite Technology Trends: Fundamental and Applied R&D** *Douglas J. Gardner* and *Yusoo Han*, University of Maine

10:15 am – 10:30 am

Coffee Break

10:30 am – 11:15 am

**Why Durability Testing is Needed and Methods to Accomplish It** *Allen F. Zielnik*, Atlas Material Testing Technology LLC

11:15 am – 12:00 noon

Poster Introductions

12:00 noon – 1:25 pm

Luncheon

## — MONDAY AFTERNOON, MAY 11 —

### CONCURRENT SESSIONS

#### SESSION IA: Foaming

1:25 pm – 1:30 pm

Introduction by Session Moderator

1:30 pm – 2:00 pm

**Foamed Styrene-based Wood-Plastic Composite using a Physical Blowing Agent Created during Reactive Extrusion** *Yusoo Han* and *Chris West*, University of Maine; *Steve Michalik*, Nova Chemicals Inc.; *Douglas J. Gardner*, University of Maine

2:00 pm – 2:30 pm

**Microcellular PLA/Cellulosic Fiber Composites Foamed with Supercritical CO<sub>2</sub> through a Continuous Extrusion Process** *Carlos A. Diaz* and *Laurent M. Matuana*, Michigan State University

2:30 pm – 3:00 pm

**Injection Molding and Mechanical Properties of Cellulose Fiber Reinforced Polypropylene Composite Foams** *T. Kuboki*, *J.W.S. Lee*, *Chul B. Park*, and *Mohini Sain*, University of Toronto

3:00 pm – 3:30 pm

Refreshment Break

3:30 pm – 4:00 pm

**Microcellular Injection Molded Poly(lactide-Flax) Fiber Composites** *Srikanth Pilla*, University of Wisconsin-Milwaukee; *Adam Kramschuster* and *Jungjoo Lee*, University of Wisconsin-Madison; *Shaoqin Gong*, University of Wisconsin-Milwaukee; *Lih-Sheng Turng*, University of Wisconsin-Madison

4:00 pm – 4:30 pm

**Measurements and Modeling of the Shear Viscosity of HDPE-Wood Composites/ Supercritical CO<sub>2</sub> Solution** *Jingjing Zhang*, South China University of Technology; *Jing*

*Wang* and *Chul B. Park*, University of Toronto; *Ghaus M. Rizvi*, University of Ontario Institute of Technology; *Hanxiong Huang*, South China University of Technology

4:30 pm – 5:00 pm

**Structures and Properties Characterization of Glass Fiber Reinforced Wood-Plastic Composites** *Hamid O. Semeralul* and *Ghaus M. Rizvi*, University of Ontario Institute of Technology

#### SESSION IB: Durability

1:25 pm – 1:30 pm

Introduction by Session Moderator

1:30 pm – 2:00 pm

**Durability of Wood-Plastic Composites** *Jeffrey J. Morrell*, Oregon State University

— MONDAY AFTERNOON, MAY 11 cont. —

2:00 pm – 2:30 pm

**Issues Impacting Long-Term Durability for WPCs** *Mark J. Manning, Fred Ascherl, and Mark Mankowski, Rio Tinto Minerals (U.S. Borax )*

2:30 pm – 3:00 pm

**Effect of Wood Species on the Weathering and Soil Performance of Wood-Plastic Composites** *Armando McDonald and James S. Fabiyi, University of Idaho; Jeffrey J. Morrell, Oregon State University*

3:00 pm – 3:30 pm  
Refreshment Break

3:30 pm – 4:00 pm

**Water Absorption and Durability of Wood-Plastic Composites** *Marek Gnatowski, Polymer Engineering Co. Ltd.*

4:00 pm – 4:30 pm

**Effects of Fire Retardant and Mechanical Properties of Nanoclay on Wood Flour/Polypropylene Composites** *Yongming Song, Qingwen Wang, Shujuan Sui, and Yiqun Fang, Northeast Forestry University*

4:30 pm – 5:00 pm

**Effect of Fire Retardants on Heat Release Rate of Wood Flour-Polyethylene Composites** *Nicole M. Stark, Scott A. Mueller, and Robert H. White, USDA Forest Products Laboratory; Tim A. Osswald, University of Wisconsin-Madison*

5:00 pm – 8:00 pm

**Reception with Exhibits and Poster Presentations**

A Monday evening reception will feature poster presentations and industrial exhibits by researchers and suppliers of materials, equipment, products, and technical services.

— TUESDAY MORNING, MAY 12 —

7:30 am – 8:25 am  
Complimentary Continental Breakfast

**CONCURRENT SESSIONS**  
**SESSION IIA: Performance**

8:25 am – 8:30 am

**Introduction by Session Moderator**

8:30 am – 9:00 am

**Morphological and Micro-Mechanical Characterization of Individual Wood Flour Particles used in WPCs** *Farzana Hussain and Lech Muszyński, Oregon State University*

9:00 am – 9:30 am

**Nanoindentation Creep in Wood-Plastic Composites** *Joseph E. Jakes, University of Wisconsin-Madison; John C. Hermanson, USDA Forest Products Laboratory; Donald S. Stone, University of Wisconsin-Madison*

9:30 am – 10:00 am

**Fracture Behavior of Different Biocomposites under Cycling Loading** *A.K. Bledzki and Adam Jaszkiwicz, University of Kassel*

10:00 am – 10:30 am  
Coffee Break

10:30 am – 11:00 am

**Influence of Loading Rate and Fiber Content on Plane-Strain Fracture Toughness of Polylactide (PLA) and Random Short Hemp Fiber Reinforced PLA Bio-composites** *Moyeenuddin A. Sawpan and Kim L. Pickering, University of Waikato; Alan Fernyhough, Biopolymer Network/SCION*

11:00 am – 11:30 am

**Macroscopic Creep Behavior of Wood-Plastic Composites in Tension, Compression, and Flexure** *Scott E. Hamel, University of Wisconsin-Madison; John C. Hermanson, USDA Forest Products Laboratory; Steven M. Cramer, University of Wisconsin-Madison*

11:30 am – 12:00 noon

**Characterizing Water Sorption and Diffusion Properties of Wood-Plastic Composites as a Function of Formulation Design** *Alireza Kaboorani and Alain Cloutier, Université Laval; Michael P. Wolcott, Washington State University*

**SESSION IIB: Products & Materials**

8:25 am – 8:30 am

**Introduction by Session Moderator**

8:30 am – 9:00 am

**Acceptance of WPCs by Building Professionals and Their Customers** *Robert J. Tichy, Washington State University; Paul M. Smith, Pennsylvania State University*

9:00 am – 9:30 am

**Novel Highly Weatherable WPC Deckboards Created by a Tri-Extrusion Process** *Gregory G. Anderson, BASF Corporation*

9:30 am – 10:00 am

**New Opportunities for Marketing Wood Polymer Composites** *William S. (Bill) Hunnicutt, Jr., JER Envirotech Ltd.*

10:00 am – 10:30 am  
Coffee Break

10:30 am – 11:00 am

**Natural Fiber Composites in Transportation Applications – Fiber Preparation, Surface Modification, and Preform Manufacturing Synergy** *James Holbery, Kevin Simmons, Cheng Huang, and Dan Howe, Pacific Northwest National Laboratory*

11:00 am – 11:30 am

**Thermoplastic Epoxy Resin (TPER) Based Wood-Plastic Composites** *Craig A. Chmielewski and J. Kaffenberger, L&L Products, Inc.*

11:30 am – 12:00 noon

**The Use of Peroxides in Wood-Plastic Composites** *Peter Dlużneski and David Weaver, GEO Specialty Chemicals*

12:00 noon – 1:25 pm  
Luncheon



## —TUESDAY AFTERNOON, MAY 12—

### CONCURRENT SESSIONS

#### SESSION IIIA: Materials

1:25 pm – 1:30 pm

**Introduction by Session Moderator**

1:30 pm – 2:00 pm

**Adhesion Phenomena in Wood-Plastic Composites** *Douglas J. Gardner, Gloria S. Oporto, and David J. Neivandt*, University of Maine

2:00 pm – 2:30 pm

**Effects of Coupling Agent and Wood Species on Selected Properties of High-Density Polyethylene/Woodfiber Composites** *S.Y. (Tony) Zhang and Yaolin Zhang*, FPInnovations – Forintek Division

2:30 pm – 3:00 pm

**Silane-Crosslinking Efficiency in Wood-Polyethylene Composites: Study of Different Polyethylenes** *Göran Grubbström and Kristiina Oksman Niska*, Luleå University of Technology

3:00 pm – 3:30 pm  
Refreshment Break

3:30 pm – 4:00 pm

**Studies of Conducting Nanocrystalline Cellulose Composites** *Syed-Abthagir Pitchaimydeen and Ning Yan*, University of Toronto

4:00 pm – 4:30 pm

**Nanofibrillated Cellulose Reinforced Fibers** *Tanja Zimmermann, G. Fortunato, J. Lübben, and N. Bordeanu*, Empa – Swiss Federal Laboratories for Materials Testing & Research

4:30 pm – 5:00 pm

**Chemical Modification of Cellulose Whiskers with Acetic Anhydride** *Nihat S. Cetin, and Nilgül Ozmen*, Kahramanmaraş Sütçü İmam Üniversitesi; *Philippe Tingaut and David P. Harper*, University of Tennessee

#### SESSION IIIB: Processing

1:25 pm – 1:30 pm

**Introduction by Session Moderator**

1:30 pm – 2:00 pm

**Influence of Processing Parameters on the Mechanical Performance of Injection Molded Wood-Plastic Composites** *Christoph Burgstaller and Wolfgang Stadlbauer*, Transfercenter für Kunststofftechnik GmbH

2:00 pm – 2:30 pm

**Comparison of Two Wood-Plastic Composite Extrusion Processes using Statistical Reliability Analysis** *Kevin A. Crookston, Frank M. Guess, Timothy M. Young, and David P. Harper*, University of Tennessee

2:30 pm – 3:00 pm

**A Comparison of Hemp Reinforced Polyester Composites Fabricated using Hand Lay-up and Compression Molding** *John Wolodko and Aaron Fuhr*, Alberta Research Council

3:00 pm – 3:30 pm  
Refreshment Break

3:30 pm – 4:00 pm

**Recyclability Index: A Measure to Determine How Recyclable Natural Fiber Plastic Composites Are** *Mehdi Tajvidi and Akio Takemura*, University of Tokyo

4:00 pm – 4:30 pm

**Natural Fiber Composites Processed by Twin-Screw Extrusion and Compression Molding: Relationship Between Fiber Structure and Composite Mechanical Properties** *Kristiina Oksman Niska and Aji P. Mathew*, Luleå University of Technology

4:30 pm – 5:00 pm

**Properties of Extruded Wood-Plastic Composites Based on Refiner Wood Fibers (Thermomechanical Pulp / TMP Fibers) and Hemp Fibers** *Anke Schirp and Jan Stender*, Fraunhofer-Institute for Wood Research (Wilhelm-Klauditz-Institute, WKI)

## Proceedings of Presentations at the Conference and Symposium

A complete proceedings of all presentations given will be prepared following the conference and symposium. Attendees will be notified when the proceedings are available and can purchase a copy at cost. Proceedings from the 1st, 3rd, 4th, 5th, 6th, 7th, 8th, 9th International Conferences on Woodfiber-Plastic Composites are still available. To receive an order form and information on these proceedings, please check the box on the enclosed registration form.

## Conference Hotline

Forest Products Society  
2801 Marshall Court  
Madison, WI 53705-2295 USA  
Phone: 608-231-1361, ext. 208  
Fax: 608-231-2152  
E-mail: [conferences@forestprod.org](mailto:conferences@forestprod.org)  
<http://www.forestprod.org>



## Exhibits (as of January 1, 2009)

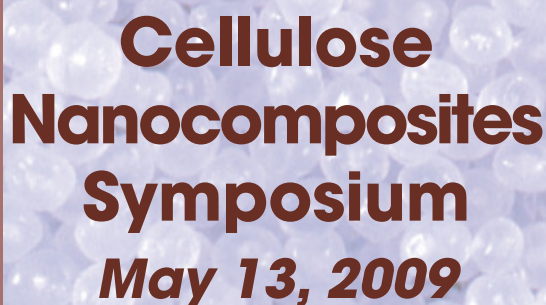
- American Wood Fibers, [www.awf.com](http://www.awf.com)
- Colortronic North America, Inc., [www.colortronicna.com](http://www.colortronicna.com)
- CreaFill Fibers (Tote Bag Sponsor), [www.creafill.com](http://www.creafill.com)
- C.W. Brabender® Instruments, Inc., [www.cwbrabender.com](http://www.cwbrabender.com)
- Schenck AccuRate, [www.accuratefeeders.com](http://www.accuratefeeders.com)
- Strandex Corporation and Wire Works Engineering, Ltd., [www.strandex.com](http://www.strandex.com)
- Struktol Company of America, [www.struktol.com](http://www.struktol.com)

# POSTER PRESENTATIONS:

## Wood & Biofiber Plastic Composites Conference - May 11-12, 2009

- **Improving the Fire Performance and Durability of Value-Added Wood Products through Nano-Treatments** *Anisa Akhtar*, FPInnovations – Forintek Division
- **Development of a New Composite Material – PLASTIGUADUA** *Hector F. Archila*, Architect
- **Modeling Wood Composites Compression Ratio and Internal Bond Strength** *Evandro Bittencourt*, UDESC – Santa Catarina State University
- **The Influence of Wood Moisture Content on the Mechanical Properties of Wood-Plastic Composites** *Christoph Burgstaller*, *Angelika Prenninger*, and *Wolfgang Stadlbauer*, Transfercenter für Kunststofftechnik GmbH
- **The Influence of Fiber Treatment on Morphology and Interfacial Shear Strengths for Sisal Fibers in Polypropylene** *Christoph Burgstaller*, *Judith Kreindl*, and *Wolfgang Stadlbauer*, Transfercenter für Kunststofftechnik GmbH
- **Property Changes of Wood Polypropylene Composites due to Extended Moisture Cycling** *Qingzheng Cheng*, West Virginia University; *Lech Muszyński*, Oregon State University; *Stephen M. Shaler*, University of Maine; *Jingxin Wang*, West Virginia University
- **Cost Analysis of a Wood-Plastic Composite Decking Operation in Canada** *Pablo Crespell*, FPInnovations – Forintek Division
- **Strength Properties and Dimensional Stability of Wood-Plastic Composites Produced from *Gmelina arborea* (roxb)** *J.A. Fuwape*, Federal University of Technology; *K.S. Aina*, Forestry Research Institute of Nigeria
- **High-Density Polyethylene Reinforced with Fibers from *Eucalyptus nitens* Bark** *William Gacitua* and *Aldo Ballerini*, Universidad del Bio-Bio; *Jean Pierre Lasserre*, CMPC Forestal; *Christian Bello* and *Andres Cid*, Universidad del Bio-Bio
- **Influence of Lignin on Thermo-Mechanical Behavior of Modified Novolac Resins** *J. Martínez*, *C. Gómez*, *D. Restrepo*, and *Piedad Gañán Rojo*, Pontificia Bolivariana University
- **Improvement of Interfacial Bonding Between Wood and PP using Various Maleic Acid Anhydride Pre-Treatments** *Timo Grueneberg*, *Holger Miltz*, *Carsten Mai*, and *Andreas Krause*, Georg-August University Goettingen
- **Mechanical Properties of PP Hybrid Nanocomposites Reinforced with Bleached Aspen CTMP Fiber** *Ruijun Gu* and *B.V. Kokta*, University of Québec at Trois-Rivières
- **Use of Wood Chips in Extrusion of Wood-Plastic Composites** *Maiju Hietala*, Luleå University of Technology and University of Oulu; *Kristiina Oksman Niska*, Luleå University of Technology; *Jouko Niinimäki*, University of Oulu
- **Tensile Fatigue Properties of Wood-PVC Composites** *Farzana Hussain* and *Lech Muszyński*, Oregon State University
- **Microcellular Injection Molding and Characterization of PHBV and PHBV/PBAT Blends** *Alireza Javadi*, University of Wisconsin-Milwaukee; *Adam J. Kramschuster*, University of Wisconsin-Madison; *Srikanth Pilla*, University of Wisconsin-Milwaukee; *Jungjoo Lee*, University of Wisconsin-Madison; *Shaoqin Gong*, University of Wisconsin-Milwaukee; *Lih-Sheng Turng*, University of Wisconsin-Madison
- **Extraction Pretreatment of Natural Reinforcement Fibers** *Carter Johnson*, Iowa State University
- **Comparison of N<sub>2</sub> and CO<sub>2</sub> as Physical Blowing Agents on Properties of Wood-Fiber Polypropylene Injection Molded Foam Structures** *Peter U. Jung*, *Yongrak Moon*, and *Chul. B. Park*, University of Toronto
- **Technology Development of Bamboo Fiber to Automotive Parts** *Seong Hun Kim*, *Hee Jae Choi*, *Jeon Tae Kang*, and *Hae Young Choi*, Hanyang University
- **Structure, Morphology, Mechanical and Thermal Properties of Composites Based on Microcrystalline Cellulose and Polyamide 6** *Alper Kiziltas*, *Douglas J. Gardner*, *Yousoo Han*, *Han-Seung Yang*, and *Chris West*, University of Maine
- **Effects of Microcrystalline Cellulose Particle Size on Mechanical, Thermal, and Rheological Properties of Polystyrene Composites** *Alper Kiziltas*, *Douglas J. Gardner*, *Yousoo Han*, *Han-Seung Yang* and *Chris West*, University of Maine
- **The Use of Long Natural Fibers in Thermoplastic Composites** *Billy Cheng*, *Qingpin Guo*, and *Mark T. Kortschot*, University of Toronto; *Robert M. Knudson*, *James Deng*, *Trek Sean*, and *Ayse Alemdar-Thomson*, FPInnovations – Forintek Division; *Mohini M. Sain*, University of Toronto
- **Influence of Nanoclay Particles on the Mechanical and Morphological Properties of Wood Polymer Nanocomposite** *Behzad Kord*, Islamic Azad University of Chalous Branch; *Ismaeil Ghasemi*, Iran Polymer & Petrochemical Institute
- **Physical Properties of WPC made from Various Wood Species and Fiber Size** *Marcus Mueller*, *Timo Grueneberg*, *Holger Miltz*, and *Andreas Krause*, Georg-August-University of Goettingen
- **Natural Fiber Reinforced Biodegradable Composites using Soy Protein (SP) and Polyvinyl Alcohol (PVA) Blend** *Seung Goo Lee*, *Tae Sang Lee*, *Ji Hyun Sim*, *Book Sung Kim*, and *Hae Jin Jang*, Chungnam National University
- **The Development of Bio-Fiber Polymer Composites: A Contribution to the Amazon Rain Forest Sustainability – The Amazon Fenix Project** *Antonio Donato Nobre*, Instituto de Pesquisas da Amazônia; *Alessandra Lucas Marinelli*, *José Donato Ambrosio*, *Marcos Roberto Monteiro*, *Lidiane Cristina Costa*, *Márcio Kobayashi*, and *Márcia Cristina Branciforti*, Universidade Federal de São Carlos
- **Macro and Micro Polymeric Composites with Cellulosic Materials** *A.M. Mousa*, Ain Shams University; *S.H. Samaha*, National Institute for Standards; *H.E. Nasr*, National Research Centre; *S. Rostom*, National Institute for Standards
- **Performance Study: Cellulosic Fiber Composites with PLA, Starch Acetate, and PP Matrix** *Kalle Nättinen* and *Johanna Lampinen*, VTT, Tampere, Finland
- **Usability of Laser Diffraction Particle Size Measurement on the Analysis of Microfibrillar Cellulose** *Katja Kilpimaa*, University of Oulu; *Aji P. Mathew* and *Kristiina Oksman Niska*, Luleå University of Technology; *Jouko Niinimäki*, University of Oulu
- **Processing of Thermoplastic Starch Based Cellulose Nanocomposites by Twin-Screw Extrusion** *Martin Nilsson*, *Aji P. Mathew*, and *Kristiina Oksman Niska*, Luleå University of Technology
- **The Comparison of Dry Bond Strength of Scotch Pine Wood Glue with Two Different Adhesives by Means of Scarf- and Lap Joint Testing Method** *Afolabi Olajumoke*, Georg-August University Goettingen
- **Wood-Plastic Composites Manufactured from Hot Water Extracted Wood** *Gloria S. Oporto*, *Douglas J. Gardner*, *Lucas Andrusyk*, and *David J. Neivandt*, University of Maine
- **Studies on HDPE/Neem Bark Flour Composites: Effect of Coupling Agent HDPE-g-MAH** *Kamini Sewda* and *S.N. Maiti*, Indian Institute of Technology-Delhi
- **Fire Retardant Properties of Wood Flour/Polypropylene Composites Containing Silicon Resin Modifier and Sodium Pentaborate Decahydrate** *Yongming Song*, *Qingwen Wang*, *Zhijun Zhang*, *Fengqiang Wang*, Northeast Forestry University
- **The Dynamic Rheological Behavior of Nanoclay Modified Wood Flour/ Polypropylene Composite Melts** *Yongming Song*, *Qingwen Wang*, *Weihong Wang*, *Haigang Wang*, Northeast Forestry University
- **Material Properties of Wood Ash-Filled Polypropylene Wood-Plastic Composites (WPCs)** *Jason S. Stevens* and *Douglas J. Gardner*, University of Maine
- **Thermal and Mechanical Characteristics of Natural Fiber-Reinforced Composites** *Hitoshi Takagi* and *Yusuke Gemai*, University of Tokushima
- **Processing and Properties of Sustainable Green Composites** *Ajay Kumar Taraiya* and *Shrikant Bhat*, GE India Technology Centre; *Jelena Bozovic*, SABIC Innovative Plastics
- **Properties of Wood-Plastic Composites made from Wood-Fiber and Maleic-Anhydride Grafted Polymer Blends** *Qingwen Wang*, *Hua Gao*, and *Shujuan Sui*, Northeast Forestry University
- **Straw-PP Composite by Traditional Hot Pressing Method** *Weihong Wang*, *Qingwen Wang*, and *Shujuan Sui*, Northeast Forestry University





# Cellulose Nanocomposites Symposium May 13, 2009



7:30 am – 8:25 am  
Complimentary Continental Breakfast

8:25 am – 8:30 am  
Introduction by Session Moderator

8:30 am – 9:00 am  
An Overview of Cellulose Nanotechnology –  
Research and Applications Mohini Sain,  
University of Toronto

9:00 am – 9:30 am  
Forest Sector Nanotechnology Research at  
FPInnovations Richard Berry, FPInnovations  
– Forintek Division

9:30 am – 10:00 am  
Cellulose Nanocrystal Characterization by  
AFM Robert J. Moon, USDA Forest Products  
Laboratory and Purdue University;  
R. Wagner, R.R. Lahiji, X. Xu, A. Raman,  
and R. Reifenger, Purdue University

10:00 am – 10:30 am  
Coffee Break

10:30 am – 11:00 am  
Cellulose Nanocrystal Suspensions Derek G.  
Gray, McGill University

11:00 am – 11:30 am  
Cellulose Nanocrystals in Nanocomposites  
Manufactured by the Electrospinning  
Technique Youssef Habibi, Maria S. Peresin,  
Justin Zoppe, and Orlando J. Rojas,  
North Carolina State University

11:30 am – 12:00 noon  
Processing of Polymer Nanocomposites using  
Functionalized Cellulose Whiskers Alain  
Dufresne, Grenoble Institute of Technology

12:00 noon – 1:25 pm  
Luncheon with Poster Presentations

1:25 pm – 1:30 pm  
Introduction by Session Moderator

1:30 pm – 2:00 pm  
Self-Assembled Bolaform Structures as  
Surfactants in Cellulose-Plastic Composites  
Jae-Woo Kim, David P. Harper, and Joseph  
Bozell, University of Tennessee

2:00 pm – 2:30 pm  
POSS Modified Cellulose for Improving  
Flammability Characteristics of Polystyrene  
Douglas M. Fox, American University; Jeffrey  
W. Gilman, and Sameer S. Rahatekar, National  
Institute of Standards & Technology

2:30 pm – 3:00 pm  
Cellulose Nanofibers and Related  
Nanocomposites Antonio N. Nakagaito,  
Kyoto University

3:00 pm – 3:30 pm  
Refreshment Break

3:30 pm – 4:00 pm  
Production of Optically Transparent  
Nanocomposites from Wood and their  
Application Hiroyuki Yano, Yoko Okahisa,  
Masaya Nogi, and Kentaro Abe, Kyoto  
University; Ayako Yoshida and Satoshi  
Miyaguchi, Pioneer Corporation

4:00 pm – 4:30 pm  
Mechanical Isolation of Cellulose  
Nanofibers and their Utilization in Novel  
Nanocomposites for Medical Application  
Aji P. Mathew and Kristiina Oksman Niska,  
Luleå University of Technology

4:30 pm – 5:00 pm  
Porous Cellulose Nanocomposite Foams  
Synthesized from Pickering – Emulsion  
Templates Jonny J. Blaker, Xinxin Li,  
Angelika Menner, and Alexander Bismarck,  
Imperial College London

## POSTER PRESENTATIONS

- Fracture Behavior of Cellulose Nanocrystals Based Polyvinyl Acetate Nanocomposites  
Niclas Björngrim, David Wixie, Roberts Joffe, Aji P. Mathew, and Kristiina Oksman Niska, Luleå University of Technology
- Biodegradable Nanocomposites from Central Appalachian Hardwood Cellulose Residues  
Qingzheng Cheng, Jingxin Wang, and Joseph McNeel, West Virginia University
- Cellulose Whiskers from Coir Fiber Morsyleide de Freitas Rosa, Embrapa Agroindústria Tropical; Eliton S. Medeiros, Embrapa Instrumentação Agropecuária and ARS-USDA; José A. Malmonge, UNESP – Universidade Estadual Paulista; Delilah F. Wood, ARS-USDA; Luiz Henrique C. Mattoso, Embrapa Instrumentação Agropecuária; William J. Orts and Syed H. Imam, ARS-USDA
- Preferential Nucleation of Isotactic Polypropylene at Cellulose Nanocrystal Surfaces  
Derek G. Gray, McGill University
- Preparation and Characterization of Cellulose Whiskers from Bagasse, Rice Straw, and Sugar Beet Pulps and their use in Alginate Nanocomposites Mohammad L. Hassan, National Research Center-Cairo; Kristiina Oksman Niska, Luleå University of Technology; Nahla A. El-Wakeel, Shimaa M. Fade, and Enas A. Hassan, National Research Center-Cairo
- New Materials from the Development of Microfibrillar Cellulose (MFC)  
Tom Lindström and Mikaerl Ankerfors, STFI-Packforsk
- Dispersion Study of MCC/Nano Fibrillated Cellulose Filled Polypropylene Composites using Thermogravimetric Analysis Douglas J. Gardner and Han-Seung Yang, University of Maine

## —CONFERENCE INFORMATION PAGE—

### DATE AND LOCATION

May 11-13, 2009

Monona Terrace Community & Convention Center  
Madison, Wisconsin, USA • [www.mononaterrace.com](http://www.mononaterrace.com)

Inspired by Wisconsin native Frank Lloyd Wright at the peak of his creative powers, and opened to the public in 1997, the Monona Terrace Community & Convention Center is one of the country's premier conference and convention facilities. The Monona Terrace is an architecturally striking 250,000 square foot structure that combines spectacular glass vistas of Lake Monona with top quality meeting and exhibition space. The Monona Terrace is connected to the Hilton Madison Monona Terrace Hotel via an enclosed, climate controlled skywalk.

### REGISTRATION FEES

For secure online registration, please visit the Forest Products Society at [www.forestprod.org/confcomposites09.html](http://www.forestprod.org/confcomposites09.html). Or you may complete the enclosed registration form and mail it to the Forest Products Society, or you may register by fax at 608-231-2152, or by phone at 608-231-1361, ext. 208.

The 3-day registration fee for the conference and symposium (May 11-13) is \$695 USD per person, and includes conference and symposium materials, all sessions, three continental breakfasts, three luncheons, one reception, and six coffee/refreshment breaks.

The 2-day registration fee for the conference only (May 11-12) is \$625 USD per person, and includes conference materials, all sessions, two continental breakfasts, two luncheons, one reception, and four coffee/refreshment breaks.

The 1-day registration fee for the symposium only (May 13) is \$250 USD per person, and includes symposium materials, all sessions, one continental breakfast, one luncheon, and two coffee/refreshment breaks.

### STUDENT REGISTRATION FEES

(full-time student; ID required)

The student registration fee for the conference and symposium (May 11-13) is \$250 USD per person, and includes conference and symposium materials, all sessions, three continental breakfasts, three luncheons, one reception, and six coffee/refreshment breaks.

The student registration fee for the conference only (May 11-12) is \$125 USD per person, and includes conference materials, all sessions, two continental breakfasts, two luncheons, one reception, and four coffee/refreshment breaks.

The student registration fee for the symposium only (May 13) is \$125 USD per person, and includes symposium materials, all sessions, one continental breakfast, one luncheon, and two coffee/refreshment breaks.

### EARLY BIRD DISCOUNT

Register by April 13, 2009 and save \$75 USD.

### GROUP RATES

For companies wishing to register four or more attendees, group discounts are available. Please contact the Forest Products Society for more details at 608-231-1361, ext. 208 or [conferences@forestprod.org](mailto:conferences@forestprod.org).

### CANCELLATIONS

Full refunds for cancellations will be given if requested by mail, e-mail, phone, or fax by April 13, 2009. A charge of 15% of the registration fee will be incurred if the cancellation is made between April 14-27. NO REFUNDS will be given after April 27. Attendees may be substituted at any time at no charge.

### RECEPTION

A Monday evening, May 11 reception will feature poster presentations and industrial exhibits by researchers and suppliers of materials, equipment, products, and technical services.

### SPONSORSHIP OPPORTUNITIES

Sponsorship opportunities are available for special recognition during the conference. Conference literature will include sponsor logos. Various levels of sponsorship are available. Please contact the Forest Products Society for more details at 608-231-1361, ext. 208 or [conferences@forestprod.org](mailto:conferences@forestprod.org).

### STUDENT CONTEST

As in our 2007 conference, the "Jerry Saeman Award of Student Achievement in WPC Research" will be given for outstanding student presentations.

### SUPPLIERS' SHOWCASE (EXHIBITS)

Exhibit space is still available. The cost is \$695 USD (exhibit space only) or \$995 USD (exhibit space + one 2-day registration). Exhibitors may either use tables provided by Valley Expo, or bring their own stand or display. The Suppliers' Showcase will take place on Monday evening, May 11, during an informal reception. The Suppliers' Showcase will feature industrial exhibits by researchers and suppliers of materials, equipment, products, and technical services. Attendees will enjoy complimentary hors d'oeuvres and a cash bar while circulating among the exhibits. If you would like to reserve exhibit space, please fill out and return the enclosed registration form.

### LITERATURE DISPLAY

If your company is not sending an attendee, but you still wish to promote your company at the conference, we will display your company literature at the conference for a fee of \$300 USD. If you would like to reserve a literature display, please fill out and return the enclosed registration form.

### POSTER PRESENTATIONS FOR CONFERENCE AND SYMPOSIUM

Poster presentation spaces are still available. The poster session for the conference will take place on Monday evening, May 11, during an informal reception. The poster session for the symposium will take place on Wednesday, May 13, during the luncheon.

A poster session consists of presentations by individuals who are stationed at a booth space similar to a typical exhibit booth. Each space contains a draped table and a 4-by 8-foot posterboard on which an abstract, key points, conclusions, charts, and diagrams are posted. If you believe you have technical materials suitable for a poster presentation (no commercial materials accepted), please contact the Forest Products Society at 608-231-1361, ext. 208 or [conferences@forestprod.org](mailto:conferences@forestprod.org). You may also submit your request for a poster presentation online at [www.forestprod.org/composites09poster.html](http://www.forestprod.org/composites09poster.html). *Poster presentations will be accepted based upon a review of their suitability to the objectives of the conference or symposium and on the availability of space.*

### HOTEL ACCOMMODATIONS

The host hotel for the conference and symposium is the Hilton Madison Monona Terrace. Set on the shimmering shores of Lake Monona in the heart of downtown Madison, Wisconsin, the Hilton Madison boasts spectacular views of the city and surrounding lakes, and is conveniently located one block from the State Capitol and minutes from the University of Wisconsin. Guests can enjoy the lively atmosphere of the adjacent Monona Terrace Community & Convention Center, with its rooftop concerts and lakeside cultural events and art exhibits, or a host of area attractions. Located in a sophisticated city that remains close to its heartland roots, the Hilton Madison offers professional service and warm hospitality to all.

A block of rooms has been reserved at the Hilton Madison at a special group rate of \$164 + tax for standard single/double occupancy. The room block will be held through **April 17, 2009**. After April 17, remaining rooms in the block will be released for sale to the general public, and attendees cannot be guaranteed the group rate or room availability after this date. A deposit of first night's room revenue + tax is required with all reservation requests. The deposit will be forfeited for all no-shows and for all reservations cancelled within 48 hours prior to arrival. In order to receive the group rate, be sure to mention the group code (FPS09). Phone reservations to 1-800-Hiltons (toll-free) or 608-255-5100. For online reservations, please visit [www.hilton.com/en/hi/groups/personalized/MSNMHHF-FPS09-20090510/index.jhtml](http://www.hilton.com/en/hi/groups/personalized/MSNMHHF-FPS09-20090510/index.jhtml).



—CONFERENCE REGISTRATION FORM—

10th International Conference on  
Wood & Biofiber Plastic Composites  
& Cellulose Nanocomposites Symposium

Mail to: Forest Products Society  
2801 Marshall Court  
Madison, WI 53705-2295 USA  
Phone: 608-231-1361, ext. 208 Fax: 608-231-2152  
E-mail: conferences@forestprod.org  
www.forestprod.org/confcomposites09.html

Monona Terrace Community & Convention Center  
Madison, Wisconsin, USA

May 11-13, 2009

Mr. \_\_\_\_\_  
 Mrs. \_\_\_\_\_ Preferred first name for badge \_\_\_\_\_  
 Ms. First Name \_\_\_\_\_ Last Name (Surname) \_\_\_\_\_  
 Dr. \_\_\_\_\_

Job Title \_\_\_\_\_

Company/Organization \_\_\_\_\_

Mailing Address:  Home  Business Street/P.O. \_\_\_\_\_

City \_\_\_\_\_ State or Province/Country \_\_\_\_\_ Zip/Postal Code \_\_\_\_\_

Phone \_\_\_\_\_ Fax \_\_\_\_\_ E-mail \_\_\_\_\_

**REGISTRATION FEES**

**Register early and save! Through April 13<sup>th</sup>**

- 3-day (Conference + Symposium, May 11-13) @ \$695 USD \_\_\_\_\_
- 2-day (Conference only, May 11-12) @ \$625 USD \_\_\_\_\_
- 1-day (Symposium only, May 13) @ \$250 USD \_\_\_\_\_

**STUDENT REGISTRATION FEES**

- 3-day (Conference + Symposium, May 11-13) @ \$250 USD \_\_\_\_\_
- 2-day (Conference only, May 11-12) @ \$125 USD \_\_\_\_\_
- 1-day (Symposium only, May 13) @ \$125 USD \_\_\_\_\_

**EXHIBITOR REGISTRATION FEES**

- Exhibit space only (Conference, May 11-12) @ \$695 USD \_\_\_\_\_
- Exhibit space + one 2-day registration (Conference, May 11-12) @ \$995 USD \_\_\_\_\_
- Literature display (Conference, May 11-12) @ \$300 USD \_\_\_\_\_

**LATE FEE**

- Late fee (if registering after April 13) @ \$75 USD \_\_\_\_\_

**TOTAL** \_\_\_\_\_

- Please send me information including an order form for the past proceedings of the International Conference on Woodfiber-Plastic Composites.

**IMPORTANT!**

Please indicate which concurrent sessions you will be more likely to attend:

- Session IA  Session IB (Monday afternoon)
- Session IIA  Session IIB (Tuesday morning)
- Session IIIA  Session IIIB (Tuesday afternoon)

**SPECIAL NEEDS**

If you have any special needs, such as a special diet, or needs related to sight, hearing, or physical mobility, please give a brief description of these needs below. Early notification will enable us to more efficiently accommodate your needs. Special Needs: \_\_\_\_\_

**MY EMPLOYMENT AREA IS:**

- Materials Supplier  Equipment Manufacturer
- Product Manufacturer  Architect
- Association  Consulting/Technical
- Education/Consulting  Education/Extension
- Engineer  Government  Publisher
- Research  Retired  Student  Supplier
- Other

**METHOD OF PAYMENT**

Payment in U.S. funds or purchase order must accompany registration form. Make checks payable to the Forest Products Society. You may order through your VISA, MasterCard, Discover, or American Express by supplying the information requested below.

Please bill my:  VISA  MasterCard

Discover  American Express

Card Number: \_\_\_\_\_

Security Code \_\_\_\_\_ Expiration Date \_\_\_\_\_

Cardholder's Name: \_\_\_\_\_