Dear Colleagues,

Welcome to TAPPI’s 2011 International Conference on Nanotechnology for Renewable Materials. We have worked diligently with this year’s Technical Program Committee to develop a unique program showcasing world-class research in nanomaterials as well as near-commercial applications.

Although the event’s name has changed, this year’s program continues our annual focus on environmental health and safety risk assessment issues as well as international standards for nanomaterials, which becomes increasingly important as nanomaterials enter the marketplace. As has become a tradition, the Technical Program Committee has invited several keynote speakers to address some of the most critical issues surrounding nanotechnology of renewable materials.

While the conference has a challenging program, we have provided lots of opportunities for networking. A vital part of the conference is the poster and tabletop displays and we have built in multiple opportunities to have face-to-face discussions with students, researchers, and suppliers.

Welcome to a full engagement meeting on the most exciting development area in the renewable materials arena!

Conference Co-Chairs:

Sean Ireland
Ted Wegner
World Nieh
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22 Sheraton Floor Plan

Continue your stay at the Sheraton Crystal City for this not-to-miss event!

- Workshop on International Standards for Nanocellulose
  June 9, 2011 8:00 am – 3:00 pm

This workshop will bring together international experts to coordinate international efforts for standards development in the area of nanocellulose materials. Participants will address:
1) priority areas for international standards development,
2) the state of science behind these priority areas and
3) discuss a path forward to effectively develop international standards for nanocellulose.

Results of the workshop may be used in our future international efforts.

Outcomes of this workshop will be written as a report and will be used to guide nanocellulose international standards development.

Learn more at http://tappinano.org

Separate registration is required.
THANK YOU...

to the 2011 Nanotechnology Conference Theme Leaders

Nano Sponsor

“For 100 years the U.S. Forest Service and its Forest Products Laboratory in Madison, Wisconsin U.S.A. have worked to develop forest-based products that improve the quality of life for the people of our Nation. Our mission is to sustain the health, diversity and productivity of our Nation’s forests and grasslands to meet the needs of the present and future generations.”

Micro Sponsor

Based in Memphis, Tennessee, Verso Paper Corp. is a leading North American producer of coated papers, including coated groundwood and coated freesheet, and supercalendered and specialty products. Verso’s paper products are used primarily in media and marketing applications, including magazines, catalogs and commercial printing applications such as high-end advertising brochures, annual reports and direct-mail advertising. Additional information about Verso is available on the company’s website at www.versopaper.com.

Macro Sponsor

The Institute for Paper Science and Technology (IPST) at Georgia Tech enables forest biomaterials business growth through innovation. It provides solutions to strategic, economic, scientific, and technical challenges facing the forest products industries. Its three strategic initiatives are New Products (chemicals and nanomaterials) from Forest Biomass; Bio-refining; and Operational Excellence.

Nanotechnology Research at Southern University Agricultural Research and Extension Center, Baton Rouge LA USA, focuses on developing safe and effective formulations and treatment strategies in using a renewable generation of nanotechnology (Cooper-Carbon Core-Shell Nanoparticles) to control blue stain, white rot and brown rot fungi and Formosa termite for protection of forest and forest products. The project was funded by USDA-NIFA and collaborators include Louisiana State University and USDA-FS.

Researchers at the University of Maine are involved in research, development, and commercialization related to new knowledge in the exploitation of wood as a nanomaterial; conversion of wood components into novel nanomaterials; incorporation of an array of nanomaterials into forest products to increase their functionality, durability and end use performance.
On Nanotechnology for Renewable Materials

![Macro Sponsor](image)

**Macro Sponsor**

The Biomaterial Center at the WVU Division of Forestry and Natural Resources focuses on efforts to identify bioenergy related economic opportunities in the state and the Appalachian region by providing scientifically proven methodologies and tools to convert woody biomass into biofuels and bioproducts through basic and applied research. The missions of the center are as follows: (1) create a multi-disciplinary research network with universities, state and federal agencies, and industries to facilitate research and pilot project demonstrations, (2) identify bio-based material resources and research needs to develop marketing strategies for biofuels and bioproducts, and (3) enhance biomaterial and bioenergy production technology transfer to promote economic and rural community development opportunities in West Virginia.

![Padfolio Sponsor](image)

**Padfolio Sponsor**

Mississippi State University is one of twelve federally-supported Wood Utilization Research Centers. The primary goal of the research center is graduate education in fields including bio-based nanocomposites, high performance engineered lumber, liquid transportation fuels, adhesives, and specialty chemicals. Federal support is highly leveraged with private funds.

![Tabletop Sponsor](image)

**Tabletop Sponsor**

Anasys Instruments is dedicated to delivering innovative products and solutions that measure material properties for samples with spatially varying physical and chemical properties at the micro and nanoscale. The Santa Barbara, CA, based company has already pioneered two major material property measurement breakthroughs: nanoscale IR Spectroscopy and nanoscale thermal analysis.

![Bag Insert Sponsor](image)

**Bag Insert Sponsor**

Nalco is the world’s largest sustainability services company focused on industrial water, energy and air applications; delivering significant environmental, social and economic performance benefits to our customers. We help customers reduce energy, water and other natural resource consumption, enhance air quality, minimize environmental releases while boosting the bottom line.

![Conference Bag Sponsor](image)

**Conference Bag Sponsor**

Omya is a leading global producer of industrial minerals, mainly fillers and pigments derived from calcium carbonate and dolomite, and a worldwide distributor of chemical products. The company’s major markets are the paper, plastics, paint/coatings/adhesives industries as well as construction, environment, agriculture, food and pharma.

![Student Poster Sponsor](image)

**Student Poster Sponsor**

The newly named UT Center for Renewable Carbon (CRC) consolidated University of Tennessee Institute of Agriculture’s growing research, teaching and outreach programs related to bioenergy production and biomaterials processing into one cohesive unit. Previously four groups were operating separate, but related programs. They include the Office of Bioenergy Programs, the Forest Products Center, the Sun Grant Initiative, and the Carbon Sequestration Program.
Join the Discussion – Three TAPPI Nanocellulose Standards Under Development

TAPPI, an ANSI-accredited, standards developing organization, is working with a community of volunteers to develop three different standards for nanocellulose materials. If you are interested in participating in these activities, please contact standards@tappi.org.

- **Nanocellulose Nomenclature and Terminology** - This standard will address nomenclature and terminology for manufactured cellulosic fibers from plants and microorganisms with two dimensions in the nanoscale (1-100 nm per the ISO definition). The scope shall cover the entire supply chain beginning with manufactured nanocellulosic raw materials to derived materials and products, ending with product end-of-life of nanocellulose derived products.

- **Representative Cellulosic Nanomaterials For Environmental, Health And Safety Studies** - This standard will address base-case cellulosic nanomaterials that will be used for environment, health and safety (EHS) evaluations.

- **Methodology For The Classification And Categorization Of Nanocellulose** - This standard will provide guidance on the preparation of comprehensive technical specifications for the characteristics of manufactured nanocellulose and their measurement methods in order to ensure the delivery of product that gives a consistent response in processing and/or final performance.

**KEYNOTE SPEAKERS**

**Mike Jackson**  
President and Chief Executive Officer  
Verso Paper Corp.

*Importance of Nanotechnology/ Nanomaterials to the Forest Products Industry of the 21st Century*  
Monday, June 6, 2011  
8:00AM

In November of 2006, Mike Jackson became President and Chief Executive Officer of Verso Paper Corp., headquartered in Memphis, Tennessee. In less than two years, Verso became public and trades on the NYSE under the VRS symbol. Verso is a leading North American supplier of coated papers that are used primarily in media and marketing applications, including catalogs, magazines and commercial printing applications such as high-end advertising brochures, annual reports and direct mail advertising.

Before joining Verso, Jackson spent 29 years with Weyerhaeuser Company, headquartered in Federal Way, Washington. Prior to retiring from Weyerhaeuser, he served as Senior Vice President of Cellulose Fibers and White Papers. In that role he was responsible for the company’s Cellulose Fibers, White Papers, Newsprint and Liquid Packaging Board businesses. During his tenure with Weyerhaeuser, Jackson received two President’s Awards for outstanding performance in businesses for which he was responsible. He also recently served as Chairman of NORPAC, Weyerhaeuser’s joint venture with Nippon Paper.

In 2009, the Association of Suppliers to the Paper Industry (ASPI) chose Jackson as its Customer Executive of the Year, in recognition of outstanding contributions to the pulp and paper industry.

Jackson is currently on the board of directors of SupplyOne, Inc. and the American Forest and Paper Association (AF&PA). He is Co-Chair of the AF&PA Political Action Committee and served as Past Co-Chair of AF&PA’s Printing-Writing Paper Group and its executive committee, as well as Past Chair of AF&PA’s Recycling Committee. Jackson is also a past board member of the Electronic Documents Systems Foundation (EDSF).
Vicki Stone is Director of the Nano Safety Research Group at Heriot-Watt University, Edinburgh; Director of Toxicology for SAFENANO, and Editor-in-Chief of the journal Nanotoxicology. Stone has published over 100 publications pertaining to particle toxicology over the last 13 years, including journals such as Nature, Nature Nanotechnology and The Lancet. Her collaborations span Europe, the USA and Asia. She has provided evidence for the government commissioned reports published by the Royal Society (2003) and the on Environmental Pollution (2008).

Stone is chair of the British Toxicology Society Speciality Section on Nanotoxicology; member of the UK Government Committee on the Medical Effects of Air Pollution (COMEAP); advisory board member for the Center for the Environmental Implications of NanoTechnology (CEINT; funded by the US Environmental Protection Agency); and advisory board member for the European project Nanotest.

Her current projects investigate the mechanism of toxicity of a panel of nanoparticles in macrophages, hepatocytes, gastrointestinal epithelium, endothelium and lung, interactions between nanoparticles and proteins and how this influences toxicity, and development of in vitro alternatives using microfluidics. In addition Vicki collaborates with ecotoxicologists to investigate the impacts of nanoparticles on aquatic invertebrates.

The nanotoxicology work at Heriot-Watt University involves funding from Research Councils (NERC and EPSRC), the European Commission (ENRHES, ENPRA, InLiveTox and NanolImpactNet), charities (The Colt Foundation and The Cunningham Trust), the UK Government (Defra commissioned reports REFNANO, EMERGNANO, HARN, and CELLPEN) and industry (Unilever and GlaxoSmithKline). This funding currently exceeds £1.3 million.


Mike Roco is the Senior Advisor for Nanotechnology at the National Science Foundation (NSF) and a key architect of the National Nanotechnology Initiative. Prior to joining National Science Foundation, Dr. Roco was Professor of mechanical and chemical engineering. He is the founding Chair (August 2000) of the U.S. National Science and Technology Council’s Subcommittee on Nanoscale Science, Engineering and Technology (NSET).


Dr. Roco is a corresponding member of the Swiss Academy of Engineering Sciences. He is a Fellow of ASME, Fellow of AICHE, and Fellow of the Institute of Physics. He leads the Nanotechnology Group of the International Risk Governance Council. Dr. Roco was elected as Engineer of the Year by the U.S. Society of Professional Engineers and NSF in 1999 and again in 2004. He was awarded the National Materials Advancement Award from the Federation of Materials Societies in 2007 “as the individual most responsible for support and investment in nanotechnology by government, industry, and academia worldwide".
Brian Holloway  
Program Manager, Defense Sciences Office, Defense Advanced Research Projects Agency (DARPA)  
Tuesday, June 7, 2011  
12:30 pm

DARPA Initiatives in Nanotechnology and Material Manufacturing

Dr. Brian Holloway joined DARPA as a program manager in 2009. His interests focus on creating new capabilities for the war fighter via improvement of critical materials-based limitations. Prior to joining DARPA, Dr. Holloway established the Nano-Materials Research Group within the Technology Development Division of Luna Innovations Incorporated in order to apply innovative nano-materials solutions to significant problems across the government and private sector business space. From 1998 to 2006, Dr. Holloway was a faculty member in the Applied Science Department at the College of William & Mary, most recently as the Arts and Science Distinguished Associate Professor (with tenure). Prior to joining the faculty at William & Mary, Dr. Holloway served in the office of Senator John. D. Rockefeller (WV) first as a MRS/OSA Congressional Fellow and, then as a Legislative Assistant. Dr. Holloway received a bachelor’s degree in mechanical engineering (Highest Honors) in 1992 from the University of Florida and a master’s degree (1993) and doctorate (1997) in mechanical engineering with a materials science minor from Stanford University.

Tom Lindström  
Director of the Biofibre Materials Research Centre (BiMaC Innovation), Royal Institute of Technology (KTH); Senior Research Scientist, Innventia AB  
Wednesday, June 8, 2011  
8:00AM

Tom Lindström’s interests span from physical and surface science of cellulosic fibers including nanocellulosics and bio-(nano)composite materials. He is a fellow of TAPPI and the International Academy of Wood Science; a George Jayme medalist (ZellCheming); and an Ekman medallist (SPCI).

Get Involved!

TAPPI’s New International Nanotechnology Division is now recruiting volunteers who can help identify advancements in renewable nanocellulose materials research, development and, commercialization. To learn more or join this exciting new division of TAPPI, email Mary Ann Cauthen, TAPPI Member Group Coordinator, at mcauthen@tappi.org.
Schedule of Events (subject to change)

Monday, June 6, 2011
8:00 – 8:45 AM
Session 1: Welcome and Keynote Presentation – Ballroom B&C
Session Chair: S. Ireland, Verso Paper

Keynote Presentation: Importance of Nanotechnology/Nanomaterials to the Forest Products Industry of the 21st Century
Mike Jackson, President and Chief Executive Officer, Verso Paper Corp.

Welcome & Introductions: Conference Co-chairs
9:00 – 10:30 AM
Session 2: Managing Environmental Risks and Rewards – Ballroom B&C
Session Chair: J.A. Shatkin, CLF
US Safety Research for Nanotechnology Innovation and Commercialization.
S. Tinkle, Deputy Administrator of NNCO
Toxicology of Cellulose Nanowhisker Based Nanocomposites, J. Foster, A. Merkle Institute, University of Fribourg
Ensuring the Safety of Manufactured Nanocrystalline Cellulose: A Risk Assessment under Canada’s New Substances Notification Regulations, B. O’Connor, FPInnovations

10:30 – 11:00 AM BREA K

11:00 – 12:30 PM
Session 3: Nanocomposites I – Ballroom B&C
Session Chair: J. Simonsen, Oregon State University
Bio-inspired Mechanically-adaptive Polymer / Cellulose Nanofiber Nanocomposites, C. Weder, Adolphe Merkle Institute
Foaming of Cellulosic Nanofibril Reinforced SMA Composites, D. Aydemir, PhD, Bartin University and The University of Maine
Nanocrystalline Cellulose Self Assembly: Control, Mechanism and Applications, J. Bouchard, FPInnovations

11:00 – 12:30 PM
Session 4: Nanomaterials and Barriers – Ballroom A
Session Chair: T. Lyons, Imerys
Paper Composites and Coatings for Improved Wet Strength and Water Barrier Properties, J. Catchmark, Penn State University
A New Type of Filler-Nanocellulose Composite Substrate for Printed Electronics Applications, J. Sievanen, VTT Technical Research Centre of Finland
Barrier properties of Nanofibrillated Cellulose/Clay Films for Applications in Packaging Materials, T. Thi Thu Ho, EMPA

12:30 – 2:00 PM Lunch
Session 5: Lunch and Keynote Presentation – Ballroom B&C
Session Chair: J.A. Shatkin, CLF Ventures

Keynote Presentation: Assessing the Potential Toxicity of a Variety of Nanomaterials
Vicki Stone, Director of the Nano Safety Research Group, Heriot-Watt University; Director of Toxicology for SAFENANO; and Editor-in-chief of the Journal Nanotoxicology

TAPPI’s commercialism guidelines were relaxed for the conference
### Session 6: Nanomaterials Characterization Techniques I – Ballroom B&C

**Session Chair:** Y. Boluk, University of Alberta

- **Study of Near-infrared Spectroscopy on the Paper Properties of Populus×Euramerica**, L. Meng, Chian Beijing Forestry University
- **Commercially-Applicable Nanomaterials for Inclusion in Forest Products**, M. Bruce Lyne
- **Cellulose Nanocrystal Size Distribution Determination by Transient Electric Birefringence**, J. Simonsen, Oregon State University

### Session 7: Production of Renewable Nanomaterials – Ballroom A

**Session Chair:** W. Tze & S. Ramaswamy, University of Minnesota

- **Nanocomposite Materials from Renewable Sources**, A. Dufresne, PhD, Grenoble Institute of Technology
- **Effect of Refining Pretreatment on Preparation of Cellulose Nanofibrils by Mechanical Process**, A. Kumar Bharimalla, Central Institute for Research on Cotton Technology
- **Effect of Preparation Method on Rheological Properties of Cellulose Nanofiber**, H. Jung Youn, Seoul National University

### Session 8: Consumer Perception/Regulation & Nanomaterials – Ballroom B&C

**Session Chair:** L. Sheremeta, Alberta Innovations

- **Nanomaterials and Global Regulation: The Pace Quickens**, L. Bergeson, Bergeson and Campbell
- **Nanotechnology Research at NIOSH: Supporting Safe Development of the Business**, C. Geraci, NIOSH

**Title TBA**

T. Thomas , Leader, Chemical Hazards Program, U.S. Consumer Product Safety Commission

### Session 9: Nanocomposites II – Ballroom A

**Session Chair:** O. Rojas, NC State University

- **Shear-Based Orientation of High Strength Cellulose Nanocrystal Films**, J. Youngblood, Purdue University
- **Processing of Multilayer Nanofibrillated Cellulose Laminates**, J., Purdue University
- **Nanoscale Infrared Spectroscopy of Biopolymetric Materials**

R. Shetty, Anasys Instruments
Monday June 8, 2011
5:30 – 7:00 PM
Session 10: Conference Poster Session and Student Poster Competition – Crystal 5&6

Session Chair: S. Wang, University of Tennessee – Student Competition

Amaranth Protein Films Reinforced with Starch Nanocrystals, A. Dufresne, PhD, Grenoble Institute of Technology

Properties of Microfibrillated Cellulose Sheets Prepared by Ozone Oxidation and Mechanical Grinding, S. Lee, Advanced Industrial Science and Technology, Japan

Cellulose Nanofibers Reinforced Thermosetting Composites, E. Erbas Kiziltas, University of Maine

Conductivity of Paper Containing PEDOT: PSS and MWCNT, E. Montibon, Karlstad University

Rheological Behavior of Cellulose Nanocrystals Filled Polymer Aqueous Suspensions, A. Dufresne, PhD, Grenoble Institute of Technology

The Structures and Properties of Nano Crystal Cellulose from Coniferous Bleached Kraft Pulp, H. Zhang, Beijing Forestry University

Covalent Coupling of Proteins to Nanocellulose Derivatives – New Method for Preparation of Bioactive Surfaces, S.A. Varjonen, Aalto University

Study of Use of Silicon Dioxide as Nano Fillers in Rice Straw Pulp Obtained by Catalyzed Acetic Acid Pulping for Manufacturing of Paper, A. Sanjay, K. Sinha, S.L.I.E.T. Longowal

Nano-Engineering for Photovoltaic Applications, J. Xiong, Los Alamos National Laboratory

The Hydrophilic Property of Polysulfone Membrane Blended with Cellulose Nanofibers, S. Li, Beijing Forestry University

Potential of Pea Starch Nano Crystals: A Comparison with Other Common Sources, D. Le Corre, LGP2

Nanoparticle Immunoassay Labeling Techniques for Locating Ink Penetration in Paper Fibers at the Nanoscale, B.V. Ramarao, State University of New York

Innovative Strategies for Isolating Starch Nanocrystals, D. Le Corre, LGP2

Cellulose Nanocrystals Compatibilization and Evaluation of their Dispersion in Organic Solvents, G. Chauve, FPInnovations and J. Bras, Grenoble INP – Pagora

STUDENT POSTER COMPETITION

Thermo-Responsive Polymer Brushes Grafted from Cellulose Nanocrystals and Their Interfacial Behavior, J. Zoppe, PhD, NC State University Department of Forest Biomaterials

Impact of Different Coating Process of MFC on Barrier and Mechanical Properties, N. Lavoine, I. Desloges and J. Bras, Grenoble Institute of Technology

New UV High Solids Nanocomposites Coatings Based on Cellulose Nanocrystals and Clay for Wood Furniture, W. N. Nkeuwa, Université Laval

Barrier Properties of Nanofibrillated Cellulose/Clay Films for Applications in Packaging Materials, H., Thi Thu Thao, T. Zimmermann, W. Caseri, P. Smith.

* Empa, Swiss Federal Laboratories for Materials Testing and Research, Wood Laboratory
* Swiss Federal Institute of Technology, Institute for Polymer
## 2011 TAPPI International Conference

**Tuesday June 7, 2011**  
8:00 – 8:45 AM  
**Session 11: Keynote Presentation – Ballroom B&C**  
**Session Chair:** W. Nieh, USDA Forest Service

**Keynote Presentation:** NSF Programs and the Future of Nanotechnology Research and Development  
Mike Roco, Senior Advisor for Nanotechnology at the National Science Foundation (NSF)

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<td>9:00 – 10:30 AM</td>
<td>Session 12</td>
<td>Ballroom B&amp;C</td>
<td>J. Catchmark, Penn State</td>
<td>Nano-Fibrillar Cellulose as Strength Additive in Filler-Rich SC Paper, K. Torvinen, VTT Technical Research Centre of Finland</td>
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<td>Potentials of Nanotechnology Application in Forest Protection</td>
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<td>Y. Qi, Southern University, Agricultural Research and Extension Center</td>
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<td>Surface-Engineered Cellulose Nanofibrils as Template for Crystallization of Hydroxyapatite, P. Qu, Beijing Forestry University</td>
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<td>10:30 – 11:00 AM</td>
<td>Break</td>
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<td>11:00 AM – 12:30 PM</td>
<td>Session 14</td>
<td>Ballroom B&amp;C</td>
<td>R. Moon, Purdue University</td>
<td>Cellulose Nanocrystals for Battery Separators, J. Simonsen, Oregon State University</td>
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<td>A Raman-Tensile Study of Load Transfer in MFC/PLA Composites, W. Tze, University of Minnesota</td>
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<td>Nano Crystalline Cellulose Composite Foams From Renewable Resources, S. Lapidot, Melodea Ltd.</td>
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<td>12:30 – 2:00 PM</td>
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<td>Session 16</td>
<td>Ballroom B&amp;C</td>
<td>B. Sastri, Department of Energy</td>
<td>Keynote Speaker: DARPA Initiatives in Nanotechnology and Material Manufacturing, Brian Holloway, Program Manager, Defense Sciences Office, Defense Advanced Research Projects Agency (DARPA)</td>
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11:00 AM – 10:30 AM  
**Session 12: Organized Structures & Interactions – Ballroom B&C**  
**Session Chair:** J. Catchmark, Penn State

9:00 – 10:30 AM  
**Session 13: Biomimicry & Self-Assembly of Renewable Nanomaterials – Ballroom A**  
**Session Chair:** C. Meredith, Georgia Institute of Technology

Method to Predict the Structure-Property Functional Relationships in Bio-Nano-Composites, S. Ramaswamy, University of Minnesota

Bondx; Activated Transgenic Fibers, as Wet Strength Agent, A. Heyman, BondX Technologies Ltd.

Implementation of Thin-Layer Molecular Self-Assembly Technologies into Current Paper Making Processes - Results of Pilot and Full Plant Trials, G. A. Grozdits, School of Forestry, LA Tech

10:30 – 11:00 AM  
**BREAK**

11:00 AM – 12:30 PM  
**Session 14: Composites III – Ballroom B&C**  
**Session Chair:** R. Moon, Purdue University

Cellulose Nanocrystals for Battery Separators, J. Simonsen, Oregon State University

A Raman-Tensile Study of Load Transfer in MFC/PLA Composites, W. Tze, University of Minnesota

Nano Crystalline Cellulose Composite Foams From Renewable Resources, S. Lapidot, Melodea Ltd.

11:00 AM – 12:30 PM  
**Session 15: Interfacial Nano-Mechanics – Ballroom A**  
**Session Chair:** S. Wang, University of Tennessee

Applications of Nanoindentation-Based Mechanical Spectroscopy in Forest Products Research, J. E. Jakes, US Forest Products Laboratory

Cellulose Nanocrystals and Self-Assembly at Interfaces, O. J. Rojas, North Carolina State University

CNC Adhesion, R. R. Lahiji, National Institute for Nanotechnology

12:30 – 2:00 PM  
**Lunch**

12:30 – 2:00 PM  
**Session 16: Lunch and Keynote Presentation – Ballroom B&C**  
**Session Chair:** B. Sastri, Department of Energy

**Keynote Speaker:** DARPA Initiatives in Nanotechnology and Material Manufacturing, Brian Holloway, Program Manager, Defense Sciences Office, Defense Advanced Research Projects Agency (DARPA)
On Nanotechnology for Renewable Materials

2:00 – 3:30 PM  
Session 17: Renewable Nanomaterials Surface Modification and Functionalization – Ballroom B&C  

Session Chair: R. Ramarao, SUNY  
Nanosilver-Reinforced Antimicrobial Cellulose Fiber, J. Y. Chen, University of Texas at Austin  
Cellulose Whiskers from the Forest, A. J. Ragauskas, IPST @ Georgia Tech  
Hydrogels Prepared from Wood Hemicellulose and Cellulose Nanocrystals, M. A. Tshabalala, USDA Forest Products Laboratory  
Surface Modification and Dispersion of Nanocrystalline Cellulose in Organic Media, Y. Boluk, National Institute for Nanotechnology, National Research Canada and Civil and Environmental Engineering, University of Alberta

3:30 – 4:00 PM  BREAK

4:00 – 5:30 PM  
Session 19: Nano-enabled Coatings & Functionalities I – Ballroom B&C  

Session Chair: N. Savage, US EPA, ORD, NCER  
Functionalized Carrier Systems for Cellulose Nanofibrils, A. Kiziltas, University of Maine  
Surface Structure Control Using NFC Embedment in a Discretely Bimodal Porous Coating Layer, C. Ridgway, OMYA Development AG  
Nano-Fibrillated Cellulose as a Paper Surface Treatment for Inkjet Printing, D. W. Bousfield, University of Maine

4:00 – 5:30 PM  
Session 20: Nanocellulosics and the Biorefinery – Ballroom A  

Session Chair: A. Ragaukaus, IPST @ Georgia Tech  
EMBRAPA-BIOFIBRAS, J. Saraiva Morais, Embrapa Cotton  
In-Situ Surface Modification of Cellulose Nanofibrils in a Drying Process for Their compatibility and Reactivity, Y. Han, PhD, AEWC Center, University of Maine  
SP1, A Molecular Scaffold for Cellulose Based Bio-Composites, Y. Nevo, The Hebrew University of Jerusalem at Rehovot

Dinner Cruise, Tuesday, June 7, 2011  
Buses depart from Sheraton at 6:00 pm  •  Cruise: 7:00 pm-10:00 pm

Come aboard the Odyssey for a unique and memorable event on the water. Your cruise will include distinctive dining, live entertainment and spectacular city views. The only vessel designed specifically to travel beneath the historic bridges spanning the Potomac, the Odyssey offers exclusive river views of the nation's greatest monuments from every table. You will be able to see the Jefferson Memorial, the Lincoln Memorial, the Washington Monument, and the Watergate Hotel. At times when wind and tide conditions prevent navigation to the Kennedy Center and Georgetown, an alternate route south on the Potomac and past historical Old Town Alexandria will be taken. This cruise route may change due to weather and cruise direction. The Dinner Cruise is included in both of the conference All Inclusive Packages. Spouses can be registered separately. Registration includes drinks, dinner, entertainment, and transportation to and from cruise. Buses will depart and return to the Sheraton.
Wednesday June 8, 2011
8:00 – 8:45 AM
Session 22: Keynote Presentation – Ballroom B&C
Session Chair: H. Khalil, Woodbridge Group

Keynote Presentation: **NanoCellulose Research and Developments at Innventia**
Tom Lindström, Director of the Biofibre Materials Research Centre (BiMaC Innovation), Royal Institute of Technology (KTH); Senior Research Scientist, Innventia AB

9:00 – 10:30 AM
Session 23: Nano-enabled Coatings & Functionalities II – Ballroom B&C
Session Chair: P. Jones, IMERYS
Design and Fabrication of the Micro Sensor for Hydrogen Detection Using the MEMS Technology, J. Kim, Dept. of Materials Science & Engine, The University of Seoul
Polymer Adsorption on Nano Fibrillar Cellulose and its Effects on Suspension Rheology, K. Hlisnikovska, Karlstad University
Advance in MFC Coating Application: The Role of Additives and Chemical Treatments, G. Rodionova, Norwegian University of Science and Technology

10:30 – 11:00 AM BREAK

11:00 AM – 12:30 PM
Session Chair: A. Martini, Purdue University
Modeling of Atomic-Scale Indentation of Crystalline Cellulose, A. Martini, Purdue University
MD Study of Surface Chemistry Effects in Oil Adhesion by Crystalline Cellulose, M. A. Quddus, North Carolina State University
Multiscale Modeling of the Hierarchical Structure of Cellulose Nanocrystals, P. D. Zavattieri, Purdue University

9:00 – 10:30 AM
Session 24: Wood Products & Nanotechnology – Ballroom A
Session Chair: W. Nieh, USDA Forest Service
Developing Fire Safe Wood Adhesives Based on Polyvinyl Acetate (PVA) via Nanotechnology, A. Kaboorani, Universite Laval
Structure and Properties of Cellulose Nano-Crystallites, M. Ya Ioelovich, Designer Energy
Carbonaceous Nano-Fibrous Felts Developed from Alkali Lignin, L. Zhang, South Dakota School of Mines and Technology

11:00 AM – 12:30 PM
Session 26: Domestic and Military Applications/Market Opportunities – Ballroom A
Session Chair: S. Ireland, Verso Paper Corp
Military and Defense Applications of Renewable Materials, S. Taubee, Army Research Lab
Applications of Soy Proteins, C. L. Salas, NC State University
Polymer Nanocomposites and Functional Aerogels Derived from Nanocrystalline or Nanofibrillated Cellulose, H. Dong, US Army Research Laboratory
On Nanotechnology for Renewable Materials

12:30 – 2:00 PM Lunch

Session 27: Lunch and Keynote Presentation – Ballroom B&C
Session Chair: T. Wegner, USDA Forest Products Lab

Keynote Presentation: Title TBD, C. Teague, National Nanotechnology Office

2:00 PM – 3:30 PM
Session 28: National & International Standards – Ballroom B&C

Session Chair: C. Teague National Nanotechnology Office

International co-operation for the standardization of nano-scale cellulose materials, U. Forsstrom, VTT Technical Centre of Finland

Developing National Standards via an International Community, Eric Fletty, TAPPI

Canadian Approach to International Standards, C. Willis, CWIC, Inc.

Session 29: Characterization – Ballroom A

Session Chair: H. Rosen

Thermal Characterization of Nanocrystalline Cellulose for Polymer Nanocomposite Applications, A. C. Finkle, University of Waterloo

New Approach to Classification of Cellulose Fibrils and Suitable Methods for their Characterization, A. Sneck, VTT Technical Centre of Finland

Characterization of Multilayer of Cationic Polymer and Cellulose Nanocrystals and its Effect on Paper Property, H. J. Youn, Seoul National University

3:30 PM – 3:45 PM BREAK

3:45 PM – 5:15 PM
Session 31: Canadian Approach to International Standards – Ballroom A

Session Chair: C. Willis, CWIC, Inc.

Commercially available Nanomaterials, B. Lyne

Report on Pilot Plant, W. Hamad, FP Innovations

Plans for a Pilot Plant at Al FT, Y. Boluk, University of Alberta

Nanomaterials from the Minerals Industry, Phil Jones, IMERYS

Efforts in Supplying Nanomaterials, Anne Franey, CEO and President of Bio Vision

5:15 PM – Adjourn

5:30 PM – Steering Committee Meeting – Executive Boardroom
Thank you to our Steering Committee

SPECIAL THANKS TO:
Sean Ireland - Conference Co-Chair, Verso Paper
Ted Wegner - Conference Co-Chair, USDA Forest Products Lab
World Nieh - Conference Co-Chair, U.S. Forest Service

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Arthur J Ragauskas Professor, School of Chemistry and Biochemistry; Institute of Paper Science and Technology at Georgia Tech
Carson Meredith, IPST at Georgia Tech
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Chris Risbrudt, USDA Forest Products Lab
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TAPPI is a professional and scientific association organized to further the application of science, engineering, and technology in the pulp and paper, packaging and converting, and allied industries. Its aim is to promote research and education, and to arrange for the collection, dissemination and interchange of technical concepts and information in fields of interest to its members. TAPPI is not intended to, and may not, play any role in the competitive decisions of its members or their employers, or in any way restrict competition among companies.

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Important Safety Information

Fire Survival
When you reach your hotel room, ask yourself: Can I close my eyes, hold my breath, and go directly to the nearest fire exit WITHOUT LOOKING in 15 seconds?
You may have to do just that:
• Under emergency conditions
• In smoke
• In darkness
• At 3:00 a.m.
Because panic is the main problem in unfamiliar surroundings, you should prepare for emergencies when you travel. The following information is provided to help you prepare for a hotel fire emergency. Remember that by-products of fire (gases, smoke, etc.) kill more people than fire itself.

Survival Plans
• Familiarize yourself with your new surroundings by checking the emergency exit and escape routes.
• Ensure that doors are unlocked and exit routes are free of obstructions.
• Study the room you are staying in (do the windows open, what is the distance to the ground, etc.).
• Avoid elevators in emergency situations.
• Count the number of doors and walls between your room and the emergency exits. Smoke could obscure lighted signs.

Before and after Leaving the room
• When an alarm sounds, slowly feel the surrounding walls and doors with the back of your hand. If the door is warm, stay as low as possible (to avoid smoke) and open it slowly. If the door and walls are not warm, proceed toward the emergency exit using the most direct route. If the smoke is too heavy, remain in the room.
• Take the key with you. You might find it safer to return to your room.
• If the smoke thickens as you go down the escape stairs, go up one flight and cross over to an alternate staircase.
• If access to the alternate staircase is blocked, proceed to your room and wait for assistance.
• Avoid breaking windows. Broken windows can allow fire and smoke into the room. If a window must be broken or opened, dangle a bed sheet from the window as a signal to firemen. Don’t jump if the fall is more than two stories.

If You Cannot Leave the Room
• Place towels and bedclothes around the door areas. Keep them soaked with water.
• Fill the bathtub and use it as a reservoir for wetting down the entire room. Placing yourself in a filled tub will not offer protection.
• Hold a wet towel around your face to filter smoke.
• Dial the hotel emergency number (0) to tell rescue personnel where you are.

General Safety Tips
To make your conference experience a safe and enjoyable one, please keep the following safety tips in mind. While you are out of the hotel, please know that, like in all cities, awareness and caution are certain to help ensure your safety. A common crime is pick pocketing, with women’s purses being the prime target. Some simple precautions you can take are:
• Never carry all of your valuables in the same place. Keep them secured in a safe deposit box.
• Never walk alone at night, especially to off property locations; there really is safety in numbers!
• Do not leave purses, briefcases or other personal property unattended in public locations. Use hotel services such as a coat check or luggage storage.
• Remove your name badge while out of the hotel. They identify you as an out-of-towner and easy target for crime.
• Women: carry your purse with the strap over your shoulder and across your chest, keeping it closed or latched with the bag portion in front of you. For added protection in crowds, you can rest your hand on top. Be particularly watchful of distractions in revolving doors, elevators or in the public.
• Men: Wrap a heavy rubber band around your wallet to prevent it from being easily slipped out of your pocket or carry it in your front pants pocket.
• If you find that you have become a victim, report the crime to the police.
• Report any suspicious persons or behavior in the hotel or convention center to the registration desk or any TAPPI staff.
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as of March 7, 2011

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