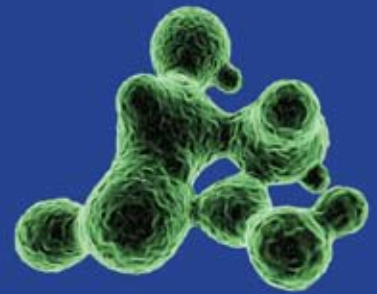
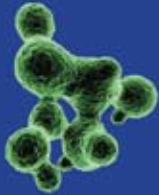




# THINK SMALL



2010 INTERNATIONAL CONFERENCE ON NANOTECHNOLOGY FOR THE FOREST PRODUCTS INDUSTRY

27-29 September 2010  
DIPOLI Congress Centre  
Espoo, Finland

**Getting Down to Business  
with Nanotech Products**

# GROW BIG

[www.tappi.org/10nano](http://www.tappi.org/10nano)

Sponsored by





# Table of Contents

Welcome.....	3
2010 Conference Theme Leaders.....	4
Keynote and Featured Speakers.....	5
Conference Program and Grid.....	6
Poster Session Presenters.....	10
Sponsors.....	12
TAPPI Membership Value.....	14
TAPPI Sustaining Companies.....	15
General and Safety.....	17
Dipoli Conference Center Floor Plan.....	20

# Welcome



## to the 2010 Nanotechnology for the Forest Industry Conference!

What makes this 10th international conference Nanotechnology for the Forest Industry Conference unique is first that it is being held in one of the most technically advanced locations in Europe, Espoo in Finland, and secondly that it boasts 90+ presentations and more than 40 posters. Truly, every attendee should leave with a full plate of new insights into the realm of nanomaterials and new forest related products.

There is a burgeoning emphasis on novel composites that harness the remarkable properties of crystalline cellulose. Besides four sessions devoted to nanocellulosics and nanocomposites, the program boasts fundamental sessions on structured materials, interfacial micromechanics, as well as thin films and interfacial assemblies. Nanotech coatings promise new functionalities for forest products in the wood, paper and packaging sectors. Reflecting the need for new products that are differentiated via nanotech coatings, there are three sessions devoted to this topic plus a related session on nanomaterials and barriers.

Optimization of nanomaterials and composites is facilitated by modeling and by new characterization techniques. For example, fully engaging the strength and stiffness of nanocrystalline cellulose in composites has yet to reach the level of development seen in rival composite materials such as carbon fiber reinforced plastics. The importance of this optimization process is seen in a keynote and two sessions devoted to computer modeling, and two sessions on novel characterization techniques.

The development of products based on nanotechnology must also be put in the context of market opportunities, consumer acceptance, health concerns, and regulatory control. This is the subject of keynote and plenary talks as well as two sessions. Finally, there are two principal paths for the creation of nanocellulosics, often referred to as NCC and MFC (or NFC). We will explore their relative merits and applicability to new products in a panel discussion with representatives of outfits with the most advanced production facilities. Since these facilities need to be integrated into existing pulp mills, and since economic viability also depends on value-added use of the materials that are dissolved to produce crystalline cellulose we have also included a session on nanocellulosics and the biorefinery.

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 working on various aspects of this exciting new discipline in the forest industry. The host institute, VTT, is also opening its doors to conference attendees and has also scheduled workshops on topics related to the conference theme for Thursday and Friday. Welcome to a full engagement meeting on the most exciting development area in forest products arena!

Prof. Bruce Lyne, *The Royal Institute of Technology*

Prof. Kristiina Oksman, *Luleå Technical University*

*Conference Co-chairs*



# Thank You



## to the 2010 Nanotechnology Conference Theme Leaders

Ali Harlin, *VTT*

Anne-Christine Ritschkoff, *VTT*

Lori Sheremeta, *Alberta Ingenuity*

Jo Anne Shatkin, *CLF Ventures, Inc. (an affiliate of the Conservation Law Foundation)*

Orlando Rojas, *North Carolina State University*

Stan Stoyanov, *The National Institute for Nanotechnology National Research Council of Canada*

Phil Jones, *Imerys*

Hiroyuki Yano, *Kyoto University*

Ted Wegner, *USDA Forest Service Forest Products Laboratory*

Bruce Lyne, *Royal Institute of Technology*

Kristiina Oksman, *Luleå University of Technology*

John Kettle, *VTT*

Hamdy Khalil, *Woodbridge Group*

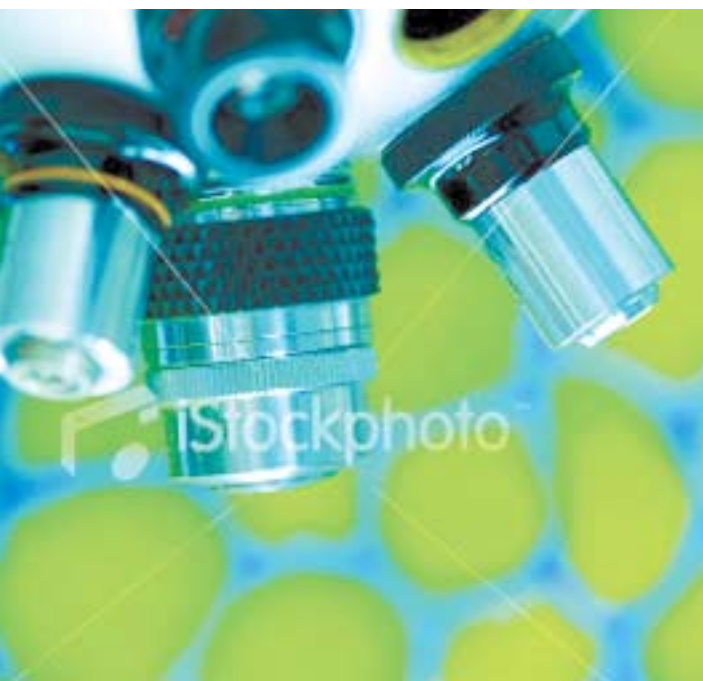
John Cowie, *AFPA*

Siqun Wang, *Tennessee Forest Products Center*

Pia Qvintus, *VTT*

Tamal Gosh, *PepsiCo*

# Thank You



### Conference Co-Chairs:

Bruce Lyne, *Royal Institute of Technology*

Kristiina Oksman, *Luleå University of Technology*

### TAPPI Onsite Team:

John Harrison, *VP, Global Planning, Meetings & Membership*

Raine Hyde, *Technical Program Lead*

# Keynote Speakers:



**Dr. Hiroyuki Yano**  
*Professor, Research Institute  
of Sustainable Humanosphere,  
Kyoto University*

**Monday, 27 September 2010,  
12:30-14:00**

Hiroyuki Yano is a Professor at the Research Institute of Sustainable Humanosphere, Kyoto University. He received his Ph.D. in wood science from Kyoto University in 1989. He joined Kyoto Prefectural University as assistant professor in 1987 and later moved to the Wood Research Institute at Kyoto University as associate professor in 1998. During 1997-1998 he was a Visiting Scientist at the Forest Products Laboratories at CSIRO, Australia.

He received the Young Scientist Award from the Japan Wood Research Society in 1989, Hayashi Jisuke Award from the Cellulose Society of Japan in 2005, and the Japan Wood Research Society Award from the Japan Wood Research Society in 2009. He is a fellow of the International Academy of Wood Science.

His research involves extraction of nanofibers from biomass resources such as wood, plant fibers, and crab and shrimp shells, and their utilization as a component of nanomaterials for optical and structural purposes.



**Andriy Kovalenko**  
*Senior Research Officer, Group  
Leader – Theory and Modeling,  
NRC-NINT Adjunct Professor,  
Department of Mechanical  
Engineering, University of Alberta*

**Tuesday, 28 September 2010,  
08:00-08:45**

Dr. Kovalenko is a leading, internationally recognized expert in theoretical and computational methods of modeling on multiple space and time scales, including statistical physics and electronic structure theory. His focus is development of theoretical methods capable of predicting the behaviour of nanosystems. He has proposed a new statistical-mechanical molecular theory of solvation, which bridges the gap between electronic structure, atomistic simulations, and system functioning. He has applied it to provide realistic description of physical and chemical properties and processes in various nanosystems: complex molecular liquids; electronic and solvation structure and thermodynamics in solution and at solid-liquid and liquid-liquid interfaces; chemical reactions and nanocatalysis in solution; electrochemistry of solutions sorbed in nanoporous materials; polymers in solutions and melts; transport of nanoparticles across biomembranes and liquid interfaces; self-assembly, conformational stability and aggregation of supramolecules and biomolecules in solution.



**Hadi Mahabadi**  
*Vice President and Center Manager,  
Xerox Research Centre of Canada  
(XRCC)*

**Wednesday, 29 September 2010,  
08:00-08:45**

Dr. Mahabadi joined Xerox in 1981 and has held a variety of managerial positions at XRCC. He has been instrumental in creating an environment to increase innovation and successful commercialization of many breakthrough materials technologies at XRCC. Examples include novel solid inks for Xerox ink jet printers and Emulsion Aggregation toner for many Xerox products introduced into the market after 2000.

Dr. Mahabadi's R&D leadership efforts earned many awards including two of Xerox Corporation's highest awards. He won the University of Waterloo's 2008 Alumni Achievement Medal. He was also ranked as #1 among PrintAction Magazine's 50 most influential Canadians in Graphic Art Communications for 2008 and 2009. Mahabadi was selected as a Fellow of the Chemical Institute of Canada, Canadian Academy of Engineering, International Union of Pure and Applied Chemistry. He recently became the Chair of the Chemical Institute of Canada.

Dr. Mahabadi has also been involved in helping to shape science and technology strategy and direction in Canada while advancing the science and technology agenda nationally and internationally. He has served on national and regional committees, taskforces, and boards of several science and technology related organizations.

## Featured Session Speakers include:

### **Petri Vasara**

*Principal of New Technologies, Jakko Poyry Consulting (JPC)*

Market Opportunities for Forest Based Nanomaterials Session

Wednesday, 29 September 2010, 09:00-10:30

### **Steffi Friederichs**

*Director, Nanotechnology Industries Association (NIA)*

Consumer Perception/Regulation & Nanotechnology Session

Wednesday, 29 September 2010, 11:00- 12:00

08:00 - 08:45

**1 CONFERENCE OPENING AND INTRODUCTION BY CO-CHAIRS**

09:00 - 10:30

**2 NANOTECH COATINGS AND NEW-NANO-ENABLED FUNCTIONALITIES - PLENARY, Hall 1**

- Printed Electrodes on Tailored Paper Enable Electrochemical Functionalization of Paper, *Jouko Peltonen – ÅA*
- Thin Film Deposition Techniques - Steps Towards More Sustainable Packages, *Mika Vähä-Nissi-VTT*
- SUNPAP, Scale-up Nano Particles in Modern Papermaking, *Ulla Forsström – VTT*
- Amorphous and Crystalline Ultra Thin Films of Cellulose and Applications with Quartz Crystal Microgravimetry, Surface Plasmon Resonance and Other Surface Sensitive Techniques, *Orlando J. Rojas – North Carolina State University*

10:30 - 11:00

**BREAK, Upper Lobby**

11:00 - 12:30

**3 NANOTECH COATINGS AND NEW NANO-ENABLED FUNCTIONALITIES- PART 2, Hall 1**

- Inkjet Printing of Functional Nanoparticles, *Ramin R. Farnood – University of Toronto*
- Tactical Perception: Finger Friction, Surface Roughness and Perceived Coarseness of Printing Papers, *Mark W. Rutland – KTH*
- Ultra-Thin Coatings of Paper by Tailor-Made Nanoparticles, *Tiina Mypelö – Aalto University*
- Reduction of the Linting and Dusting Tendency of Newsprint by Using Nanocellulose Coatings, *Mikael Ankerfors – Innventia AB*

**4 WOOD PRODUCTS AND NANOTECHNOLOGY, Luolamies**

- Influence of Nano Coatings on the Hygroscopic Properties of the Wood, *Selamawit M. Fufa – Norwegian University of Science and Technology*
- Advanced Wood Products with Nanoengineered Surfaces, *Anne-Christine Ritschkoff, Salla Jäämsä, Riitta Mählberg, Juha Mannila, and Juha Nikkola, VTT Technical Research Centre of Finland, Shaoxia Wang and Jouko Peltonen, Åbo Akademi University*
- Using High Resolution Solution-State NMR Spectroscopy to Characterize Nanoscale Wood Cell Wall Polymer Modifications, *Daniel J. Yelle – University of Wisconsin-Madison*
- Potential of Wood Fibres and Nanoparticles in Light-Weight Foams, *Anne Savolainen – VTT*

12:30 - 14:00

**LUNCH – KEYNOTE: Potential of Cellulose Nanofiber-Based Materials, Hall 2**

*Dr. Hiroyuki Yano, Professor, Research Institute of Sustainable Humanosphere, Kyoto University*

14:00 - 15:30

**5 ORGANIZED STRUCTURES AND INTERACTIONS - PART 1: MATERIALS AND INTERACTIONS, Hall 1**

- Adhesion and Nanotribology of Biofibres, *Mark W. Rutland – KTH*
- Cellulose Nanocrystals: Novel Templates for the Synthesis of Nanostructures, *Robert Moon – Purdue University*
- Heterogeneous Modification of Cellulose Nanocrystals and Surface Assemblies, *Ilari Filpponen – Aalto and NC State University*
- Nanofibrillar Cellulose - in Vitro Study of Cytotoxic and Genotoxic Properties, *Marja Pitkänen – VTT*
- Stability of Cellulose Nanocrystal Suspensions in Electrolyte and Polymer Solutions, *Yaman Boluk – University of Alberta*

**6 CHARACTERIZATION TECHNIQUES- PART 1, Luolamies**

- Cellulose Nanocrystal Size Distribution Determination by Transient Electric Birefringence, *John Simonsen – Oregon State University*
- Anisotropic Elasticity of Crystalline Cellulose: Atomistic Modeling and Experiments, *Ashlie Martini – Purdue University*
- Crystallinities of Nanocrystalline and Nanofibrillated Celluloses by FT-Raman Spectroscopy, *Umesh Agarwal – Forest Products Laboratory*
- Influence of Fibrillation Degree and Surface Grafting of Micro-Fibrillated Cellulose on Their Rheological Behavior in Aqueous Suspension, *Julien Bras – LGP2 Laboratory of Pulp and Paper Science*
- Microstructural Characterization of Cellulose Nanostructures Extracted from Different Sources, *Sandra K. Tadokoro, Aji P. Matthew, Kristiina Oksman – Luleå University of Technology*

15:30 - 16:00

**BREAK, Upper Lobby**

16:00 - 17:30

**7 ORGANIZED STRUCTURES. PART 2: THIN FILMS AND INTERFACIAL ASSEMBLIES, Hall 1**

- Ultra Thin Films of Oriented Cellulose Nanocrystals by Electric Field-Assisted Convective Assembly, *L. Csoka – University of West Hungary*
- Unusual Morphology in Ultrathin Cellulose Derivative Blend Films, *Laura Nyfors – Aalto University*
- Structure of Nanofibrillated Cellulose Monolayers at the Oil/Water Interface, *Xhanari Ka – Norwegian University of Science and Technology (NTNU)*
- Hydrophobisation of Pulp Fiber with Multilayering of Saponified Rosin and PAH, *Sungrin Lee – Seoul National University*

**8 CHARACTERIZATION TECHNIQUES- PART 2, Luolamies**

- Interfacial Micromechanics of Tunicate and Cotton Whisker Polymer Nanocomposites Using Raman Spectroscopy, *Dr. Stephen Eichhorn – University of Manchester*
- Influence of Fibrillation Method on the Character of Nanofibrillated Cellulose (NFC), *T. Pöhler<sup>1</sup>, T. Lappalainen<sup>1</sup>, T. Tammelin<sup>1</sup>, P. Eronen<sup>2</sup>, P. Hiekkataipale<sup>2</sup>, A. Vehniäinen<sup>2</sup>, T.M. Koskinen<sup>2</sup>, The Finnish Centre for Nanocellulosic Technologies, VTT Technical Research Center of Finland<sup>1</sup>, Aalto University, School of Science and Technology<sup>2</sup>, UPM-Kymmene Oyj<sup>3</sup>*
- Characterization of Nanofibrillated Cellulose Samples Using X-ray scattering, Microtomography, Scanning and Transmission Electron Microscopy, *Kirsi Leppänen – University of Helsinki*
- The Rheological Behavior of High-Aspect-Ratio Nanocelluloses from Softwood Flour, *Guan Gong – Luleå University of Technology*

17:30 - 19:00

**9 POSTER SESSION, TABLETOP EXHIBIT AND PRODUCT DEMOS, Upper Lobby**

08:00 - 08:45

**10 KEYNOTE ADDRESS: "THEORY, MODELING, AND SIMULATION ON MULTIPLE SCALES FOR NANOTECHNOLOGY APPLICATIONS", Hall 1**

*Andriy Kovalenko – Senior Research Officer, Group Leader – Theory and Modeling, NRC-NINT and Adjunct Professor, Department of Mechanical Engineering, University of Alberta*

09:00 - 10:30

**11 NANOCELLULOSICS AND NANOCOMPOSITES - PLENARY, Hall 1**

- Nanoscale Cellulose Fibrils – Potential for Further Extension of the Mechanical Property Range in Fibrous Networks, *Lars Berglund – KTH*
- TEMPO-Oxidized Cellulose Nanofibers Prepared from Chemical Wood Pulps, *Akira Isogai – University of Tokyo*

10:30 - 11:00

**BREAK, Upper Lobby**

11:00 - 12:30

**12 COMPUTER MODELING – MULTISCALE MODELING METHODS FOR CELLULOSE STRUCTURE AND AGGREGATION, Hall 1**

- Coarse-Grained Material Properties for Fiber-Based Materials from Computer Simulations, *Mikko Alava – Aalto University*
- Multiscale Modeling of the Solvation Structure and Thermodynamics of Chemically Modified Nanocrystalline Cellulose, *Stanislav R. Stoyanov – Los Alamos National Labs*
- Computational Perspective to Cellulose Nanofibrils Through Atomistic Simulations, *Ippo Vattulainen – TUT*
- Smoothed Dissipative Particle Dynamics Model for Predicting Self-Assembled Nano-Cellulose Fibre Structures, *David Vidal – FP Innovations*
- Cellulose Crystal Structure and Forcefields, *Malin Bergensträhle – Wallenberg Wood Science Center, Royal Institute of Technology, Stockholm, Sweden*

12:30 - 14:00

**LUNCH, Hall 2**

14:00 - 15:30

**14 COMPUTER MODELING OF CELLULOSE PROPERTIES AND APPLICATIONS, Hall 1**

- Multi-Scale Modeling Environment for Nanocellulose Applications, *Erkki Hellen – VTT*
- Multi-Scale Modeling of Biomass and Its Degradation, *S. Gnanakaran – Los Alamos National Labs*
- Molecular Modeling of Ionic Liquids Aimed for the Dissolution of Cellulose, *Empu Salonen – Department of Physics, University of Helsinki and Kai Nordlund Department of Applied Physics, Aalto University*
- New Simulation Approach to Mechanical Properties of Nanocellulose Aerogels, *Jukka Ketola – VTT*
- How to Flocculate Rapidly with Polyelectrolytes, *Jan Forsman – Luleå University of Technology*

15:30 - 16:00

**BREAK, Upper Lobby**

Tuesday Technical Program continued...

16:00 - 17:30

**15 NANOTECH COATINGS AND NEW NANO-ENABLED FUNCTIONALITIES, Hall 1**

- **NanoCoating Close to the Market**, Moritz Eulenbourg-Coatema Coating Machinery GmbH
- **Using Thin-Crystal Engineered Kaolins to Enhance Mechanical Properties of Coatings**, John Husband – Imerys
- **Nano-Particle Products from New Mineral Resources in Europe**, John Kettle, Juha Sarlin, Ali Harlin, Sebastian Teir, and Lea Räsänen - VTT
- **Rheological Behavior of Different Bio-based Nanoparticles Suspensions**, Julien Bras- Laboratory of Pulp and Paper Science

**16 B NANOCELLULOSICS AND NANOCOMPOSITES - PART 3 Luolamies**

- **Carrot Nanofibers vs. Wood Pulp Nanofibers: Morphological and Mechanical Properties**, Gilberto Siqueira – Luleå University of Technology
- **Fibre Spinning Nanocomposites Based on Low-Cost Racemic Polylactide/Bacterial Cellulose Nano-Whiskers**, Alexander Bismark – Imperial College London
- **New Nanocomposite Concept Based on Crosslinking of Hyperbranched Polymers in Cellulose Nanopaper Templates**, Marielle Henriksson – KTH

- **Cellulose Nanofiber-Reinforced Unsaturated Polyester as a Potential Substitute for Glass Fiber-Reinforced Plastics**, Antonio Nakagaito – Kyoto University
- **Applications of Nanofibrillated Cellulose in Polymer Composites**, T. Zimmermann – Empa

17:30 - 18:30

**17 POSTER SESSION, TABLETOP EXHIBIT AND PRODUCT DEMOS, Upper Lobby**

19:00 - 21:30

**CRUISE AND DINNER**

Join your fellow delegates for a cruise to Suomenlinna, and dinner at the famous Walhalla Restaurant. Suomenlinna, one of islands off Helsinki, was built as a maritime fortress in the mid-18th century during the Swedish era. Today, it is a UNESCO World Heritage Site and one of Finland's most popular tourist attractions.

Restaurant Walhalla was built into the fortress as Helsinki prepared itself for the 1952 Olympic Games. The name of the restaurant is inspired by the Walhalla secret society that in the 1780s conspired against the Swedish king Gustav III. The name of the secret society, Walhalla, is from Scandinavian mythology, and is the place in the after world where heroes and warriors enjoyed an eternal feast.

Buses will depart from Dipoli at 18:30 for the harbour. Buses will return from the harbour at 21:30 to Dipoli first, then the Sokos Hotel Tapiola Gardens.

A separate registration is required for this event. Registration includes roundtrip ground transportation, the round trip cruise and food and beverage. Cost is \$148, €122.



**13 NANOCELLULOSICS & NANOCOMPOSITES - PART 2, Luolamies**

- **Single Step Functionalisation of Cellulose to Produce All-Cellulose Nanocomposites**, Alexander Bismark- Imperial College London
- **Nanowhiskers Reinforced All-Cellulose Composite Gels**, Lingyun Chen- University of Alberta
- **The Effect of Nano-Fibrillated Cellulose on the Mechanical Properties of Polymer Films**, Mike Bilodeau- University of Maine
- **Films Impact of Micro/Nanofibrillated Cellulose Preparation on the Reinforcement Properties of Paper and Composites**, Sandra Tapin-Lingua, Domaine Universitaire
- **Surface Modification of Bacterial Cellulose Nanofibrils: Why Do Cellulose Nanofibrils Behave Differently When Modifying Freeze-dried or Never-dried Bacterial Cellulose?** Koon Yang, Imperial College London

**16 A PANEL NCC VS MFC, Luolamies**

# Wednesday, 29 September

08:00-08:45

**18 KEYNOTE ADDRESS: BIO BASED NANO PARTICLE AND GREENER PRINTING INDUSTRY, Hall 1**  
Hadi Mahabadi –Vice President and Center Manager Xerox Research Centre of Canada

09:00-10:30

**19 NANOCELLULOSICS AND NANOCOMPOSITES – PART 4, Hall 1**

- **Cellulose Nanocrystals as Reinforcement of Poly (Vinyl Alcohol) Nanocomposites**, Maria S. Peresin – North Carolina State University
- **Microfibrillated Cellulose Reinforced Semi-Crystalline Poly(lactide) Acid Composites: Thermal and Mechanical Properties**, Lisman Suryanegara – Kyoto University
- **Properties of Bionanocomposites Made from Poly(lactide) Latexes and Microfibrillated Cellulose**, Karolina Larsson – Innventia AB
- **Novel Approach for Fabricating Optically Transparent Composites from Crab Shell**, Dr. Hiroyuki Yano – Kyoto University

**20 MARKET OPPORTUNITIES FOR FOREST BASED NANOMATERIALS, Luolamies**

- **The Road Ahead for Forest-Based Nanomaterials**, Petri Vasara – Poyry
- **Printed Biofuel Cells**, Maria Smolander – VTT
- **Cellulose Nanofiber Based Composites for Use as Ligament or Tendon Substitute**, Aji P Matthew – Luleå University of Technology
- **The Potential of Cellulose Nanofibrils for Stabilizing Commercial Paints**, Syverud Ka – PFI

10:30 - 11:00

**BREAK, Upper lobby**

Tuesday's Technical Program continues on next column...

Wednesday Technical Program continues on next page...



11:00 - 12:00

**21 CONSUMER PERCEPTION/REGULATION AND NANOTECHNOLOGY – PLENARY, Hall 1**

- TBA, Steffi Friedrichs – Nanotechnology Industry Association
- TBA, Antje Grobe – Risk Dialogue Foundation
- Three R's of Nano-Enabled Biomaterials and Bioproducts: Risk, Reward and Regulatory Issues, Lori Sheremeta – National Institute for Nanotechnology

12:00 - 13:30

**LUNCH, Hall 2**

13:30 - 15:00

**22 INTERFACIAL MICROMECHANICS, Hall 1**

- Adhesive Forces at Nanocrystalline Cellulose Surfaces, Roya R. Lahiji – University of Alberta
- Development of a Carrier System for Cellulose Nanofibrils (CN) in Polymer Composites, Alper Kiziltas – University of Maine
- Advanced AFM-based techniques for characterizing composite interphases, Siqun Wang – University of Tennessee
- Polysaccharide Interactions with Nanocellulose as a Platform for Biomimetic Modifications, Paula Eronen – Aalto University

**23 EU AND NA PUBLIC FUNDING, Luolamies**

- Public Funding from EU to Nanotechnology Related Research in Europe, Jyrki Suominen – European Commission, DG Research, Industrial Technologies Directorate
- Nanotech Finland from Vision to Commercialisation, Markku Lämsä – Tekes – the Finnish Funding Agency for Technology and Innovation
- A Canadian Perspective on Nanotechnology Funding with a Focus on Forestry Related Program, Mils Peterson – National Institute for Nanotechnology National Research Council
- Federally-Funded Nanotechnology Research in the United States, Chris Risbrudt – USDA Forest Service Forest Products Laboratory

15:00 - 15:30

**BREAK, Upper Lobby**

15:30 - 17:00

**24 NANOCELLULOSES AND THE BIOREFINERY, Hall 1**

- Aspects of Raw Materials and Processing Conditions on the Production and Utilization of Microfibrillated Cellulose, Kelley L. Spence – NCSU
- Hydrogels Based on the Cellulose Nanofibers Isolated from Plant Sources, Kentaro Abe – Kyoto University
- Novel Fractionation Techniques: Fractionation of MFC Suspensions in a Viscoplastic Fluid, A. Madani – University of British Columbia
- Novel Biorefinery: A Residue from Wood Bioethanol Production Converted into Cellulose Nanocrystals, Kristina Oksman – Luleå University of Technology
- Integrated Production of Nano-Cellulose with Ethanol from Woody Biomass, Junyong Zhu – USDA Forest Products Laboratory

**25 NANOMATERIALS AND BARRIERS, Luolamies**

- Semi Industrial Application of MFC Barrier Coating, A Complete Rheological and Technological Study, Marco Iotti – Norwegian University of Science and Technology (NTNU)
- Surface Modification of Microfibrillated Cellulose Films by Gas-Phase Esterification: Improvement of Barrier Properties, Galina Rodionova – Norwegian University of Science and Technology (NTNU)
- Composites Out of Nanofibrillated Cellulose and Clay for Barrier Applications in Packaging Materials, Thi Thu Thao – Empa
- Nanoparticle Deposition on Packaging Materials by the Liquid Flame Spray, Hannu Teisala – TUT



# The 2010 International Conference on Nanotechnology for the Forest Products Industry

## Additional Events Hosted by

There is no charge for these events. Separate registration is required.

**Friday, 24 September**

**FUNCTIONAL MATERIALS WORKSHOP**

**Thursday, 30 September**

- 08:30-12:00 - VTT Workshop - "Safety on Nanocellulose"
- 12:00 - 13:00 - Lunch
- 13:00 - 17:00 - EU FP7 project "Promine" Information Day

**Friday, 1 October**

- 9:00 - 12:00 - Tour of VTT



# Program Grid



Registration: Gala Lobby

Speaker Room: Klondyke

## Monday, 27 September

08:00 - 08:45	09:00 - 10:30	11:00 - 12:30	12:30 - 14:00	14:00 - 15:30	16:00 - 17:30	17:30-19:00
Conference Registration open						
<b>1</b> Conf. Co-chairs Introduction and State of the Art	<b>2</b> Nanotech Coatings & New Nano-Enabled Functionalities -Plenary	<b>3</b> Nanotech Coatings & New Nano-Enabled Functionalities - Part 2 <b>4</b> Wood Products & Nanotechnology	Lunch - <b>Keynote: Prof Hiro Yano Kyoto University Japan- "Potential of Cellulose Nanofiber-based Materials"</b>	<b>5</b> Organized Structures & Interactions -Part 1: Materials and Interactions <b>6</b> Characterization Techniques Part 1	<b>7</b> Organized Structures. Part 2: Thin Films and Interfacial assemblies <b>8</b> Characterization Techniques Part 2	<b>9</b> Poster Session Table Top Exhibit and Product Demos

## Tuesday, 28 September

08:00 - 08:45	09:00 - 10:30	11:00 - 12:30	12:30 - 14:00	14:00 - 15:30	16:00 - 17:30	17:30-18:30	19:00 - 21:30
Conference Registration open							
<b>10</b> Keynote- <b>Andriy Kovalenko - "Theory, Modeling, and Simulation on Multiple Scales for Nanotechnology Applications"</b>	<b>11</b> Nanocellulose & Nanocomposites - Plenary	<b>12</b> Computer Modeling - Multiscale Modeling Methods for Cellulose Structure and Aggregation <b>13</b> Nanocellulose & Nanocomposites - part 2	Lunch	<b>14</b> Computer Modeling of Cellulose Properties and Applications <b>16b</b> Panel NCC vs MFC	<b>16a</b> Nanocellulose & Nanocomposites - part 3 <b>15</b> Nanotech Coatings and New Nano-Enabled Functionalities	<b>17</b> Poster Session Table Top Exhibit and Product Demos	Boat to Waihalia Restaurant

## Wednesday, 29 September

08:00 - 08:45	09:00 - 10:30	11:00 - 12:00	12:00 - 14:30	14:30 - 15:00	15:30 - 17:00	17:30-19:30
Conference Registration open						
<b>18</b> Keynote- <b>Hadi Mahabadi- "Bio Based Nano Particle and Greener Printing Industry"</b>	<b>19</b> Nanocellulose & nanocomposites - part 4 <b>20</b> Market Opportunities for Forest Based Nanomaterials	<b>21</b> Consumer Perception/Regulation & Nanotechnology - Plenary	Lunch	<b>22</b> Interfacial Micromechanics <b>23</b> EU and NA Public Funding	<b>24</b> Nanocellulose & The Biorefinery <b>25</b> Nanomaterials and Barriers	Conference Wrap-Up Meeting (Committee Only)

## Thursday, 30 September

08:30-12:00	12:00 - 13:00	13:00 -17:00
Safety of Nanocellulose - VTT Workshop	Lunch	EU FP7 project "ProMine" Information Day "Future Nanotechnology Aspects of Printing Surfaces & Conductive Inks by Means of Nanometals" at VTT

## Friday, 1 October

09:00-12:00
VTT Tour

# Poster Sessions



**17:30 - 19:00** Monday, 27 September 2010

**17:30 - 18:30** Tuesday, 28 September 2010

## Poster Sessions and Table Top Exhibit and Product Demonstrations

**Precise Determination of (Nano)particle Emissions from Paper Surfaces via Acoustic Waves,**

Andreas Kornherr, Mondi Uncoated Fine Paper

**Modeling the Rheology of Nanocellulose Suspensions,** A. Puisto, Aalto University, School of Science and Technology

**Multiscale Modeling, Synthesis, and Application of Multifunctional Gelators,**

Sergey Gusarov and Andriy Kovalenko, University of Alberta

**Coarse-Grained Material Properties for Fiber-Based Materials from Computer Simulations,**

Mikko Alava, Aalto University

**Atomistic Modeling of Cellulose Nanofibrils: Elastic Properties,** J. L. McWhirter and Sami Paavilainen, TUT

**Atomistic Modeling of Cellulose Nanofibrils and Their Interactions,** S. Paavilainen, TUT

**Theory and Modeling at Multiple Scales for Understanding Supramolecular Self-Assembly, Solvation Effects, and Gelation,** Stanislav R. Stoyanov, National Institute for Nanotechnology, National Research Council of Canada

**Cellulose Fibers and Nanofibrils for Adhesive Reinforcement,**

Stefan Veigel, University of Natural Resources and Applied Life Sciences

**Cellulose Nanofiber (CNF) for Nanocomposites Production: Opportunities and Challenges,**

Hossein Yousefi, University of Tehran

**Preparation of Cellulose Nanofibrils from Short Staple Cotton Fibers / Cotton Linters by Homogenization and its Characterization,** A. K. Bharimalla, Central Institute for Research on Cotton Technology, Matunga, Mumbai

**Enzymatic and Acid Hydrolysis of Sisal Fibers: Morphological Aspects of Nanoparticles and Influence on the Mechanical Properties of Nanocomposites,** Gilberto Siqueira, PAGORA

**Bacterial Cellulose Biocomposites Based on Epoxidized Soy Bean Oil and Gelatin Matrices,**

C. Peña, University of the Basque Country

**Studies on Electrospun Chitosan Based Nanofibres Reinforced with Cellulose and Chitin Nanowhiskers,**

Valencia Jacobs, Luleå University of Technology

**Thermoplastic Composites Reinforced by Nanofibrils of Cellulose,** Yousoo Han, University of Maine

**Physicochemical Characterization of Nanofiber of Different Treatment on Kenaf Bast Fiber,**

Alireza Shakeri, Golestan University

**Flexible Filler Nanocellulose Structures,** Katariina Torvinen and Jenni Sievanen, VTT

**Bacterial Cellulose Coated "Hairy" Sisal Fibres for Renewable Hierarchical Composites,**

Anne Delille, Imperial College London

**Cellulosic Nanocomposites Reinforced with Nanocrystals Isolated from Hardwood Residues and Hybrid Poplar,**

Jingxin Wang, West Virginia University

**Water-binding Capacity of Nanofibrillar Cellulose,** Monika Österberg, Aalto University

## Poster Sessions *Continued*

**Nano-fibrillation of Wood Pulp Using a High-Speed Blender**, Kojiro Ueetani, Kyoto University

**Composite Materials of Cellulose Nanofibers and Natural Rubber**, Takeshi Nakatani, Kyoto University

**Nanocellulose based Materials with High Performances**, Hanna Lönnberg, SweTree Technologies AB

**Preparation and Characterization on Cellulose Nanofiber Paper**, Liyuan Zhang, Deakin University

**Mechanical Behavior of Recycled Fibers Coated by Silver Nanoparticles**, L. Csoka, University of West Hungary

**Aligned Cellulose Nanocrystals Deposited on Flat Supports by Convective Assembly**,

Ingrid C. Hoeger, North Carolina State University

**Poly(N-isopropylacrylamide) brushes grafted from Cellulose Nanocrystals via Surface-Initiated Atom Transfer Radical Polymerization (SI-ATRP)**, Justin Zoppe, North Carolina State University

**Optically Transparent Organic-Inorganic Hybrid Materials (OIH) Based on BC and Bohemite- Glycidoxypopyltrimethoxysilane (Boe-GPTS) Systems**, Hernane S. Barud, São Paulo State University-UNESP

**Photocromic Organic-Inorganic Hybrid (OIHs) Based on Bacterial Cellulose and Polioxometalate (POM)**,

Hernane S. Barud, São Paulo State University-UNESP

**Influence of Nanoclay on Physical and Mechanical Properties of Bio Fiber/ Plastic Composite**,

Hossein Khanjanzadeh and Taghi Tabarsa, Gorgan University

**Nanosized Coatings on Paper Using Electrospinning/Spraying Process**, P. Heikkilä, TUT

**Nanoscale Surface Processing with Atmospheric Plasma Technique**, Johanna Lahti, TUT

**Gas and Moisture Barrier on Bio-based Packaging Materials by Atomic Layer Deposition**, Terhi Hirvikorpi, VTT

**Papers Coated with a MODIFIED Pigment Obtained by in Situ Synthesis of Silica Film on PCC**,

José A.F. Gamelas, University of Coimbra

**Thin Coatings for the Paper by Foam Coating**, Karita Kinnunen, Tuomo Hjelt, Eija Kenttä, VTT

**Controlled Wettability of Paperboard by Nanoparticles Using Liquid Flame Spray Process**, Milena Stepien, AA/TUT

**Nanofibrillated Cellulose as Carrier of (Nano) Particles**, Kirsi Kataja, VTT

**Using Nanofibrillated Cellulose to Improve Biomaterials Properties for Packaging Applications**,

Susana Aucejo Romero, Packaging, Transport & Logistics Research Center

**Modifying Contact Angles on Lignin Surfaces By the Application Of Silica Nanoparticles**,

Lei Dong, Tiina Nypelö, Monika Österberg, Janne Laine, and Mikko Alava, Aalto University

**Cellulose Nanoparticles and Alginate Encapsulation for Their Use in Extrusion Process**,

Julien Bras - Laboratory of Pulp and Paper Science

**Processing and Characterization of Melt Spun Bio-Nanocomposite Fibres**, Maya Jacob John & Aji Mathew, Luleå

University of Technology



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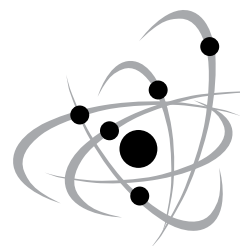
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## Membership Value

TAPPI's Mission is to engage the people and resources of our Association in providing sound solutions to the workplace problems and opportunities that challenge our current and future members.

### What is TAPPI?

TAPPI is the world's largest association of professionals in the pulp, paper, packaging and converting industries. TAPPI provides members with Access to Knowledge and Access to Networks to gain information, share insights with others who face similar challenges, and contribute more fully to your employer, industry associates and society.

#### History

Most occupations, professions, and pursuits have professional societies or associations that serve to enhance the knowledge base and activities of the group. For example, physicians have medical associations, and meteorologists have the meteorological society. Such organizations owe their origin to the trade guilds of the Middle Ages, and have flourished particularly in the USA during the past 100 years.

TAPPI's founding name (from the early 1900's) was the Technical Association of the Pulp and Paper Industry. In addition to pulp and paper, TAPPI has expanded to allied areas of packaging (such as corrugated and flexible packaging, lamination, adhesions, coatings and extrusion).

#### Non-Profit Status

As an association, TAPPI is a registered not-for-profit, NGO (Non-Governmental Organization) comprised of about 10,000 member engineers, scientists, managers, academics and others from around the world involved in the areas of pulp, paper, and packaging. TAPPI provides a peer-reviewed, scientific forum of quality for its members to gain knowledge and networks to help them in their professional lives.

#### Purpose

TAPPI provides a forum of exchange for the professionals involved in the industry and conducts activities to keep them informed and connected. TAPPI publishes articles and books and conducts

events for peer-reviewed information relevant to the industry. TAPPI's website serves as a ready focal point for the members' access to knowledge and networks. This access helps improve the industry and its contributions to society.



### Why Join TAPPI?

The following are the top ten reasons\* members gave for joining TAPPI:

1. [www.tappi.org](http://www.tappi.org) - technical information from members-only website
2. Events - key information at conferences, exhibits, courses
3. Latest business news compiled each week
4. Networking opportunities
5. TAPPI JOURNAL
6. TAPPI Standards and TIPS
7. Paper360° magazine
8. Enhance my personal standing in the industry
9. Discounts on TAPPI events and books/CDs
10. Support for industry programs (scholarships, awards, environmental outreach)

*\*Results from a recent survey of TAPPI Members.*

(random, 95% confidence, +/-5% MOE)

[www.tappi.org](http://www.tappi.org)

To talk directly with someone about becoming a member, contact:

TAPPI Member Connection at

800-332-8686 (US), 1-800-446-9431 (Canada), +1-770-446-1400 (Worldwide),

Fax +1.770.209.7206 • email [memberconnection@tappi.org](mailto:memberconnection@tappi.org)



# Sustaining Members



## Sustaining Member Companies as of August 24, 2010

A. H. Lundberg Associates Inc.  
Acuren Inspection Inc.  
Air Conveying Corporation  
Al Zeina Tissue Mill Company  
Alliance Machine System Int'l.  
Allison Systems Corporation  
American Process Group  
Andritz Inc.  
ASD Inc.  
Ashland Hercules Water Technologies  
AstenJohnson  
BASF Corporation  
BE&K Engineering Company  
Bercen Inc.  
BHS Corrugated North America  
Bobst Group North America  
BTG Americas Inc.  
Buckman  
Cargill Inc.  
Cartones De Guatemala S.A.  
CE Power Solutions, LLC  
Celulosa Argentina S. A.  
Celulose Nipo-Brasileira S.A.  
Centre Technique Du Papier  
Chemical Research Technology  
Chemstone Inc.  
Chemtreat Inc.  
Copar Corporation  
Corn Products International Inc.  
Corrugated Gear & Services Inc.  
Crane & Company Inc.  
Diamond Power International Inc.  
DICAR Inc.  
Domtar Paper Co. LLC  
Donahue & Associates Intl. Inc.  
Dow Chemical  
DuPont Soy Polymers  
Efacec USA, Inc.  
Eka Chemicals Inc.  
ERCO Worldwide  
Ernest Paper  
Essco Inc.  
Fibria Celulose SA  
FM Global  
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Fosber America Inc.  
George M. Martin Company  
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Goss International Americas Inc.  
Grain Processing Corporation  
Hansol Paper  
IMERYS  
Innovia Films Inc.  
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INX International Ink Company  
Kadant Inc.  
Kamin LLC  
Kemira  
KSH Solutions Inc.  
Lachenmeier  
Leo Paper Group  
Longview Fibre Paper and Packaging Inc.  
Lorentzen & Wettre USA Inc.  
LS Mtron Ltd.  
MarquipWardUnited  
Metso Paper  
Mica Corporation  
Michelman  
Mid-Atlantic Packaging  
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MWV Center for Packaging Innovation  
NewPage  
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NSK Corporation  
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OpTest Equipment Inc.  
Orange County Container Group  
OYKA Paper & Packaging Inc.  
Pacific Southwest Container  
Packaging Corp. of America  
Panther Systems Inc.  
PaperWorks Industries Inc.  
Penford Products Company  
Poyry (Appleton) LLC  
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Roberts PolyPro Inc.  
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# Meets



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# General Information



**PLEASE TURN OFF ALL CELLULAR PHONES, BLACKBERRIES AND BEEPERS WHILE ATTENDING SESSIONS**

## **ADA Assistance**

Attendees with special needs are encouraged to contact the staff at the TAPPI Registration Desk so TAPPI can make your participation more enjoyable and meaningful.

## **Antitrust Policy Statement**

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.

## **Badges**

Please wear your badge on your right lapel unless you are provided a lanyard. It is important that the official badge supplied at the time of registration be worn at all times. This practice is a courtesy to your fellow registrants. It also indicates that you have completed registration and may participate in the events scheduled. Admission to technical sessions and workshops will be by badge only.

## **Information Desk, Message Center and employment Board**

A bulletin board is available to post positions available and resumes. Notices of telephone calls, messages, special meetings or meeting time changes can also be posted.

## **Hosted Events not sponsored by TAPPI**

All company hosted events (customer meetings, social events, etc.) that are not officially a part of TAPPI's program may not conduct group functions which compete with scheduled TAPPI activities, such as technical sessions, committee meetings, receptions, award ceremonies, group meals and trade fairs or exhibits.

If you are planning to host a group event, please check with the TAPPI Account Manager to avoid conflict.

## **TAPPI's Policy regarding equipment at non-exhibit events**

TAPPI prohibits the unauthorized physical display or demonstration of equipment in sessions, workshops, or committee meetings held during TAPPI seminars, short courses, conferences, or other meetings, unless approved by the TAPPI Account Manager. This prohibition does not preclude the graphic non-commercial depiction of equipment via slides, pictures, or video tape. This prohibition is intended to preclude commercialism and to minimize attendee exposure to potentially dangerous equipment and to avoid conflicts with contractual and governmental requirements regarding the use of meeting facilities. All inquiries should be directed through the TAPPI Account Manager on-site.

## **Lost and Found**

Articles which are found should be brought to the Registration Area. Please note the room in which the article was found for the purpose of tracing it to the appropriate owner.

## **Membership and Publication Information**

TAPPI membership dues, membership applications (TAPPI and committee), and requests for TAPPI publications may be obtained the membership booth or at registration.

## **Nonmembers of TAPPI**

If you apply for membership in TAPPI while at this meeting, you will be able to register at the member rate. Take advantage of this opportunity to join TAPPI and save money.

## **Photographic Consent**

Photographs may be taken during this meeting for TAPPI to use for publicity purposes. A registrant's presence at the meeting constitutes consent for TAPPI to use the photographs in which he or she may appear.



## General Information *Continued*

### Ribbons

Association, technical division, and committee officers are requested to pick up their ribbons at the registration desk. Session chairmen and speaker ribbons will also be available at the registration desk.

### Use of Personal Video recorders at Technical sessions

The use of personal camcorders to record technical sessions at TAPPI conferences is strictly prohibited. Only TAPPI's official designee is authorized to video tape sessions.

Should a company and/or individual seek to violate this prohibition, that company and individual will be barred from giving technical presentations at TAPPI sponsored events for a period of two years, that period starting from the date of infraction. TAPPI staff is authorized to have equipment in violation of this policy immediately removed upon detection and shipped to the owner's principle location at the owner's expense. Inquiries on this policy should be directed to the TAPPI Meetings Department, c/o TAPPI headquarters.

## 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.

**Note:** After any emergency, contact your home and office so all can be assured of your safety.

## General Safety Tips

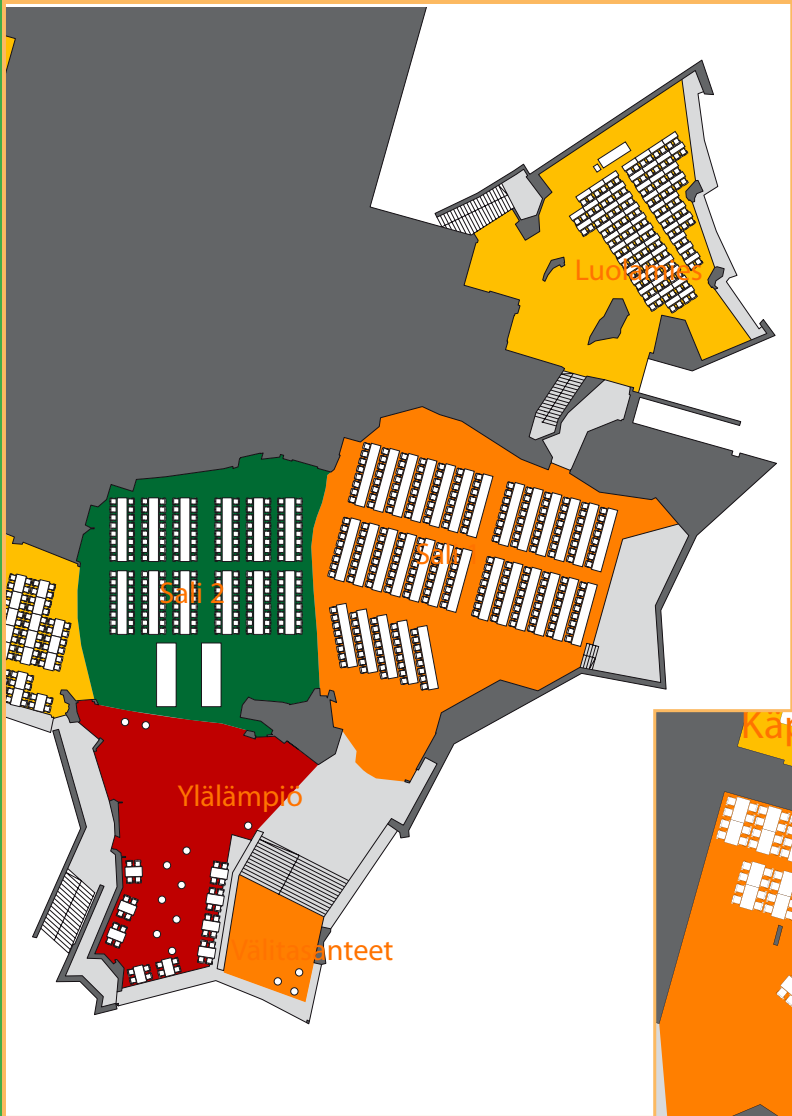
To make your conference experience a safe and enjoyable one, please keep the following safety tips in mind. While you are out of the hotel, please know that, like in all cities, awareness and caution are certain to help ensure your safety. A common crime is pick pocketing, with women's purses being the 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.



**Please continue to check [www.tappi.org](http://www.tappi.org) for more information on the  
2011 TAPPI International Conference on  
Nanotechnology for the Forest Products Industry  
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