

2012 TAPPI INTERNATIONAL CONFERENCE

ON NANOTECHNOLOGY FOR RENEWABLE MATERIALS

June 4-7, 2012

Hyatt Regency Montréal • Montréal, Québec CANADA

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2012 TAPPI INTERNATIONAL CONFERENCE

Dear Colleagues,

Welcome to TAPPI's 2012 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 and development in nanomaterials as well as near-commercial applications.

This year's program continues our annual focus on environmental, health, and safety risk assessment issues as well as national and international standards for cellulosic nanomaterials. Developing standards become increasingly important as nanomaterials enter the marketplace.

As has become a tradition, the Technical Program Committee has invited a number of keynote speakers to address critical issues surrounding research, development and commercialization of renewable nanomaterials and nano-enabled products. 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.

While the conference has a challenging program, we have provided opportunities for personal and professional networking. To further help build the community of people interested in and promoting renewable nanomaterials and nano-enabled products, TAPPI has started a Nanotechnology Division. We invite you to join in organizing and developing the programs and activities of TAPPI's newest division. We further invite you to talk with us or any of the TAPPI staff about the Nanotechnology Division.

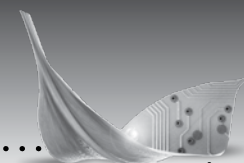
Welcome to a full engagement meeting on the most exciting development area in the renewable materials arena!

Conference Co-Chairs:

Ron Crotogino

Patrice Mangin

Robert Moon



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AMERICAN ELEMENTS

American Elements is the world leader in commercializing developments in materials science. Expertise in ultra high purity renewable materials, nanoparticles, nanopowder, nanotubes, nanofluid, nanowires and ultra-fine submicron powders allows us to meet the needs of a wide variety of industry groups, including energy, aerospace, optics, automotive, military and pharma/cosmetics.



ANASYS INSTRUMENTS

Anasys Instruments is dedicated to delivering innovative products and solutions that analyze samples with spatially varying physical and chemical properties at the micro and nanoscale. Anasys Instruments introduced the AFM-TA technique in 2006 which pioneered the field of nanoscale thermal property measurement. In 2010, Anasys Instruments proudly introduced the award-winning breakthrough AFM-IR technique which pioneered the field of nanoscale IR measurement.



ARBORA NANO

ArboraNano is a Business-Led Network of Centres of Excellence, funded jointly by the Canadian Federal Government, the private sector and provincial sources to stimulate industrial innovation. The primary focus of this partnership of the forest products and other manufacturing industries, universities, research institutes and government organizations is to develop new high-value manufactured products from forest-derived nanomaterials.



CELLUFORCE

CelluForce is the world leader in the commercial development of NCC. The company is a joint venture of Domtar Corporation and FPInnovations. We invite you to visit the world's first NanoCrystalline Cellulose (NCC) plant located in Windsor, Quebec on June 4, 2012. Departure is scheduled at 11am with a return planned for 4pm. The CelluForce team will be on site to explain some of the manufacturing processes and answer questions. Please note that pictures and/or video will be forbidden.

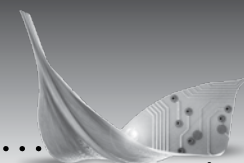


FOREST PRODUCTS ASSOCIATION OF CANADA

The Forest Products Association of Canada (FPAC) works on behalf of Canada's wood, pulp, and paper producers at both the national and international levels, representing industry interests on a wide variety of issues, particularly those related to the economy, trade, and the environment.



ON NANOTECHNOLOGY FOR RENEWABLE MATERIALS



FPInnovations

FPInnovations is a world leader that performs research and development, innovates and delivers creative solutions in support of the Canadian forest sector's global competitiveness, for every area of the sector's value chain, - from forest operations to consumer and industrial products. FPInnovations employs a workforce of 550. Its facilities are located across Canada.



Institute of Paper Science & Technology @ Georgia Tech

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 including new pulp and paper products.



ONTARIO BIOAUTO COUNCIL

The Ontario BioAuto Council is an industry-driven, not-for-profit organization established in 2007 with funding from the Ontario Government. The Council has broad national and international membership. Its goal is to help companies bring new bio-products to the global marketplace. The Council is also a member of Ontario's Network of Excellence.



QUEBEC NANOTECHNOLOGY INFRASTRUCTURE

Under the banner of NanoQuébec, the Quebec's Nanotechnology Infrastructure (QNI) gives optimal access to a full range of state-of-the-art nanotechnology equipment and expertise. With + \$300 M in equipment and +300 qualified persons, the QNI provides services including training, use of equipment and projects delivery from RD to application



USDA FOREST PRODUCTS LABORATORY

The USDA Forest Service is studying nanomaterials derived from a renewable source. Lignocellulose is one of the most abundant biological raw materials, and the nanocrystals derived from it can offer a wide range of new or enhanced materials and products as cost-effective, sustainable substitutes for products currently made from non-renewable materials.



ArboraNano



Creating opportunities for innovation.

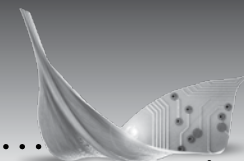
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ON NANOTECHNOLOGY FOR RENEWABLE MATERIALS



Keynote Address

Renewable Materials for Information Technology Applications • by Dr. Dylan J. Boday

Tuesday, June 5, 12:30 pm - 2:00 pm



Dr. Dylan J. Boday is the Advisory Engineer Team Lead for IBM's Materials Engineering Laboratory. In this role, he leads efforts across multiple divisions to advance technological capabilities and enhance product performance.

Dylan's research at IBM focuses on creating inventive pathways toward the development of polymers, composites, surface science, nanoparticles and hybrid materials. He has organized several strategic partnerships to leverage new materials development that align with specific business needs for IBM. He also established and now leads a global team focused on the sustainability of IBM's products and is the co-lead of an upcoming international conference that will focus on the advances and challenges of sustainable materials.

As a member of the American Chemical Society Polymer Board, he provides leadership to the broader polymer science field. His technical contributions have led to more than 30 patent filings in the areas of electrostatic discharge and thermally conductive composites, functional nanomaterials and printed circuit board materials. He also has numerous published articles on composites, self healing materials and anti-corrosion coatings, in addition to serving as a reviewer for several scientific journals. In 2011, he was named an IBM Master Inventor and is a member of the IBM Smarter Planet invention review board.

Dylan holds a bachelor's degree in Chemistry and a doctorate degree in Materials Engineering from the University of Arizona.

The Business of innovation – CelluForce, a case study • by Jean Hamel and Jean Moreau

Abstract

Wednesday, June 6, 8:00 am - 8:45 am

Nanocrystalline cellulose (NCC) was a laboratory curiosity no more than six years ago. It exhibited some intriguing properties, but any serious efforts to exploit these commercially were thwarted by the limited availability of this material. Production of NCC in university laboratories was measured in grams per week. As part of an aggressive Transformative Technologies program for the forest products industry, FPInnovations made the decision to produce NCC in sufficient quantities to evaluate the potential of this material for use in a wide variety of application. Pilot-scale production of this material, now measured in kilograms per week, quickly revealed the potential of this material for application in a wide range of products, and a decision was made to go build a commercial demonstration plant with a capacity of one tone/day. The Celluforce facility in Windsor, Québec officially opened its door on January 26, 2012. This scale-up from grams/week to tonnes/week, six orders of magnitude in six years, was driven by a clear focus on high-value product innovation, and executed by rigorous application of the principles of concurrent engineering. This case study for the business of innovation has become a template for development of other promising new forest products.



Jean Moreau, President and Chief Executive Officer, Celluforce. As President and CEO of CelluForce since February 2011, Jean Moreau brings a wealth of experience in finance, operations and business development which he acquired in both private and public corporations, in various fields including manufacturing, entertainment, distribution and consumer goods.

A chartered accountant for over 10 years at Arthur Andersen and Co., Mr. Moreau was responsible for the acquisition of numerous large companies and plants.

Among others, he headed financial and production planning teams as Vice President of Finance, Paper Production sector and Vice President of Supply for Domtar. As Chief Financial Officer, he was also involved in the introduction of the Supremex Income Fund on the Toronto Stock Exchange, raising \$300M in capital funding and, in addition was responsible for the implementation of a strategic business plan at Guess Canada, which was subsequently named one of Canada's 50 Best Managed Companies.

As head of the CelluForce team, Jean wished to promote, within several sectors of activity, the development of commercial applications related to NCC around the world, thus ensuring the company's manufacturing and commercial growth.



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Jean Hamel, Eng. Vice President, FPIInnovations

JEAN HAMEL received his B.Sc. (1983), and M. Eng. (1985), in Mechanical Engineering from the University of Sherbrooke. He joined Pulp and Paper Research Institute of Canada (Paprican) as a Research Engineer to work on the technical development, optimization and troubleshooting of paper finishing equipment. In 1995 he joined St-Laurent Paperboard as a Senior Process Engineer to work on product development, paper machine optimization and start-up of new finishing equipment. In 1996, he returned to Paprican where he led the construction of the pilot paper machine and developed the new Roll Testing Facility, the first business unit concept of the organization. In 2004 he became Manager of the Product Performance Program. Soon after merging of three research institutes (Paprican, Forintek, FERIC) to form FPIInnovations in 2007, he was named the Director of Research for the Pulp & Paper Division of FPIInnovations where he focused on accelerating the technology transfer and developing new innovation processes. Since 2009 he has been the Vice President of FPIInnovations, leading the innovation program on pulp and paper and shifting the R&D effort to develop new chemicals, biomaterials and composites from wood fibers. He currently sits on the boards of CelluForce, a Domtar-FPIInnovations joint venture on nanocrystalline cellulose (NCC) production, Sustainable Chemistry Alliance (SCA), ICGQ, ADRIQ and NSERC Green Fiber Network.

Perspective on EHS Nanotechnology Science and Standards Development

by Andy Atkinson, Health Canada, Environment Canada



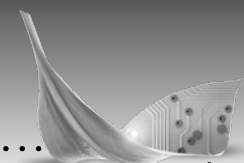
Thursday, June 7, 8:00 am - 8:45 am

Andrew Atkinson is currently Manager of the Emerging Science Policy group under the Strategic Policy Branch of Health Canada.

Andrew is currently overseeing coordination of science policy issues across the various regulatory and research programs under the mandate of Health Canada. Prior to Health Canada, he was a manager under Environment Canada's CEPA new chemicals program, where he oversaw chemical and nanomaterial risk assessments, as well as the development of risk assessment methodologies.

In parallel to domestic work, he has been actively engaged in ISO and OECD nanotechnology efforts, including co-chairing groups on nomenclature of nano-objects under ISO TC229.

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Technical Program

(Subject to Change)

Monday, June 4

11:00 am - 4:00 pm

Session: Cellulforce Tour

6:00 pm - 6:30 pm • Grand Salon Opera A

Session: Speaker/Session Chair Meeting Reception

6:30 pm - 7:30 pm • Grand Salon Opera A

Session: Welcome Reception

Tuesday, June 5

8:00 am - 8:45 am • Grand Salon Opera B

Session 1: Welcome & Introductions

Session Chair: *Patrice Mangin*, Lignocellulosic Materials Research Centre/UQTR

Norman Marsolan, TAPPI Board of Directors Chairman

Pierre LaPointe, Conference Chairman

"Overview of Nanomaterials"

TBD

9:00 am - 10:30 am • Grand Salon Opera B

Session 2: Nanocellulosics and Nanocomposites: Solutions

Session Chair: *Johan Foster*, University of Fribourg

"Gelation of Cellulose Nanocrystal Suspensions in Glycerol"

Derek Gray, McGill University, Department of Chemistry

Annie Dorris, FPIInnovations

"Ionic Crosslinking of Cellulose Nanocrystals"

John Simonsen, Oregon State University

Han Chan, Oregon State University

"Characterization and Application of Bio-Based Nanofibers Prepared Using Aqueous Counter Collision for Composites and Surface Coating"

Tetsuo Kondo, Kyushu University

Session 3: Nanomaterials Characterization

Grand Salon Opera C

Session Chair: *Stephanie Beck*, FPIInnovations

"Mechanical Testing of Thin Film Nanocellulose Materials"

Emily Dawn Cranston, McMaster University

"Gaining Insights into Polymer Microdomain Formation via Nanoscale Infrared Spectroscopy"

Roshan Shetty, Anasys Instruments Corp.

"Nanomechanical Measurements of Cellulose Nanocrystals using the Atomic Force Microscope"

Ryan Wagner, Purdue University

Robert Moon, USDA Forest Service

Arvind Raman, Purdue University

***TAPPI has relaxed their commercialism guidelines for this Conference.**





2012 TAPPI INTERNATIONAL CONFERENCE

Tuesday, June 5

11:00 am - 12:30 pm • Grand Salon Opera B

Session 4: Nanocellulosics and Nanocomposites

Session Chair: *John Simonsen*, Oregon State University

"Use of Förster Resonance Energy Transfer (FRET) as a New Characterization Method for the Interface and Interphase in Nanofibrillated Cellulose Nanocomposites"

Jeffrey W. Gilman, NIST

"Cellulose Composites with Light-Responsive Behaviour"

Johan Foster, University of Fribourg

Mahesh Biyani, Adolphe Merkle Institute

Christoph Weder, Adolphe Merkle Institute

"Melt Processing of Polymer Nanocomposites Reinforced with Cellulose Nanocrystals"

Alain Dufresne, PhD, Grenoble Institute of Technology

12:30 pm - 2:00 pm • Grand Salon Opera B

Session 6: Keynote

Session Chair: *Robert J. Moon*, USDA Forest Service

"Renewable Materials for Information Technology Applications"

Dr. Dylan J. Boday, Advisory Engineer Team Lead, IBM's Materials Engineering Laboratory

2:00 pm - 3:30 pm

Session 7: Cellulose Nanomaterials Processing I

Grand Salon Opera C

Session Chair: *Bruce Lyne*, KTH

"Dispersing Dried Nanocrystalline Cellulose in Water"

Stephanie Beck, FPIInnovations

Richard M. Berry, FPIInnovations

Jean Bouchard, FPIInnovations

"Spray-Drying Cellulose Nanofibrils: the Effect of Spray Drying Processing Parameters on Particle Morphology and Particle Size Distribution"

Douglas J. Gardner, University of Maine

"Interfacial Design of Cellulose-Based Nanomaterials by Chemical Modification"

Shingo Yokota, Kyushu University

Session 5: Nanostructured Materials by Self Assembly

Grand Salon Opera C

Session Chair: *Derek Gray*, McGill University

"Processing and Characterization of High Strength Nanocellulose Films"

Jeffrey Youngblood, Purdue University

Robert Moon, USDA Forest Service

Jen-Chieh Liu, Purdue University

Jairo Diaz, Purdue University

Alex Riesing, Purdue University

"Crystallization of Cellulose Nanocrystal/Polyhydroxybutyrate Nanocomposites"

Stephanie Lin, Georgia Institute of Technology

"Flocculation of Cellulose Nanocrystals by Adsorbing and Non-Adsorbing Polymers"

Yaman Boluk, Ph.D., University of Alberta

Christophe Danumah, National Institute for Nanotechnology

Zahra Khalili, University of Alberta

Session 8: Nanotech Coatings and Novel Nano-Enabled Functionalities I • Grand Salon Opera B

Session Chair: *Jean Bouchard*, FPIInnovations

"Transition Metal Oxide - Nanofibrillated Cellulose Composite Films for Photocatalytic Degradation of Pollutants in Water"

Alexandra Snyder, Purdue University

Robert Moon, USDA Forest Service

Lia Stanciu, Purdue University

"Effect of Nanocrystalline Cellulose on Trimethylolpropane Trimethacrylate Grafted Methylcellulose-Based Biodegradable Films"

Stephane Salmieri, INRS-Institute Armand Frappier

Ruhul Khan, Post Doc, INRS-Institute Armand Frappier

Dominic Dussault, INRS-Institute Armand Frappier

Jean Bouchard, FPIInnovations

Monique Lacroix, INRS-Institute Armand Frappier

"Inclusion of Nanocellulose in Coatings for Wood"

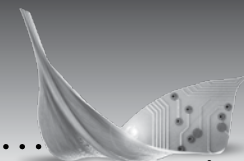
Bouddah Poaty, Université Laval - Centre De Recherche Sur Le Bois

Greg Chauve, FPIInnovations

Veronic Landry, FPIInnovations

Bernard Riedl, Centre de Recherche sur le Bois

ON NANOTECHNOLOGY FOR RENEWABLE MATERIALS



Tuesday, June 5

4:00 pm - 5:30 pm

Session 9: Cellulose Nanomaterials Processing II

Grand Salon Opera C

Session Chair: Alain Dufresne, Grenoble Institute of Technology

"Specific Conditions for Isolation Nano-Crystalline Cellulose Particles"

Michael Ya. Ioelovich, Designer Energy

"Gradual Disintegration Procedure in Optimization of Chemical Mechanical Treatment for Micro- and Nanocellulose Production"

Kaarina Kekalainen, University of Oulu

Mirja Illikainen, PhD, University of Oulu

Jouko Niinimäki, PhD, University of Oulu

"Development of Birch Cellulose Properties in Microfibrillation by Stirred Media Milling and Homogenization"

Terhi Tuulikki Suopajarvi, University of Oulu

5:30 pm - 7:30 pm • Grand Salon Opera A

Session 11: Table Top Reception and Poster Session

Session Chairs: Robert J. Moon, USDA Forest Service;

Patrice Mangin, Lignocellulosic Materials Research Centre/UQTR

"Molecular Modeling of Cellulose: Self-Assembly, Interactions with Water, and Intermolecular forces"

Ali Chami, University of Quebec

"Modification of NCC for improving the wetting property with polyurethane"

Hao Zhang, Beijing Forestry University

"Comparison Of Cellulose And Starch Nanocrystals As Bio-Based Nanofillers In Reinforced Natural Rubber"

Julien Bras, Grenoble INP Pagora - LGP2

"Barrier properties of specialty papers coated with microfibrillated cellulose: influence of base paper and coating weight"

Julien Bras, Grenoble INP Pagora - LGP2

"Surface energy characterization of cellulosic fibers in micron/nano-scale using inverse gas chromatography Yucheng Peng, and Yousoo Han AEWC Advanced Structures and Composites Center, University of Maine, Orono, Maine"

Yucheng Peng, University of Maine

Douglas J. Gardner, University of Maine

Yousoo Han, PhD, University of Maine

"Molecular modeling on the cholesteric liquid crystalline phase of nanocrystalline cellulose: Fundamental interactions."

Philippe Bourassa, Université Du Québec Trois-Rivières

Sylvain Robert, Director, LMRC, Univ. Du Québec A Trois-Rivières

Session 10: Nanotech Coatings and Novel Nano-Enabled Functionalities II • Grand Salon Opera B

Session Chair: Yaman Boluk, Ph.D., University of Alberta

"Control of Surface Energy of Paper by Starch Self-Organization"

Mika L.J. Anttila, VTT Technical Research Centre of Finland

"Potential Applications of Nanofibrillated Cellulose in Printing and Writing Papers"

Michael A. Bilodeau, University of Maine

Douglas Bousfield, University of Maine

"Microencapsulation of Lactobacillus Rhamnosus ATCC 9595 in Alginate-Nanocrystalline Cellulose (NCC) Beads: Effect of Starch and Lecithin"

Tanzina Huq, Student, INRS-Institut Armand Frappier

Jean Bouchard, FPIInnovations

Carole Fraschini, FPIInnovations

Bernard Riedl, University Laval

Stephane Salmieri, INRS-Institut Armand Frappier

"Antimicrobial Nanocomposite Films for Food Packaging"

Avik Khan, INRS-Institut Armand Frappier

Jean Bouchard, FPIInnovations

Dominic Dussault, INRS-Institut Armand Frappier

Bernard Riedl, University of Laval

Stephane Salmieri, INRS-Institut Armand Frappier

"Multiscale modeling of the structure, thermodynamics and interactions of nanocrystalline cellulose particles in electrolyte solutions"

Stanislav R. Stoyanov, National Institute for Nanotechnology

Olga Lyubimova, University of Alberta

Javier Cuervo, University of Alberta

Sergey Gusarov, National Institute for Nanotechnology
Alexander Kobryn

Andriy Kovalenko, National Institute for Nanotechnology

"Multiscale modeling of pristine and modified nanocrystalline cellulose particles in different solvents: Microscopic origin of dispersion properties and cholesteric behavior"

Javier Cuervo, University of Alberta

Student Poster Session Judge: Ronald C. Sabo, Jr., USDA FS
Forest Products Laboratory

"Piezoelectricity of BCNs"

Levente Csoka, University of West Hungary

"Nanocellulose produced..."

Katalin Halasz, University of West Hungary

"Paper Mill Residue Utilization to make thinner, stronger papers with targeted specific paper properties. - The combination of Layer-by-Layer nanocoating and molecular mitigation technologies."

George Grozdits, Louisiana Tech University

Katalin Halasz, University of West Hungary

Thank you to our Student Poster Competition Sponsor, Sappi Fine Paper North America

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Wednesday, June 6

8:00 am - 8:45 am • Grand Salon Opera B

Session 12: Keynote

Session Chair: Ron Crotogino, ArboraNano

"The Business of Innovation – CelluForce, A Case Study"

Jean Hamel, FPInnovations

Jean Moreau, CelluForce

9:00 am - 10:30 am

Session 13: Applications I: Novel

Application Possibilities • Grand Salon Opera B

Session Chair: Sean Ireland, Verso Paper

"Cellulose Nanofiber Composite Substrates for Flexible Electronics"

Ronald C. Sabo, Jr., USDA FS Forest Products Laboratory

Zhenqiang Ma, University of Wisconsin-Madison,

Department of Electrical & Computer Engineering

Jung-Hun Seo, University of Wisconsin-Madison, Department of Electrical & Computer Engineering

"Structured Nanocellulose Materials: Preparation,

Functionalization and Templates for Transparent Composites"

Hong Dong, US Army Research Laboratory

"Value from Nano for the Forest Products Industry: Presenting Opportunities and Up-Dating a Vision"

Katja Bergroth, Poyry Management Consulting Oy

11:00 am - 12:30 pm

Session 15: Applications I: Packaging

Material Applications • Grand Salon Opera B

Session Chair: Ulla M. Forsström, PhD, VTT Technical Research Centre of Finland

"The Potential Use of Micro- and Nano Fibrillated Cellulose as a Reinforcing Element in Paper and Board Based Packaging"

Isko Kajanto, UPM

"Replacement of Synthetic Binders with Nanofibrillated Cellulose in Board Coating"

Heikki Pajari, VTT Technical Research Centre of Finland

Pertti Moilanen, VTT Information Technology

"Antimicrobial Copper Nanoparticles in Cellulose-Based Food Packaging Materials"

Gloria S. Oporto, West Virginia University

Tuhua Zhong, West Virginia University

Wednesday, June 6

12:30 pm - 2:00 pm • Grand Salon Opera A

Session 17: Networking Lunch • Grand Salon Opera C

Session Chair: Ronald C. Sabo, Jr., USDA FS Forest Products Laboratory

Student Poster Winners Announced, TAPPI Nanotechnology Division Update

2:00 pm - 4:30 pm • Grand Salon Opera B

Session 18: Workshop on Business Innovation and Convince the Investor

Session 14: Applications II/Composites • Grand Salon Opera C

Session Chair: Johanne Denault, National Research Council Canada, Industrial Materials Institute

"Nanocrystalline Cellulose as a Green Reinforcing Material for Wood Adhesives"

Alireza Kaboorani, University Laval

Marco Fellin, IValsa Istituto per la Valorizzazione del Legno e delle Specie Arboree

Omid Hosseinaei, University of Tennessee

Bernard Riedl, University Laval

Siqun Wang, University of Tennessee

"Water-Activated, Shape Memory Twist Effect in Wood Slivers as an Inspiration for Biomimetic Smart Materials"

Joseph E. Jakes, USDA FS Forest Products Laboratory Nayomi Plaza

Don Stone, University of Wisconsin- Madison

Sam Zelinka, USDA FS Forest Products Laboratory

"Silylated Cellulose Nanofibrils In Polymer Nanocomposites"

Zheng Zhang, Swiss Federal Laboratories for Materials Science and Technology

Session 16: Applications II/Composites • Grand Salon Opera C

Session Chair: Steven Masia, Sappi Fine Paper N.A.

"Preparation and Characterization of Polymer Nanofibres Containing Nanocrystalline Cellulose"

Andrew C. Finkle MASc, University of Waterloo

Leonardo Simon, University of Waterloo

"Characterization of Trilayer Antimicrobial Diffusion Films (ADFs) Based on Methylcellulose-Polycaprolactone Composites"

Afia Boumail, IAF-INRS

"Synthesis of a Nano Amphiphilic Cellulose and Its Use for Polysulfone Dialysis Membrane Surface Modification"

Yuan Gao, Beijing Forestry University

Session Chair: Ron Crotogino, ArboraNano

"Demystifying the Process of Innovation"

Brian Engleman, SRI International

"Picking the Winners"

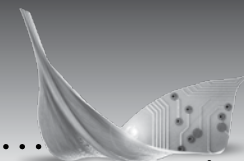
Paul Smith, Xerox Corporation

6:00 pm - 10:00 pm

Session 19: Conference Offsite Reception

Dinner at Vieux-Port Steakhouse and Cirque du Soleil Show

ON NANOTECHNOLOGY FOR RENEWABLE MATERIALS



Dinner at Vieux-Port Steak House followed by Cirque Du Soleil's Amaluna

Wednesday, June 6, 2012

Board buses at hotel at 5:30 pm



The Gala event on Wednesday, June 6 starts with dinner at Vieux-Port Steakhouse, Montréal's landmark steakhouse located just steps away from the Old Port. With old stone walls, wood floors, large picture windows, and cozy fireplaces Vieux-Port's dining rooms evoke a warm and inviting atmosphere.

After dinner, you and your fellow delegates will walk over to Cirque Du Soleil's Amaluna, the show that invites you to a mysterious island governed by Goddesses and guided by the cycles of the moon.

This Gala event is included in the full conference registration, the single day registration for Wednesday and the Spouse/Guest program.



Thursday, June 7

8:00 am - 8:45 am • Grand Salon Opera B

Session 20: Keynote

Session Chair: *Robert J. Moon*, USDA Forest Service

Perspectives on EHS Nanotechnology Science
and Standards Development

Andy Atkinson, Health Canada, Environment Canada

9:00 am - 10:30 am

Session 21: EHS • Grand Salon Opera C

Session Chair: *Brian O'Connor*, FPIInnovations

"Proactive Approaches to Risk Management for Nanomaterials"

Jo Anne Shatkin, CLF Ventures Inc

"What Have we Learned about Human Health Impacts of
Carbon Nanotubes: Summary of Toxicology Research for
Carbon Nanotubes (CNTs)"

Richard C. Pleus, Intertox

"Assessing the Characteristics and Safety of Nanocellulose
– Consensus and Co-Operation on National, European and
International Level"

Heli Kangas, VTT Technical Research Centre of Finland

Ulla Forsström, VTT Technical Research Centre of Finland

Marja Pitkanen, VTT Technical Research Centre of Finland

11:00 am - 12:30 pm

Session 23: EHS Panel • Grand Salon Opera C

Session Chair: *Jo Anne Shatkin*, CLF Ventures Inc

Panelists:

Rene D. Goguen, P.E., CelluForce

Claude Ostiguy, IRSST

Brian O'Connor, FPIInnovations

Abdul Afghan, Health Canada

Session 22: Innovation in Forest Industry • Grand Salon Opera B

Session Chair: *Nicole Poirier*, ArboraNano

"Innovation in Forest-Based Nanomaterials: Pay to Play"

G. Ronald Brown, Agenda 2020 Technology Alliance

"A Research Joint Ventures (RJV) Model for Advancing
Development on Renewable Nanomaterials"

John G. Cowie, Agenda 2020 Technology Alliance

"ArboraNano – an Industry Driven Innovation Network"

Ron Crotogino, ArboraNano

Nicole Poirier, ArboraNano

Session 24: International Standards • Grand Salon Opera B

Session Chair: *Clive Willis*, CWIC Inc.

Participants:

John Simonsen, Oregon State University

Ron Crotogino, ArboraNano

Ulla Forsström, VTT Technical Research Centre of Finland

Prof. Hiroyuki Yano, University Uji



2012 TAPPI INTERNATIONAL CONFERENCE

Thursday, June 7

12:30 pm - 2:00 pm

Session 25: Lunch (On your own)

2:00 pm - 3:30 pm

Session 26: Nanocellulosics and Nanocomposites: Modeling • Grand Salon Opera C

Session Chair: Hamdy Khalil, Woodbridge Group

"Prediction of the Elastic Properties of Cellulose Nano- Crystal-Reinforced Cellulose Fiber Networks"

R. Byron Pipes, Purdue University

Johnathan Goodsell, Purdue University

Robert J Moon, USDA Forest Service

"On the Multiscale Mechanics of the Hierarchical Structure of Cellulose Nanocrystals"

Fernando Dri, Purdue University

Pablo D. Zavattieri, Purdue University

LG Hector, General Motors

A Martini, University of California Merced

Robert J. Moon, USDA Forest Service

"Multiscale Theoretical Modeling of the Structure and Dispersion of Grafted Nanocrystalline Cellulose for Rational Design of Green Nanocomposites and Foams"

Stanislav R. Stoyanov, National Institute for Nanotechnology

Nikolay Blinov, University of Alberta

Javier Cuervo, University of Alberta

Sergey Gusarov, National Institute for Nanotechnology

Alexander Kobryn, University of Alberta

Andriy Kovalenko, National Institute for Nanotechnology

Olga Lyubimova, University of Alberta

Igor Omelyan, University of Alberta

4:00 pm - 5:30 pm

Session 28: Modeling Round Table-Challenges in Modeling at the Nano Length Scale • Grand Salon Opera C

Session Chair: Roger Gaudreault, Cascades, Inc.

Participants:

John Nairn, Oregon State University

Dr. Sylvain Robert, Centre de Recherche sur les Matériaux

Lignocellulosiques, Université du Québec à Trois-Rivières

Stanislav R. Stoyanov, National Institute for Nanotechnology

Open Discussion - Contributions from the floor are welcome

6:00 pm - 7:00 pm

Session COM1: Open Steering Committee Meeting -

Guests Welcome • Picardie

2:00 pm - 5:30 pm

Session 27: Standards Workshop • Grand Salon Opera B

Session Chairs: World Nieh, USDA Forest Service

Dave Ensor, RTI International

The success of the 2011 Workshop on International Standards for Nanocellulose has resulted in writing of the Roadmap for the Development of International Standards for Nanocellulose (Draft 4). Since then, TAPPI has formed the International Nanocellulose Standards Coordination Committee (INSCC) in its Nanotechnology Division to house and coordinate the execution of the Roadmap. The 2012 Workshop on International Standards for Nanocellulose will bring workshop participants up-to-date on nanocellulose standards activities since the completion of the Roadmap (Draft 4), initiate coordination activities in several areas of nanocellulose standards development, and if necessary, discuss revisions to the Roadmap.

2:00 pm - 2:20 pm

Opening Presentation by Session Chair

The INSCC and Its Activities in 2011-2012 - by World Nieh and Dave Ensor

2:20 pm - 3:30pm

Breakout sessions (concurrent)

Breakout 1: Issues in developing measurement and characterization standards for nanocellulose - lead tbd

This breakout session will focus on planning of pre-normative studies in measurement and characterization standards for nanocellulose.

Breakout 2: Issues in developing environment, health and safety (EHS) standards for nanocellulose- lead Jo Anne Shatkin

This breakout session will focus on identifying areas in EHS that are ready for nanocellulose standards development and if possible organize specific tasks to initiate standards development in the identified areas.

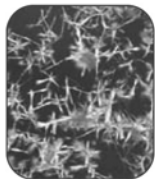
3:30 pm - 4:00 pm

Report back from breakout sessions

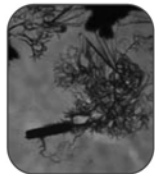
4:00 pm - 4:30 pm

Discussion on the Roadmap for the Development of International Standards for Nanocellulose

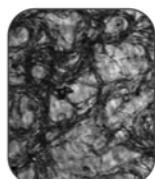
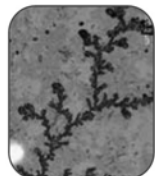
USDA Forest Service *Forest Products Laboratory's* **Nanotechnology Program**



Wood is a renewable, sustainable, carbon-neutral resource. Innovations in wood-based nano-enabled products have the potential to displace part of America's petroleum-based economy with a more sustainable cellulose-based economy. This revolutionary nano-scale science could transform the forest products industry regarding production of raw materials, new applications for composite and paper products, and new generations of multifunctional wood-based (lignocellulosic) materials.

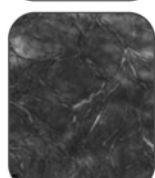
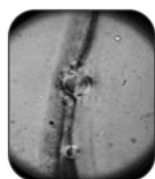


With interdisciplinary teams of chemists, materials scientists, engineers, and biologists using structural, chemical, and mechanical evaluation techniques, the Forest Products Laboratory (FPL) continues to expand its fundamental research in wood nanotechnology to further extend the nation's timber supply through the wise utilization of its forest resources.



Current Research

- Production of pilot-scale quantities of cellulose nanocrystals and nanofibrillated cellulose to support research and development activities nationwide.
- Characterizing cellulose nanoparticles, optimizing cellulose nanocomposite processing, and developing predictive models.
- Development of submicron scale spatially resolved chemical analysis via synchrotron radiation and atomic force microscopy.
- Development of nanoindentation based mechanical spectroscopy to assess time, temperature and moisture dependent mechanical properties of heterogeneous materials.
- Multi-scale modeling of materials from the nanoscale to the macroscale.
- Developing science and technology for product applications.
- Developing national and international material and product standards for cellulose nanomaterials and nano-enabled products.



Looking Into the Future

- National Nanotechnology Initiative (NNI)—To better coordinate Federal nanotechnology research and development, the NNI serves as a locus of collaboration under the Nanoscale Science, Engineering and Technology Subcommittee of the National Science and Technology Council. Cellulosic nanomaterials are part of the NNI-Sustainable Manufacturing Signature Initiative.
- Agenda 2020 Technology Alliance—This industry-led partnership with government and academia focuses on invigorating the forest products industry through innovation in processes, materials, and markets.
- Academic Partnerships Coast to Coast—This research coalition, led by the Agenda 2020 Technology Alliance and the USDA Forest Service Forest Products Laboratory, focuses on underlying science to advance nanotechnology in the forest products sector. Other partners include University of Tennessee–Knoxville, North Carolina State University, University of Maine, Pennsylvania State University, Georgia Institute of Technology, Oregon State University, and Purdue University.
- Purdue University–Birck Nanotechnology Center—This partnership builds upon the strengths of the nanotechnology infrastructure and expertise of Purdue University and the wood science expertise of the Forest Products Laboratory. FPL permanently relocated one scientist to the university. Researchers can leverage advances in science and engineering to create innovative programs in cellulose-based nanotechnology, sensor technology, and predictive modeling.

Visit www.fpl.fs.fed.us
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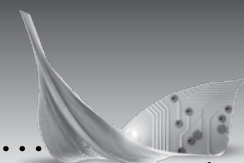
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ON NANOTECHNOLOGY FOR RENEWABLE MATERIALS



2012 TAPPI International Conference on Nanotechnology for Renewable Materials Bookstore

A special list of industry-related publications is available to 2012 TAPPI International Conference on Nanotechnology for Renewable Materials attendees at a “conference only” discount.

You can purchase these books at the registration desk.

2011 TAPPI International Conference on Nanotechnology for Renewable Materials Proceedings CD..... (11NANOCD)

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2010 International Conference on Nanotechnology Proceedings CD (10NANOCD)

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Nano Science and Nano Materials: Synthesis, Manufacturing and Industry Impacts (12NSNM)

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To view a complete list of products visit www.tappi.org/bookstore.



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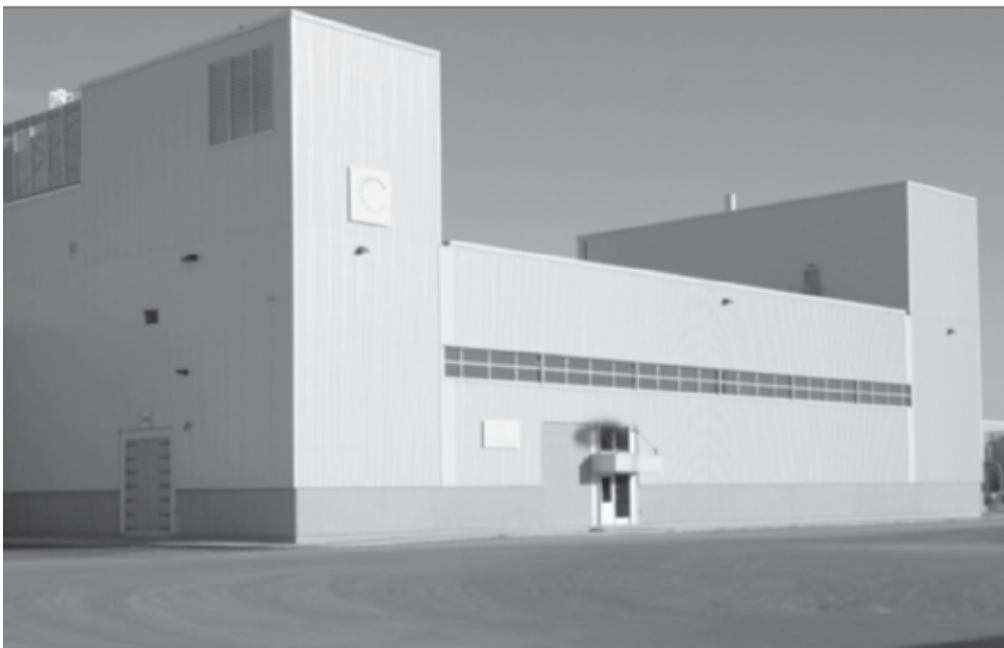
CelluForce
Allure

CelluForce
Impact

CelluForce is the world leader in the commercial development of NanoCrystalline Cellulose (NCC). The company is a joint venture of Domtar Corporation and FPIInnovations and was created to manufacture NCC in the world's first plant of its kind, located in Windsor, Québec.

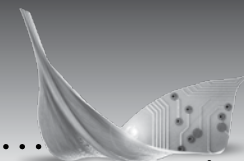
NCC is abundant, renewable, recyclable and biodegradable. It is expected to become a major contributor to the green economy in the coming decades, and should serve as a strategic platform for sustainable development.

Backed by a patented process, CelluForce develops and markets new applications for NCC under the "Impact" and "Allure" brands.



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Montreal, QC Canada
514-360-1023
info@celluforce.com
www.celluforce.com

ON NANOTECHNOLOGY FOR RENEWABLE MATERIALS



CelluForce Tour

Conference registration includes tour of CelluForce, the world's first Nanocrystalline Cellulose (NCC) plant

Kick off your 2012 TAPPI International Conference on Nanotechnology for Renewable Materials experience with a tour of CelluForce, located in Windsor, Québec on Monday, June 4 from 11:00 am-4:00 pm. CelluForce is the world leader in the commercial development of NCC. The company is a joint venture of Domtar Corporation and FPIInnovations. The CelluForce team will be on site to explain some of the manufacturing processes and answer questions. Please note that pictures and/or video will be forbidden. Lunch will be provided. You must be a registered TAPPI conference attendee to sign up for the CelluForce tour.

“We are the only and first semi-commercial facility. We're bringing a virtually non-toxic bio-product to market for industries that will no longer need to use environmentally harmful chemicals in the manufacture of their products.”

– Jean Moreau, President and CEO, CelluForce

WANT TO LEARN MORE? JOIN TAPPI'S INTERNATIONAL NANOTECHNOLOGY DIVISION

TAPPI's International Nanotechnology Division serves as the leading global forum for the community of individuals, organizations and institutions seeking to collectively advance the responsible and sustainable production and use of renewable nanomaterials.

The Division works to:

Gain Knowledge and Expand Your Professional Network

- Advance research, development and deployment of renewable nanomaterials to help meet the material needs of people and society.
- Share and disseminate knowledge and information on the responsible production, use, and disposal of renewable nanomaterials, with a special emphasis on nanomaterials produced from forest biomass.
- Advance the science and technology supporting the production, modification and end user applications for renewable nanomaterials used either alone or in combination with other materials.

The Division has established three teams to work on supporting Division activities:

- **Technical Team** - focuses on the Annual Conference, Symposiums, and Courses.
Team Leaders: Robert Moon, USDA Forest Service and Yaman Boluk, University of Alberta.
- **Marketing & Promotions Team** – focuses on industry outreach, campus outreach, division recruitment, and industry trends.
Team Leaders: John Cowie, Agenda 2020 and Professor Bruce Lyne, KTH.
- **Product Resources & Development Team** – focuses on the development of new books, standards, and other educational material. Team Leader: Mike Bilodeau, University of Maine.

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Verso Paper

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WFCR, Asst. Director USDA Forest
Products Laboratory

To learn more or join the Nano Division or one of the Division Teams, email Mary Ann Cauthen, TAPPI Member Group Coordinator, at mcauthen@tappi.org.





2012 TAPPI INTERNATIONAL CONFERENCE

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

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.

Ribbons

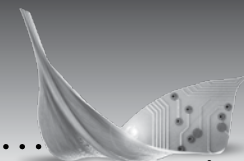
Association, technical division, and committee officers are requested to pick up their ribbons at the registration desk.

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 video equipment 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.

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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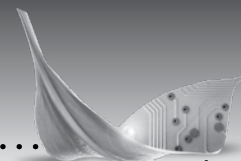
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TCC Consultants

(starting at top right): Bob Harrison, Dick Reese, Dan Dieck,
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“Share the Pride” in your profession, and in your association, by referring your peers and colleagues to join TAPPI — and you’ll receive a free TAPPI PRESS book. Choose from a long list of titles made available for this special program, and take pride in supporting TAPPI’s efforts to strengthen and educate our industry.

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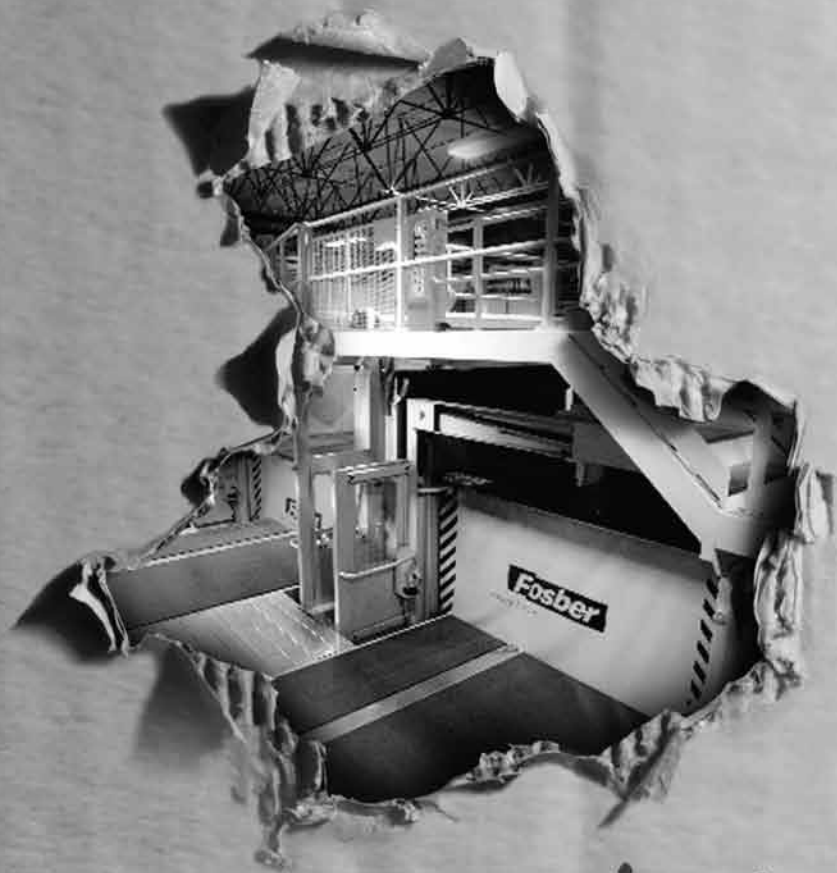
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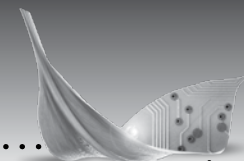
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- Samuel Strapping Systems
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- Sauer System
- SCG Paper Public Company Limited
- Scion (New Zealand Forest Research Institute Ltd.)
- Shandong Century Sunshine Paper Group Co. Ltd.
- Signode
- SNF SAS
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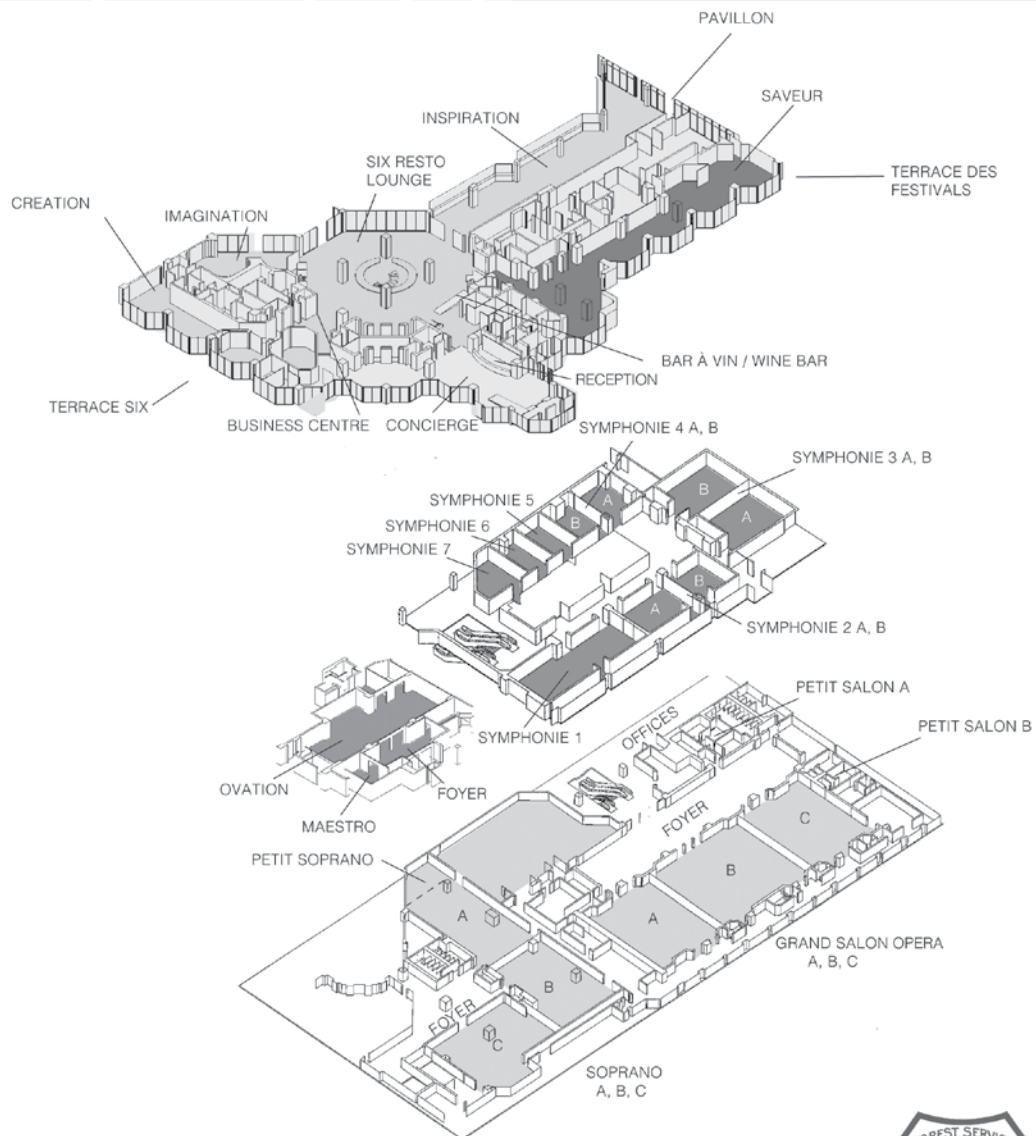


Hyatt Regency Montréal

DIRECTIONS

From Montréal-Trudeau Airport, follow signs for Highway 20 East for Montréal Downtown / Centre-Ville. Follow signs for Highway 720 East and keep to the right. Exit Berri / St-Laurent direction St-Laurent and turn left on René-Lévesque. Turn right on Jeanne-Mance. The hotel is located on the right hand side, between René-Lévesque and St-Catherine streets.

LEVEL 6



LEVEL 5

LEVEL 4



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