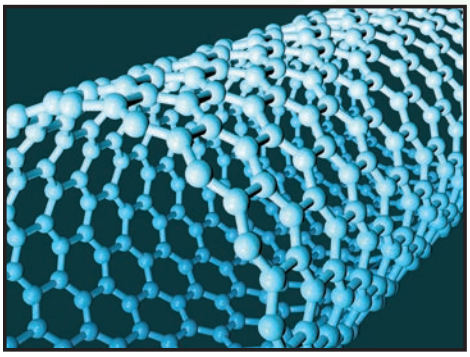
www.tappi.org/15nano

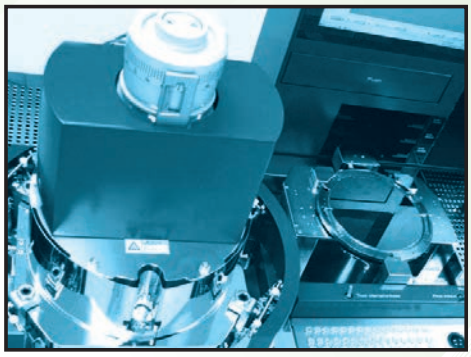
2015 TAPPI

International Conference on

Nanotechnology for Renewable Materials

22-25 June, 2015 | Hyatt Regency | Atlanta, GA





Conference Guide

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NANO360° TAPPI International Nanotechnology Division

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TAPPI JOURNAL

WELCOME!

Dear Colleagues,

Welcome to Atlanta and to TAPPI's 2015 International Conference on Nanotechnology for Renewable Materials! We would like to thank you for joining us in ***HOT****lanta for the next three days to learn about the latest - breakthroughs and applications of nanomaterials from sustainable sources.*

We would also like to thank this year's conference Theme Leaders who diligently worked to develop the excellent technical program and to TAPPI for their organization of the entire conference. We also extend our appreciation to this year's Sponsors: Renewable Bioproducts Institute, GL&V, FPInnovations, and American Elements. Also, special thanks to this year's Gold Sponsor, American Process Inc., for giving us the opportunity to view their new nanocellulose line and biorefinery.

This year's program highlights over 110 technical presentations on production, characterization, applications and functionalizaton of renewable nanomaterials. We are pleased to announce that this year's conference includes additional content in a three track program throughout much of the event including a full day symposium on Energy, Electronics and Biological Devices from Nanocellulose Materials.

The conference includes two keynote presentations, a conference dinner at the Georgia Aquarium, and a Poster Session featuring 40 posters and the annual Student Poster Competition sponsored by Verso Corporation. Back by popular demand, we will hold a panel discussion with leading industrialists and academics on the state of commercialization of cellulose nanomaterials. Indeed, there is much to see and learn about during your time at the conference, and we very much hope you take advantage of the networking opportunities during breaks, the poster session and reception.

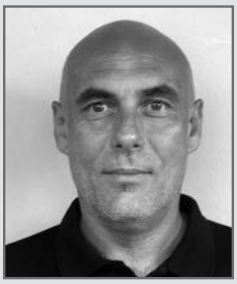
The co-chairs welcome your comments on the evolution of this conference, as we endeavor to keep astride of the rapidly advancing field of nanotechnology and renewable materials.

We hope you have a rewarding and enjoyable stay in Atlanta and find the technical program useful and compelling.

2015 Conference Co-Chairs:

Yaman Boluk, University of Alberta (Canada)
Alain Dufresne, Grenoble Institute of Technology (France)
Sean Ireland, Verso Corporation (USA)

Yaman Boluk
University of Alberta
(Canada)



Alain Dufresne
Grenoble Institute of
Technology
(France)

Sean Ireland
Verso Corporation
(USA)

THEME LEADERS

Behzad Ahvazi, AITF
Stephanie Beck, FPInnovations
Yaman Boluk, University of Alberta
Isabelle Captron, INRA
Chelsea Davis, NIST
Alain Dufresne, Grenoble Institute of Technology
Jeff Gillman, NIST
Youssef Habibi, Tudor Institute
Wadood Hamad, FPInnovations
Liangbing Hu, University of Maryland
Sean Ireland, Verso Paper
Hamdy Khalil, Woodbridge Group
Robert Moon, USFS
World Nieh, USDA
David Plackett, University of British Colombia
Gilberto Siqueira, EMPA
Rajesh Sunasee, SUNY
Junyong Zhu, USDA Forest Products Lab

CONFERENCE HIGHLIGHTS

MONDAY, 22 JUNE 2015

9:30 a.m. – 2:30 p.m. • Tour of API's Thomaston Biorefinery Tour and New Nano Demonstration Line

Tour sponsored and hosted by API
Space is limited to 100 participants.
Additional $20 registration fee.
Pre-registration is required. Lunch will be provided. Participants will arrive in groups. First bus will depart at 9:30 a.m. with tour beginning at 11:00 a.m. Group will return to hotel at 2:00 p.m. Second bus will depart hotel at 11:00 a.m. with tour beginning at 12:30 p.m. Group will return to hotel at 3:30 p.m.

American Process Inc.'s (API) Thomaston Biorefinery (3.5 dry tons/day biomass throughput) produces nanocellulose, pulp, cellulosic sugars, cellulosic ethanol, and native lignin from a variety of biomass feedstocks (HW, SW, agricultural residues, etc) using their patented AVAP® technology. The plant's new nanocellulose demonstration line produces cellulose nanofibrils, cellulose nanocrystals, and lignin-coated, hydrophobic varieties of each directly from biomass. The facility is situated on eight acres and includes 41,000 square feet of manufacturing space along with API's corporate R&D laboratory.

7:00 p.m. - 8:00 p.m. • Young Professionals Mixer (Hosted by the Young Professionals Division)
Executive Conference 223, 2nd Floor Hyatt Regency
Join the YP's for some fun and laid back networking with the industry's future leaders.

TUESDAY, 23 JUNE 2015

8:00 a.m. – 9:00 a.m. • Keynote
Dr. Marie D'Iorio Executive Director, National Institute for Nanotechnology

Marie D'Iorio is the Executive Director of the National Institute for Nanotechnology, Professor of Physics and Assistant VP-Research (Nanotechnology) at the University of Alberta. Dr. D'Iorio has championed a number of large collaborative programs, in partnership with government departments, industry and academia to accelerate photonics and nanotechnology deployment in the ICT, Construction, and Energy sectors.

12:30 p.m. – 2:00 p.m.
Lunch Presentation by
Renewable Bioproducts Institute (RBI) at Georgia Tech
Presenter: Norman Marsolan
Georgia Tech Nanocellulosic Research: Innovating Renewable Bioproducts

The Georgia Tech Renewable Bioproducts Institute (RBI) is the premier research institute for transformation of biomass into valued products, including pulp & paper, renewable energy, chemicals and advanced materials. We are an innovation ecosystem bringing together education, research, government and industry to enable companies to seize new opportunities and develop future leaders.

6:30 p.m. – 10:00 p.m. • Conference Dinner at the Georgia Aquarium
Additional $75 Registration Required. Includes drinks, dinner, dessert and a ticket to explore the aquarium. Limited to 125 participants.

Join us for an elegant dinner with your colleagues, both new and old. In addition to your dinner, you'll have an all-access admission to the entire Aquarium including whale sharks, manta rays, penguins, beluga whales, bottlenose dolphins and more.

WEDNESDAY, 24 JUNE 2015

12:30 p.m. – 2:00 p.m. • Lunch Keynote
Dr. Theodora Retsina CEO, American Process Inc.

Dr. Theodora Retsina is the CEO of American Process Inc. (API). API focuses on value enhancement of the biomass industries through process integration, biorefinery technology applications and value engineering.

6:30 p.m. – 8:00 p.m.
Poster Reception and Student Poster Competition

Visit over 40 presentations which focus on additional applications, characterization and functionalization of cellulose and other renewable nanomaterials. Each year this Competition draws multiple submissions. Winners are announced at the conference and cash prizes and certificates are awarded to the first and second place team winners. This year's competition is sponsored by Verso Corporation.

TECHNICAL PROGRAM

Subject to change. For the latest updates visit **www.tappi.org/15Nano.**

Monday – 22 June 2015

9:30 - 2:30	**Tour of API's Thomaston Biorefinery & New Nano Demonstration Line- pre-registration required (limited to 100 persons)**
6:00 - 7:00	**Welcome Reception Sponsored by FPInnovations • Terrace Foyer**
7:00 - 8:00	**Young Professionals Networking Mixer, Sponsored by the TAPPI Young Professionals Division. (Open to all Attendees) • Executive Conference 223, 2nd Floor Hyatt Regency**

Tuesday – 23 June 2015

8:00 - 9:00

Session 1: Welcome and Opening Keynote Presentation • Regency VII
Marie D'Iorio, Executive Director, *National Institute for Nanotechnology*

9:00 - 10:30

Session 2 • Regency V
Composites I: Thermoset and PLA-based Composite
Session Chair: Gilberto Siqueira, EMPA

Design and Characterization of Cellulose Nanocrystals Enhanced Epoxy Hardeners
Shane Peng, Purdue University

Use of Order of Addition to Improve CNC Dispersion and Emulsion Stability in Waterborne Epoxy Formulations
Carson Meredith, Georgia Institute of Technology

Investigating the Interphase in PLA/CNC Composites
John Simonsen, Oregon State University

Process-Structure-Property Relationship of Cellulose Nanocrystal / Polylactic Acid Nanocomposite Films
Erin M. Sullivan, Georgia Institute of Technology

Session 3 • Regency VII
Lab & Pilot Scale I
Session Chair: Leslie McLain, IMERYS

Microfibrillated Cellulose as Cost-Effective Substitute for CMC in Paperboard Applications
Sinke Henshaw Osong, Mid Sweden University

Research, Development, Scale-Up, Production and Selected Applications of FiberLean™ Microfibrillated Cellulose/ Mineral Composite for Paper and Board Applications
David R. Skuse, Imerys

Effect of Carboxy-Methyl-Cellulose (CMC) as a Dispersing Agent for Micro-Nano Fibrillated Cellulose (MNFC) on Z-Structured TMP Paper and MNFC Films Properties
Mohamed Ali Charfeddine, Lignocellulosic Materials Research Centre/UQTR

Optimizing the Microstructure of MFC Composite Paper for Improved Dewatering and Sheet Properties
Juuso Johannes Rantanen, Aalto University

Session 4 • Regency VI
Characterization: Thermal, Mechanical and Surface Properties of Cellulosic Nanomaterials
Session Chair: Emily Cranston, McMaster University

Comparative Kinetic Study of the Thermal Decomposition of Nanocellulose Produced by H2SO4 Hydrolysis, TEMPO, and AVAP Processes
Jamila Marshall, Clark Atlanta University

Characterization of Cellulose Nanomaterials and Cellulosic Biomass with the Atomic Force Microscope
Ryan Wagner, NIST

Effects of Electron Beam Treatment on Nano-Crystalline Cellulose Properties
Yung B. Seo, Chungnam National University

2D NMR Identification of Sulfate Group on Cellulose Nanocrystals
Teng Xu, Auburn University

10:30 - 11:00 **BREAK**

11:00 - 12:30

Session 5 • Regency V
Composites II: Processing of Composites
Session Chair: Alain Dufresne, Grenoble Institute of Technology

Manufacturing of Cellulose and Chitin Nanocomposite Fibres Using Ionic Liquids and Environmentally Benign Solvents
Sameer S. Rahatekar, University of Bristol

Drying Techniques for Improved Redispersion of Cellulose Nanocrystals in Transparent Media
Jim Snyder, U.S. Army Research Laboratory

MFC-Based Composite Films for Gas Barrier Applications
Caglar Mericer, University of Bologna

Melt processing of cellulose nanocrystal reinforced polycarbonate from a master-batch process
Marcos Mariano, Grenoble Institute of Technology

Session 6 • Regency VI
Lab & Pilot Scale II
Session Chair: Behad Ahvazi, AITF

Preparation of Dried Cellulose Nanofiber Materials Which Are Easily Re-Dispersed in Water
Hiroaki Namba, Nippon Paper Industries Co. Ltd.

Experience From First Commercial Cellulose Nanofibril Production Plant
Michael A. Bilodeau, University of Maine

Strategic Development for Optimization of Cellulose Nanocrystals (CNC) Production
Christophe Danumah, PhD, Alberta Innovates - Technology Futures

Production, Application Development and Commercialization of Cellulose Filament (CF)
Balazs Tolnai, Kruger Inc.

12:30 - 2:00 **SESSION 7: LUNCH & PRESENTATION BY NORMAN MARSOLAN GEORGIA TECH NANOCELLULOSIC RESEARCH: *INNOVATING RENEWABLE BIOPRODUCTS* • REGENCY VII**

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TECHNICAL PROGRAM

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Tuesday – 23 June 2015

2:00 - 3:30

Session 8 • Regency VI
Composites III: Thermoplastic-based Composites
Session Chair: John Simonsen, Oregon State University

Thermoplastic Nanocomposite Films Using Micro- and Nano-Sized Cellulose Reinforcing Agents from Wood Fibers and Recycled Cotton Fabric
Richard A. Venditti, Jr., North Carolina State University

Bio-Reinforced Composites for Additive Manufacturing: Nanocellulose-Termoplastic Composites
Halil Levent Tekinalp, Oak Ridge National Laboratory

Lignin: A Friend of a Foes in Nanocellulosics?
Orlando J. Rojas, Aalto University

Session 9 • Regency VII
Lab & Pilot Scale III: Production and Application of Nanocelluloses
Session Chair: Rajesh Sunasee, State University of New York at Plattsburgh

Nanocellulose: Technology, Applications and Markets
Jack Miller, Market-Intell LLC

Laboratory and Pilot-Scale Production of Cellulose Nanocrystals at Alberta Innovates - Technology Futures
Frank J. Tosto, Alberta Innovates Technology

Analyzing the Future Applications of Nanocelluloses
Jesse Kautto, Poyry Management Consulting Oy

Overcoming Challenges on the Development of Naocellulose-based Products
Pia Qvintus, VTT

Session10 • Regency VI
Technology Showcase

Masuko
Hideki Soga

USFS
Theodore Wegner

CNNT
Sean Yoon

Pacific Nano Products
Charles P. Klass and Vijay Mathur

American Process
Jack Miller

FPInnovations/Sentinel Bioactive Paper Network
Dr. Huining Xiao

3:30 - 4:00 **BREAK**

4:00 - 5:30

Session 11 • Regency V
Composites IV: Design of Specific Composites
Session Chair: Wadood Hamad, FPInnovations

High Performance Cement via Cellulose Nanocrystal Addition
Jeffrey P. Youngblood, Purdue University

Carbon Fibers from Polyacrylonitrile (PAN)/ Cellulose Nanocrystals (CNCs)
Huibin Chang, Georgia Institute of Technology

CNT Incorporated Lignin/PAN Composite Carbon Fibers
H. Clive Liu, Georgia Institute of Technology

Developing Design Model for Cellulose Nano Crystal Composites
Meisam Shir Mohammadi, Oregon State University

Session 12 • Regency VII
Lab & Pilot Scale IV: Benefits of Cellulose Nanofibrils
Session Chair: Rajesh Sunasee, State University of New York at Plattsburgh

Nanocellulose Meeting the Oil/Water Interface: Emulsion and Applications
Orlando J. Rojas, Aalto University

The Addition of CNF to Papermaking Furnish – Part 2
Donna A. Johnson, University of Maine

Cellulose Nanofibril Bound Laminated Paper Nanocomposites (Cellubound)
Mehdi Tajvidi, University of Maine

The Benefit of Cellulose Nanofibrils on Foam Formed Paper Properties
Katariina Torvinen, VTT Technical Research Centre of Finland

6:30 - 10:00 **CONFERENCE DINNER AT THE GEORGIA AQUARIUM - REGISTRATION REQUIRED. ADDITIONAL $75**
Dinner participants should meet in the hotel lobby at 6:00pm. Group will walk to the Aquarium. Admission to the Aquarium begins at 6:30 p.m.

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Subject to change. For the latest updates visit **www.tappi.org/15Nano.**

Wednesday – 24 June 2015

9:00 - 10:30

Session 13 • Regency VII
Electronics I: Cellulose Nanomaterial Substrates for Electronics
Session Chair: *Liangbing Hu, University of Maryland*

Printed Microfluidic Channels and Nanocellulose for Printed Electronics and Energy
Bernard Kippelen, Georgia Institute of Technology

Stable Top-Gate Organic Field-Effect Transistors on Cellulose Nanocrystal Substrates
Cheng-Yin Wang, Georgia Institute of Technology

Tuning Mechanical and Electrical Properties of Paper for Disposable Devices
Aaron Mazzeo, Rutgers University

Development of Transparent Cellulose Nano Fiber Film for Flexible Displays
Takayuki Shimaoka, Oji Holdings Corporation

Session 14 • Regency V
Metrology I: Novel Measurement Methods for Nanocellulose
Session Chair: *Jeff Gilman, NIST*

Preparation and Characterization of Silica Nanoparticle-Cellulose Nanofibre Composites
Warren J. Batchelor, Monash University

Mechanical Properties Characterization of Cellulosic Nanocrystal Films
Chelsea Davis, NIST

3D Infrared Chemical Images for Characterizing Cellulose Nanomaterials
Barbara Illman, U.S. Forest Service Forest Products Lab

On the Aggregated State of Pulp Cellulose Nanocrystals: Are CNCs Crystalline or Simply Consolidated Particles?
Umesh P. Agarwal, USDA Forest Products Laboratory

Session 15 • Regency VI
Renewables I
Session Chair: Gilberto Siqueira, EMPA

Plastics with the Highest Native Lignin Contents are Nano-Biomaterials Composed of 13 nm Macromolecular Complexes
Simo Sarkanen, University of Minnesota

Fabrication of 'Cellulose Nano-Anemone'
Tetsuo Kondo, Kyushu University

Preparation of Cellulose Nanocrystal/Silver Nanoparticle Composite Materials for Surface Enhanced Raman Spectroscopy Applications
Rongbing Du, National Institute for Nanotechnology

Influence of charge density and ionic strength on the aggregation process of cellulose nanocrystals
Isabelle Capron, INRA-Nantes

10:30 - 11:00 BREAK

11:00 - 12:30

Session 16 • Regency VI
Electronics II: Cellulose Nanomaterials for Device Structure
Session Chair: *Junyong Zhu, US Forest Products Laboratory*

Multifunctional Paper and Fibers Based on Nanocellulose Materials
Hongli Zhu, University of Maryland

Cellulose Nanofiber Materials for Electronic Devices
Nogi Masaya, Osaka University

Flexible Magnetostrictive Cellulose Nanofibril Membranes
Ronald C. Sabo, Jr., USDA Forest Products Laboratory

Printed Microfluidic Channels and Reaction Stations for Enzymatic Testing Based on Functionalized Calcium Carbonate and Micro Cellulose
Roger C. Bollstrom, Omya International AG

Session 17 • Regency V
Metrology II: Progress in Standards and Policy Development for Nanocellulose
Session Chair: *Chelsea Davis, NIST*

Cellulose Nanomaterials: Measurement Needs Workshop Report
Jeffrey W. Gilman, NIST

Biodegradability, Compostability and Safety of Cellulose Nanofibrils (CNF) and CNF Based Products
Heli J. Kangas, VTT Technical Research Centre of Finland

Readying Cellulose Nanomaterials for Commercialization: Analysis of Information Needs for Globally Harmonized Standard Safety Data Sheets
Jo Anne Shatkin, Vireo Advisors

In-situ Measurements of Size and Consistency of Cellulose Nanocrystals (CNCs) in a Suspension Using Rayleigh-Gans Scattering
Junyong Zhu, US Forest Products Laboratory

12:30 - 2:00 SESSION 18: LUNCH WITH KEYNOTE PRESENTATION BY THEODORA RETSINA, CEO, AMERICAN PROCESS INC. REGENCY VII

2:00 - 3:30

Session 19 • Regency VII
Electronics III: Cellulose Nanomaterials for Energy
Session Chair: Hongli Zhu, University of Maryland

Biomass-Derived Carbon for Energy Storage
Xiulei (David) Ji, Oregon State University

Session 20 • Regency V
Grafting I
Session Chair: Yaman Boluk, University of Alberta

Low Cost Hydrophobic Surface Functionalization of Cellulose Nanomaterials with Lignin for Polymer Composite Reinforcement
Kim Nelson, American Process Inc.

Session 21 • Regency VI
Renewables II
Session Chair: TBA

Control of Indium Tin Oxide Nanoparticle Morphology using Scraficial Templating Method
Yuan Lu, Oak Ridge National Laboratory

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TECHNICAL PROGRAM

Subject to change. For the latest updates visit **www.tappi.org/15Nano.**

Wednesday – 24 June 2015

2:00 - 3:30

Electronics III (Session 19, continued)
Cellulose Nanofibrils: Opening Up One- Dimensional Opportunity for Flexible/High-Performance Lithium-Ion Paper Batteries
Sang-Young Lee, UNIST (Ulsan National Institute of Science and Technology)

Cross-linked Aerogels from Cellulose Nanocrystals as Universal Scaffolds for Supercapacitor Devices
Emily Cranston, McMaster University

Energy Storage Devices Based on High Consistency Cellulose
Otto-Ville Kaukoniemi , VTT Technical Research Centre Of Finland

Grafting I (Session 20, continued)
Incorporation of Forest Derived Cellulose Nanomaterials into Polylactic Acid
Lionel Cross, Clark Atlanta University

Voltammetric Optimisation of TEMPO-Mediated Oxidation of Cellulose
Yun Jin, University of Bath

Improved Mechanical Properties of Polylactide Nanocomposites-Reinforced with Cellulose Nanofibrils Through Interfacial Engineering via Amine-Functionalization
Yuan Lu, Oak Ridge National Laboratory

Renewables II (Session 21, continued)
Cellulose Nanofibers Isolated from Thermomechanical Pulp with Low Energy Consumption
Gilberto Siqueira, EMPA

What Conformational Isomerism and Auxetics Typify Crystalline Cellulose?
Akwasi Asamoah, University Of Exeter

Bridging atomic structure and nanoscale architecture of cellulose nanofibrils in plant cell walls by Transmission Electron Tomography and Molecular Modeling
Peter Ciesielski,
National Renewable Energy Lab

3:30 -4:00 **BREAK**

4:00 - 5:30

Session 22 • Regency VII
Electronics IV: Other Possibilities of Cellulose Nanomaterials in Electronics & Energy Devices
Session Chair: Robert Moon, USDA Forest Service, GA Tech

Wood Cellulose Materials Toward Photonics, Electronics and Energy
Liangbing Hu, University of Maryland College Park

Cellulose Nanocrystals-Based Electrolyte for Alkaline Fuel Cells with Superior Dimensional Stability
Yuan Lu, Oak Ridge National Laboratory

Cellulose Nanocrystal Hydrogel Particles and Capsules from Single and Double Emulsion Drops
Carlos Martinez, Purdue University

Mesoscale Modeling of the Interfacial Mechanics of Nanocellulose Composites
Sinan Keten, Northwestern University

Session 23 • Regency V
Grafting II
Session Chair: Usha Devi Hemraz, National Research Council of Canada

Grafting Polyolefins Onto Cellulose Nanocrystals and Preparation of Reinforced Polyethylene Nanocomposites
Yaman Boluk, University of Alberta

CNCs-PEHMA Nanomaterials for Applications in Thermoplastics
Wadood Y. Hamad, FPInnovations

Flame Retardant Modification of Natural Products
Gamini Mendis, Purdue University

5:30 - 7:00 **SESSION 24: POSTER SESSION & STUDENT POSTER COMPETITION SPONSORED BY VERSO CORPORATION**
TERRACE FOYER • POSTER DETAIL INCLUDED ON PAGE 11-12

Thursday – 25 June 2015

8:00 - 9:30

Session 25 • Regency VII
Specialty Applications I
Session Chair: Alan Rudie, National Research Council of Canada

Alkenylated Cellulose Nanocrystals for Applications in Structureal Foam and Rubber
Wadood Y. Hamad, FPInnovations

Transparent Gas Barrier Materials from Chitin Nanofibers
Carson Meredith, Georgia Institute of Technology

The Influence of Cellulose Nanocrystals on the Rheology of Oil Well Cement Paste
Vivek Bindiganavile, University of Alberta

Flame Retardant Coatings Based on Carbohydrates, Nanoclay, and Borate Salts
Douglas Fox, American University

Session 26 • Regency V
Colloids I: Interface and Self-Assembly
Session Chair: Isabelle Capron, French National Institute for Agricultural Research

Pickering Emulsions Stabilised by Oxidised Cellulose
Yun Jin, University of Bath

Encapsulation of π-Conjugated Polymers by Fungal Janus Surfactants
Cornelia Rosu,
Georgia Institute of Technology

Self-Assembly of Cellulose Nanocrystals Towards Enhanced Property Control
Jairo A. Diaz, Purdue University

Effect of Ionic Strength on the Near Zero-Shear Viscosity of Cellulose Nanocrystal Suspensions
Stephanie Beck, FPInnovations

Session 27 • Regency VII
Renewables III
Session Chair: Alain Dufresne, Grenoble Institute of Technology

Removal of Nickel Ions from Aqueous Solution by Application of Electrospun Chitosan-Polyethylene Oxide Membranes
Ichrak Lakhdhar, UQTR

TEMPO Mediated Oxidation of Bagasse Pulp: Study on Nanogel, Nanopaper and Nanofibrils Reinforcing Capabilities
Seyed Rahman Djafari Petroudy,
Shahid Beheshti University (SBU), IRAN

A Green Approach for Obtaining Nanocellulose from Sugarcan Bagasse Organosolv Pulp
Beatriz Santucci, Grenoble INP Pagora

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TECHNICAL PROGRAM

Subject to change. For the latest updates visit **www.tappi.org/15Nano.**

Thursday – 25 June 2015

9:30 - 10:00 BREAK

10:00 - 11:30

Session 28 • Regency VII
Specialty Applications II
Session Chair: Wadood Hamad, FPInnovations

Cellulose Nanocrystals and Nanofibers for Renewable Active Materials
Jaehwan Kim, Inha University

High Performance Barrier Materials Made from Polyamide – Epicholorohydrin Resin Crosslinked Cellulose Nanofibrils
Sudhir Sharma, Yulin Deng, Georgia Institute of Technology

"Industrial applications of Melodea's CNC in packaging and composite foams" -
Shaul Lapidot, Melodea Ltd.

Session 29 • Regency V
Colloids II: Viscoelastic Behaviour of Cellulose Nanomaterials in Suspension
Session Chair: Stephanie Beck, FPInnovations

The role of Xylan in Softwood Pulp on the reaction rate of TEMPO-mediated oxidation and the rheology of the nanocellulose (NFC) gel
Katarina Dimic-Misic, Aalto University

Rheological Property Changes of Pigmented Micro and Nano-Fibrillated Cellulose Suspensions During Dewatering
Michel Schenker, Omya International AG

Engineering the Colloidal Structure of Cellulose Nanofibres Using Polyelectrolytes and Varying Ionic Strength to Control Filtration and Sheet Properties
Warren J. Batchelor, Monash University

Use of Suspension Gel Point as a Measure of the Quality of the Cellulose Nanofibres Prepared from Spinifex Grass Using Different Conditions
Alireza Mayahi, The University of Queensland

Session 30 • Regency VI
Biomedicals I: Drug Delivery Applications
Session Chair: Johan Foster, Virginia Tech

Continued Release of Antibacterial Agents Using Cyclodextrin and Cellulose Nanocrystals
Daniele Oliveira De Castro Grenoble INP Pagora

Biosynthesized Nanocellulose for Dura Mater Repair – from Science to GMP Manufacturing
Wojciech Czaja, DePuy Synthes (Companies of J&J)

Contact Active Antimicrobial Surface Produced by Surface Quaternised Cellulose Nanofibrils
Julien Bras, Grenoble INP Pagora

New Nanocellulose Based Materials for Stem-Cells Culture
Julien Bras, Megan Smyth, Grenoble INP Pagora

11:30 - 1:00 LUNCH (ON YOUR OWN)

1:00 - 2:30

Session 31 • Regency VII
Standards for Cellulosic Nanomaterials
Session Chair: World Nieh, US Forest Service

Update on ISO TC6 Cellulosic Nanomaterials Task Group
Jean Bouchard, FPInnovations

ISO TC 229 Technical Report: Nanotechnologies – Characterization of Cellulose Nanocrystals
Linda Johnston, NRC

ISO TC 229 Standard Terms and Their Definition for Cellulose Nanomaterial
World Nieh, US Forest Service

Plans for TAPPI EHS Standards Development
Jo Anne Shatkin, Vireo Advisors

After the presentations, breakout groups will meet to discuss different aspects of standards development.

Session 32 • Regency V
Colloids III
Session Chair: Warren Batchelor, Monash University

Barrier Film Based on Cellulose Nanofibers and Tempo-Oxidized Cellulose Nanocrystals
Julien Bras, Grenoble INP Pagora

Characterization of Pore Size Distribution in Nanofibrillated Cellulose-Based Membranes: Assessment of Different Porosimetry Techniques
Orsolini Paola, EMPA

Water Sorption in Microfibrillated Cellulose (MFC)
Marco Giacinti Baschetti, University of Bologna

Session 33 • Regency VI
Biomedicals II: Biocompatability
Session Chair: Orlando Rojas, Aalto University

In vitro Cytocompatibility Study of Nanocellulose
Yuan Lu, Oak Ridge National Laboratory

Better, Stronger, Faster… Implantable Structured and Functional Bionanocomposite Materials
Johan Foster, Virginia Tech, Material Science and Engineering

Chitin Nanotubes Based Scaffolds for Neuronal Cell Adheshion
Sameer S. Rahatekar, University of Bristol

2:30 - 3:00 BREAK

3:00 - 4:30

Session 34 • Regency VII
Panel Discussion: Panelist will share perspectives on the advances needed in research, cross-industry collaboration, and other factors to develop commercial markets for cellulosic nanomaterials. Moderator: Sean Ireland, Verso
Panelists: Shaul Lapidot, Melodea Ltd. • Johan Foster, Virginia Tech

POSTER SESSION & STUDENT POSTER COMPETITION

Sponsored by Verso Corporation

Session Chair: Robert Moon, USDA Forest Service

Flax and Hemp Advanced Fibre Based Composites
Marcos Latorre, ITENE

Cereal waste valorisation through development of functional key fibres to innovate in fibre packaging materials
Miriam Gallur, ITENE

Preparation of modified cellulose powders via use of spray-drying technique
Sofiya Shopova, ITENE

Cellulose nanomaterial-based cooperative chemocatalysts for acid-base catalyzed carbon-carbon bond forming reactions
Nathan Ellebracht, Georgia Institute of Technology

Valorization of Tunisian Vegetal Wastes as a Source of Cellulose and Cellulose nanocrystal
Alain Dufresne, Grenoble Institute of Technology

Mechanical and thermal properties of nanofibrillar cellulose from Posidonia oceanica reinforced styrene butadiene rubber
Alain Dufresne, Grenoble Institute of Technology

Fluorescence methods to probe CNC distribution in polymer composites
Tianyang Leng, National Research Council

Renewable Biomaterials to Encapsulate and Align Synthetic Semiconducting Polymers
Bailey Risteen, Georgia Institute of Technology

Comparative Properties on Highly Transparent All-Cellulose Nanopaper Prepared by Sulfuric Acid Pretreatment and TEMPO-Mediated Oxidation for Energy Devices
Xiuxuan Sun, Louisiana State University

Chitin nanofibers as bio-based nanopolymer for film & coating applications
Mohammadreza Dehghani, Gorgan University of Agricultural Sciences and Natural Resources

Self-organization behavior of Sugar-based Polyamides in Strong Polar Solvents?
Cornelia Rosu, Georgia Institute of Technology

Evaluation of occupational nanoparticles exposure to human and its health risks
Muhammad Ilyas, KFUPM

Morphology and selected properties of papermaking fines
Jerome Colson, University of Natural Resources and Life Sciences

Advanced approaches for polymer characterization
Tom C. Lundin, Kemira

Aqueous foams stabilized by cellulose particles and a small amount of oil
Yi Zhang, Georgia Institute of Technology

Development of Microcapsules Containing Surface Modified Cellulose Nanocrystals for Optical Applications
Youngman Yoo, Purdue University

Cellulose nanocrystals reinforced silica aerogels: microstructure and mechanical properties
Jingjing Fu, University of Tennessee

Investigation of nanoporous carbon synthesized from cellulose nanocrystals and lignin
Yujie Meng, University of Tennessee

Biocompatible Multi-Membrane Hydrogels from Cationic Cellulose Nanocrystals and Anionic Alginate as Drug Delivery
Alain Dufresne, Grenoble Institute of Technology

Protein-assisted active electronics incorporating semiconducting polymers on flexible and foldable cellulose substrates
Cornelia Rosu, Georgia Institute of Technology

Effects of surface treatment on the mechanical properties of cellulose nanocrystal reinforced liquid epoxidized natural rubber toughened unsaturated polyester
Hanieh Kargarzadeh, University National Malaysia (UKM)

Removal of heavy metal through lignocellulosic waste reinforced lignin-TEOS based nanocomposites
Kumari Shweta, Guru Ghasidas

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Poster Session & Student Poster Competition

(continued)

Development of Manufacturing Process of Cellulose Nano Fiber And Its Application For Transparent Sheets And Composites

Ikue Honma, Oji Holdings Corporation

Preparation of Poly(lacid actic)/Cellulose Nanocrystal Composites by Melt Extrusion Method
Liliane Cristina Battirola, University of Campinas

Microstructure and mechanical properties of cellulose nanofibrils foams
Florian Martoia, Univ. Grenoble Alpes/CNRS, LGP2

Acid Induced Flocculation of Flame Retardant Coatings Based on Alginate and Nanoclay
Douglas Fox, American University

Drying and Redispersing Nanocellulose for Use in Transparent Composites
Alda Kapllani, Army Research Laboratory

Polyacrylonitrile/Cellulose Nanocrystal Composite Films
Jeffrey Luo, Georgia Institute of Technology

Nanocellulose one-pot surface hydrophobization via transesterification with triacylglycerols
Maria Mercedes Gonzalez-Bernal,
Universidad Industrial de Santander

Grafting modification of cellulose nanofibrils by emulsion polymerization
Arie Tri Nugroho Mulyadi,
Georgia Institute of Technology

Cationic poly (2-aminoethylmethacrylate) and poly (N-(2- aminoethylmethacrylamide)) modified cellulose nanocrystals: Synthesis, characterization, cytotoxic and inflammatory activities
Rajesh Sunasee,
State University of New York at Plattsburgh

Dye adsorption behavior of nanofibrillated cellulosic material
William Tze, University of Minnesota

The Characterization method for determing the re-dispersibility of dried Cellulose Nanofibers (CNFs) in water by using colloidal particle
Takeshi Nakatani, Nippon Paper Industries Co. Ltd.

Potential Use of Nanocellulose in High Volume Applications: Challenges and Limitations
Mark Miller, Georgia Institute of Technology

Potential for industrial level hydrogen gas production using water, sunlight irradiation, and photocatalytic inorganic semiconductor nanoparticles suspended in cellulose fibers
Lewis Luo, University of Washington

Comparative performance of enzyme-mediated preparation of Nanocellulose
Valdeir Arantes, University of Sao Paulo

A green approach of obtaining nanocellulose from sugarcane bagasse organosolv pulp
Beatriz Stangherlin Santucci, Grenoble INP Pagora

Extraction and characterization of nanocellulose structures from linter Dissolving Pulp
Somayeh Ghasemi, Michigan Technical University

Application of Carbonate Buffer Solution in TEMPO-Mediated Oxidation
Zhu Long, Jiangnan University

Polysulfone Nano-composite membranes for water treatment from petroleum sources
Diakanua Nkazi, University of the Witwatersrand

Lignin as a Green Reinforcing Agent for Silicone Elastomers
Jianfeng Zhang, McMaster University

High Wet Strength and Super Hydrophobic Nanofibre Barriers for Packaging Applications
Warren J. Batchelor, Monash University

Cellulose nanofibrill-derived separator membranes for lithium-ion batteries: Effective strategies for control of cellulose network channels
Jung-Hwan Kim, UNIST

Exploiting Colloidal Interfaces for Improved Dispersion, Performance, and Pot Life in Cellulose Nanocrystal/ Waterborne Epoxy Composites
Natalie M. Girouard, Georgia Institute of Technology

Development, Processing, and Novel Applications of Sustainable Nanocellulose Gel
Yunsang Kim, University of Georgia

INTERNATIONAL NANOTECHNOLOGY DIVISION AWARDS

The Nanotechnology Division is pleased to announce the recipient of the following awards:

INTERNATIONAL NANOTECHNOLOGY DIVISION AWARD AND IMERYS FIBERLEAN™ PRIZE

Orlando J. Rojas

This year's award will be presented to **Orlando J. Rojas** on Tuesday, 23 June 2015, at the Conference Dinner.

Rojas received his undergraduate degree from Universidad de Los Andes in Venezuela, before obtaining his master's degree in paper engineering from the Polytechnic University of Catalonia in Spain. He subsequently received a PhD in Chemical Engineering from Auburn University. Other academic training includes postdoctoral fellowships in KTH and the Institute for Surface Chemistry in Stockholm.

Prior to his current position as professor of bio-based colloids and Materials at Aalto University in Finland, Rojas was professor in the departments of forest biomaterials and chemical and biomolecular engineering at North Carolina State University. Earlier in his career he was a senior scientist appointed by the Royal Swedish Academy of Sciences in the Royal Institute of Technology, a postdoctoral fellow in the Institute for Surface Chemistry in Sweden, and research assistant at Auburn University.

Rojas was appointed as Finland Distinguished Professor from 2009-2014 and was Chair of the Division of Cellulose and Renewable Materials of the American Chemical Society from 2009-2011. He was elected with the distinction of Fellow of the American Chemical Society in 2013, an accolade that is testament to the exceptional level of his scientific and professional contributions. Other merits include his appointment as a Faculty Scholar of NCSU and his receiving the ACS Division Award of Cellulose and Renewable Materials.

INTERNATIONAL NANOTECHNOLOGY DIVISION'S LEADERSHIP AND SERVICE AWARD

J. Philip E. Jones

This year's award will be presented to J. Philip E. Jones on Tuesday, 23 June 2015, at the Conference Dinner.

Jones received his bachelor's degree in Physics from King's College, University of London, in 1970 and a Ph.D. in Physics (solid-state properties of synthetic kaolins) from the University of London. In 1975 he joined English China Clays plc. (English China Clays is now a part of Imerys). In 1979, he transferred to ECC International's lab in Sandersville, Georgia where he became Vice President, Technology.

In 2006 and 2007 he co-chaired the TAPPI International Nanotechnology Conference for the Forest Products Industry. His work has concentrated on developing and understanding the mechanisms for white mineral pigment performance where pigment characterization and ways of structuring mixed mineral systems have allowed micro and nano-engineering.

Jones became involved at TAPPI by going through the Chairs of the Coating Division, Research Management Division as well as twice serving on the TAPPI Board of Directors and chairing their Technical Operating Committee. He is a TAPPI Fellow and served on the board of the Empire State Research Associates at Syracuse, NY. He was also invited to join the CTO committee of Agenda 2020 and went on to start and chair their nanotechnology work group.

Ted Wegner at the US Forest Products Lab and Jones started a Nanotechnology workshop in 2004 and went on to initiate the TAPPI International Nanotechnology Conferences, subsequently establishing the TAPPI Nanotechnology Division.

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The USDA Forest Service develops innovative science and technology to conserve, extend, and sustainably use America's forest resources. The Forest Service is advancing the enabling science supporting commercialization of wood-derived cellulose nanomaterials because these materials offer a sustainable source of high-performance, large-volume, and cost-competitive nanomaterials for an array of end use applications. **www.fpl.fs.fed.us.**

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The Nanotechnology Division is redesigning our logo and invites students to enter into a Logo Competition. Students have a chance to show off their artistic skill and win a $300 cash prize.

Top three entries will be announced at the conference. Conference attendees will vote to determine the winner on June 24, 2015, the winner will be announced at the conference.

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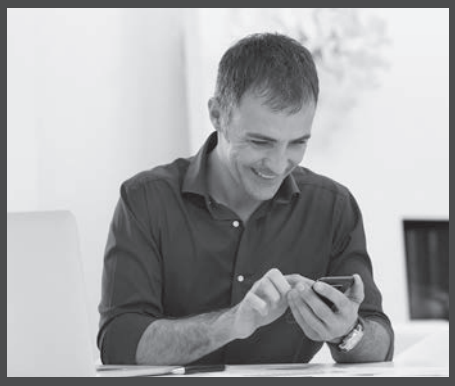

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…is to engage the people and resources of our Association in providing sound solutions to the workplace problems and opportunities that challenge our current and future members.

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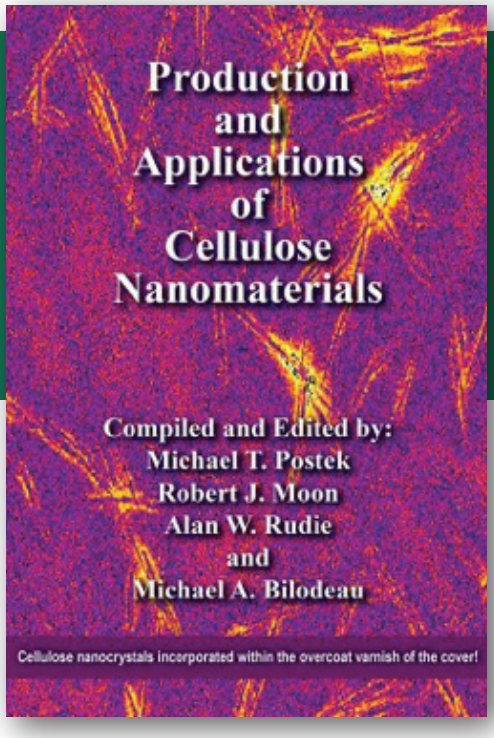

Production and Applications of Cellulose Nanomaterials

By: Michael T. Postek, Robert J. Moon, Alan W. Rudie, Michael A. Bilodeau

Cellulose nano-crystals and cellulose nano-fibrils have been known for 20-50 years, but recent research suggesting very high strength properties and other unique physical properties have generated extensive interest in these materials. The book is a collection of two-to-three page summaries on both recently completed and on-going research as well as identifying a who's-who of research and leads on successful applications.

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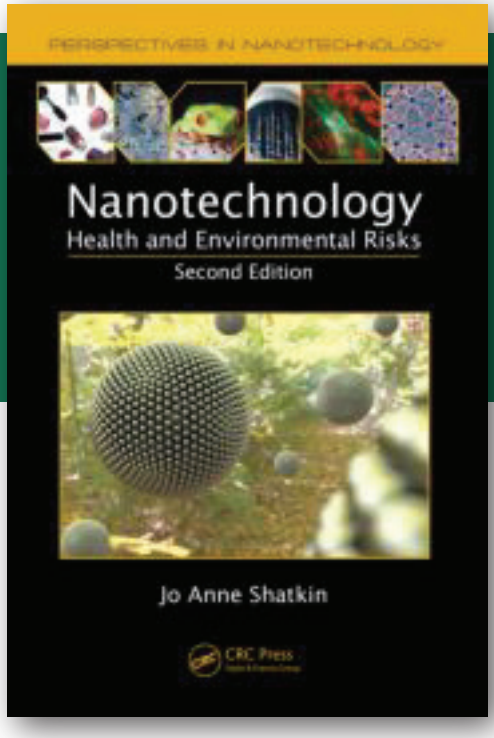

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By: Jo Anne Shatkin

Examining the state of nanotechnology science, this book discusses what is known and what still needs to be understood about nanotechnology risk. It looks at the uses of nanotechnology for energy, industry, medicine, technology, and consumer applications and explains how to determine whether there is risk—even when there is little reliable evidence—and how to manage it. Written in easy-to-understand language, without sacrificing complexity or scientific accuracy, this book offers a wide-angle view of nanotechnology and risk. Supplying cutting-edge approaches and insight, it explains what types of risks could exist and what you can do to address them.

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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 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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