2022

International Conference on Nanotechnology for Renewable Materials

13-17 June 2022 | Helsinki Finland

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TAPPI NANO DIVISION

Have You Joined TAPPI's International Nanotechnology Division Yet?

What are you waiting for? TAPPI Nano members advance the responsible production and use of renewable and sustainable nanomaterials around the world.

As a member, you are part of:

- An elite, global forum of leading researchers, scientists, technical professionals, end users, and others who work together to develop and deploy renewable nanomaterials
- An organization dedicated to the responsible production, use and disposal of renewable nanomaterials
- An informational exchange and dissemination process used to advance nanomaterials science and technology
- An opportunity to engage today's students to become tomorrow's leaders in nanomaterials

You can reap the benefits of membership through activities on the:

- RESEARCH COMMITTEE – Collaborate on projects, applications, functionalization and characterization
- PRODUCERS COMMITTEE – Freely identify industry-wide and pre-competitive issues under TAPPI's strict antitrust policy
- STUDENT COMMITTEE – Enabling the next generation to engage in technical discussions, seek advice, access resources for career development
- WEBINAR COMMITTEE – Put your subject matter expertise front and center on a global stage

Be a part of a global community of nanomaterial experts and help advance this exciting, groundbreaking field

Join Today

To learn more about membership benefits, stop by TAPPI Registration and sign up to join TAPPI, the Division or a Committee. Or simply visit tappinano.org to join.

TAPPI NANO DIVISION

Dear Colleagues,

It is a pleasure to welcome you to the 2022 TAPPI International Conference on Nanotechnology for Renewable Materials at the Scandic Marina Congress Center and Grand Marina in Helsinki, Finland.

After two years of hosting events virtually, we are excited to hold our event in-person in one of the key EU centers of applied research and business related to nanotechnology, and we thank you for joining us. We have a robust program for you focused on the latest technical advancements in production and use of renewable nanomaterials from around the globe.

We hope that our more than 100 technical presentations, workshops, and dynamic keynote presentations enable you to leave fully informed, engaged and excited about the current state of renewable nanomaterials.

Throughout the event, you will find numerous networking opportunities, including the Conference Dinner at Restaurant Saaristo, a Young Professionals Mixer and the Poster Session and Student Competition with more than 40 entries. We hope that you will not only visit the Poster Session in the exhibit to encourage this next generation of researchers, but also vote on the winning entries.

In addition to participating in the technical program, you'll want to explore Helsinki, a compact, walkable city. Design, architecture, cuisine, and shopping are all great options to tour for culture enthusiasts. There's also plenty of stunning natural scenery from large park areas, forests, lakes, and the coastline with numerous islands sprinkled along the view. There's something for everyone!

To maximize your time at the conference, please download the Nano conference app or utilize this onsite guide to see the session schedule, view times and locations and plan your day.

Most importantly, we'd like to thank the research committee, its subcommittees, session chairs, speakers and our sponsors and exhibitors. This conference would not have been possible without your tremendous support and dedication.

We hope you enjoy TAPPI Nano 2022. **Welcome to the Land of the Midnight Sun, the world's happiest country for the fifth year in a row!**

Sincerely,

2022 Conference Co-chairs
Dr., Heli Kangas, VTT Technical Research Centre of Finland Ltd.
Professor Eero Kontturi, Aalto University
Dr. Mehdi Tajvidi, University of Maine

Conference Co-Chairs

Dr. Heli Kangas
VTT Technical Research Centre of Finland Ltd., Finland
Conference Chair

Professor Eero Kontturi
Aalto University, Finland
Conference Co-Chair

Dr. Mehdi Tajvidi
University of Maine, USA
Conference Co-Chair

Technical Program Chair

Dr. Maria Soledad Peresin
Auburn University
Research Committee Chair and Technical Program Chair

Highlights

Monday, 13 June 2022 • 8:30 – 14:30
(Separate Registration Required. $50)

Aalto University & VTT Tour

The tour will begin at VTT, one of Europe's leading research institutions. Here participants will have an opportunity to visit:

- Biomass fractionation facilities, including nanocellulose manufacturing
- Film and coating pilot lines - VTT SutCo pilot line for manufacturing stand-alone nanocellulose films and biomaterial dispersion coatings and VTT CelluloseFilms pilot line for regenerated cellulose films and coatings
- Sustainable biobased textiles at Aalto University: fiber spinning line plus textile design and manufacturing

After visiting VTT, attendees will travel to Aalto University, a public research university located in Espoo, Finland. Upon arrival, attendees will have a light lunch and have an opportunity to visit tabletops and posters hosted by students. Following lunch, participants will visit the lab and pilot. Full tentative tour schedule is below.

8:30 Bus leaves from the hotel (Scandic Grand Marina, Helsinki)

9:15 Arrival to VTT Bioruukki

9:30 Welcome & Coffee, posters & tabletop in the lobby

11:30 Bus leaves to Aalto University

12:00 Arrival to Aalto Dept. Bioproducts and Biosystems

Light lunch in the lobby, posters & tabletop by students

Tours in the lab & pilot

14:00 Bus leaves to Helsinki

14:30 Arrival at the hotel

Mentor/Mentee Meet & Greet

Monday, 13 June 2022 • 12:00 – 13:30
(Pre-registration is Required.)

Meet your Mentor/Mentee

This program is designed to help students, postdocs and young professionals make the most of their conference experience by pairing them with global leaders in renewable materials. This is a fun, informal opportunity for student and young professionals to meet, connect and make an impact. Experts are paired with young professionals to mentor them during the conference.

CNM Characterization Workshop – Primary Characterization

Monday, 13 June 2022 • 13:30 – 16:00
(Separate Registration Required. Member: $216; Nonmember: $266)

Workshop Organizers:

Johan Foster
University of British Columbia

Robert J. Moon
USDA Forest Service - Forest Products Laboratory

For the advancement in understanding, process optimization, and utilization of cellulose nanomaterials (CNMs) it is critical to use characterization measurement protocols that give consistent, reliable, and accurate results. However, because of the exponential growth in interest/activity in CNMs, much of the development of these measurement protocols have been outpaced. This 2.5-hour workshop helps to address this gap by outlining the best practices and limitations for several techniques/methods typically used for the characterization of CNMs. Examples of such include surface charge, surface characterization, crystallinity determination and mechanical properties. Each topic will be covered by experts in the field for the given technique with the purpose to inform the audience as to why one should consider using a given technique (e.g., use "this" technique for "that" reason"), followed by a detailed best practice for the technique (e.g., here is the proper way to do "this" technique). Where possible, examples have been given to highlight how "this" technique results "this" data on "these" CNMs. Throughout the workshop, specific comments are made regarding any differentiation in the characterization of CNC versus CNF.

Young Professionals Mixer

Monday, 13 June 2022 • 19:30 – 20:30
Helsinki City Hall, Banquet Room
Hosted by:

TAPPI YOUNG PROFESSIONALS DIVISION Advancing the Future of Next Generation Stars

This event hosted by TAPPI's Young Professionals Division, is a great opportunity to network with a diverse group of young professionals in a relaxed environment while attending the 2022 TAPPI Nano Conference. This event offers a great way to combine both business and social networking. Enjoy drinks and appetizers with other YP's as well as division representatives. This event is geared toward those who are 30 and under but is open to all conference attendees.

University Product Showcase

Tuesday, 14 June, 2022 • 17:30 - 19:00

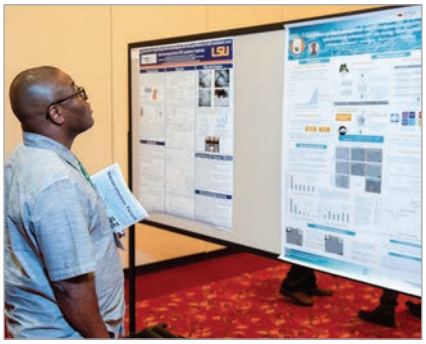
The product showcase will feature samples of products, materials etc., from Universities. This session will be held in conjunction with exhibitor tabletops and the poster session.

**Check the conference app for a list of participating companies.*

Poster Session and Student Poster Competition

Tuesday, 14 June 2022 • 17:30 – 18:30
Coordinated by: Nano Student Committee

Georgia Tech Renewable Bioproducts Institute



View poster presentations which focus on additional application, characterization, and functionalization of cellulose and other renewable nanomaterials. The poster session and student poster competition are held every year at the conference to showcase undergraduate and graduate research. Conference attendees are invited to vote on the student posters in the competition using either paper ballot, or the voting tool in the Conference App. Prizes are awarded to the top poster presenters.

Conference Networking Dinner & Awards Ceremony

Wednesday, 15 June 2022 • 18:30 – 22:00
(Separate Registration is Required. Tickets are $100 for Conference Registrants and $175 for guests.)

Join us at the Restaurant Saaristo, located in front of Kaivopuisto, on the Klippan islet. This Art Nouveau villa is one of Helsinki's most spectacular and traditional restaurants. Completed in 1899, the building has a long and colorful history. The restaurant is surrounded by sea views and is complimented by a dance floor and three outdoor terraces. Dinner will be followed by our awards ceremony. KEJ Band will provide the evening's entertainment.

Keynote Speakers

Monday, 13 June 2022 • 16:00 – 17:30

Nina Kopola
Director General, CEO Business Finland

Saving the World is Good Business!

Our world is in a dire state. In order to save it we need innovations. What are we doing to create a thriving innovation environment—especially in the bio- and circular economy? Why does this matter?

Nina Kopola began her five-year term as Director General of Business Finland on 1 September 2019. Her leadership has already brought about the implementation of Business Finland's strategic and organizational reform.

Kopola is widely recognized as an experienced business leader and pioneering female CEO. She is best known for her time as CEO of the Suominen Corporation and as Business Director at Dynea, and was the only female CEO of a publicly listed company in Finland for quite some time. She has also served on the board of directors of many other listed companies.

Kopola holds a master's degree in engineering and a licentiate of technology.

Throughout her career, Kopola has gained a wealth of experience in international business, especially in the process industry. She is also adept at research, product and business development, and marketing. Above all, Kopola is a reformer, a leader of people, and an expert in overseeing organizational change.

Tuesday, 14 June 2022 • 12:00 – 14:00

Sean Ireland
Vice President Business Development, FiberLean® Technologies NA Inc.

FiberLean MFC – It's Like We Are Printing You Money!

Sean Ireland, VP Business Development, will be giving a presentation on the newest addition to the Werhahn Group - FiberLean Technologies! During the presentation, you will learn about the new commercial products, divisions and capabilities that are driving cellulosic nanomaterials into a globally thriving business. FiberLean is changing how businesses can utilize biomaterials to enhance their products, remove fossil based materials and reduce their carbon footprint. Join us at the FiberLean sponsored lunch presentation.

Ireland has over 30 years' experience in electronics, electrical engineering and process control from the military to industrial manufacturing; however, his real desire is in growing new technologies globally through his passion and motivation. Almost two decades ago, his interest shifted to the physical and surface sciences of nano-scale technologies with a focus on cellulosic nanomaterials. During the twenty years, Sean has delivered multiple keynote presentations on nanotechnology to diverse audiences across the globe, striving to motivate them to work with these new materials. Additionally, Ireland has been integral in working with multiple government agencies to obtain federal funding for critically needed nanocellulosics research and development.

Prior to working for FiberLean Technologies, he served in the U.S. military where he earned his officer commission and his wings. He then went on to fly the F-16 Fighting Falcon. Later, Ireland was appointed as the Commander of the 174th Forward Operating Location (FOL) located at 10th Mountain Division, Fort Drum, New York.

Over the past 25 years, Ireland has worked for Champion International, International Paper, Verso Paper and FiberLean Technologies during which he is credited with patents and applications in nanocellulose enhanced composites, polymers, building materials, neural modeling, specialty paper and coating formulations. He has authored or co-authored several technical papers on non-linear systems and nanocellulose technology and papers on the vision for nanotechnology. Ireland is very active in TAPPI's Nanotechnology and other divisions. He was an Adjunct Professor in the School of Chemical Engineering, University of Maine, was the first Chair for the TAPPI Nano Division, and the Scientific Advisory Board for P3Nano.

Keynote Speakers

Wednesday, 15 June 2022 • 12:00 – 14:00

Riikka Timonen
Director and Business Accelerator, Valmet Technologies Inc.

Accelerating New Business Growth from Circular Economy

Riikka Timonen is an experienced business development professional with a passion for sustainable development and change leadership.

Having joined Valmet two years ago, Timonen leads the Business Accelerator program, a corporate-level initiative for generating new business growth.

Timonen also holds an eMBA and a Master's degree in Environmental Engineering.

Prior to joining Valmet, she worked for Kemira for over 15 years, where she held several positions in different business segments centered around strategic business development. In her last role as Head of Marketing and Applications Development, Timonen focused on chemical water treatment business. As the Head of Corporate As the Head of Corporate Responsibility, she was responsible for establishing Kemira's sustainability function.

Thursday, 16 June 2022 • 12:00 – 14:00

Alexander Bismarck
Professor of Materials Chemistry and Head of the Faculty of Chemistry, University of Austria

Waste, No Waste: Manure as Source for Nanocellulose, Energy and More...

Alexander Bismarck is Professor of Materials Chemistry and Head of the Institute of Materials Chemistry of the Faculty of Chemistry, University of Vienna, Austria. His research focuses on polymer materials and composites. He has worked in the area of natural fibres, including various nanocellulose fibrils, for about 25 years. The interest in renewable nanomaterials is mainly driven by of their mechanical and barrier properties.

During his career, Bismarck has worked at various Universities and industry and is part of the start-up Ecoinno, Hong Kong. Alexander has published over 250 papers in refereed journals and contributed to numerous outreach activities.

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- Advanced Understanding of Paper and Board Coating Processes and Structures
- Sustainability: Advances at the Forefront

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Technical Program

Time	Monday, 13 June 2022
8:30–14:30	****Aalto University and VTT Tour**
12:00–13:30	***Student Committee Lunch** *Nautica Room*
13:30–16:00	****CNM Characterization Workshop – Primary Characterization** *Lead Instructors:* ***Johan Foster, University of British Columbia, Robert Moon, USDA Forest Service - Forest Products Laboratory and*** *Pressroom*
16:00–17:30	**Session 1: OPENING SESSION AND KEYNOTE** ***Session Chair: Heli Kangas, VTT Technical Research Centre of Finland, Ltd.*** *Saving the World is Good Business* ***Nina Kopola, Director General & CEO, Business Finland*** *Europaea Room*
17:30–19:00	**Welcome Reception & Trade Fair** *Europaea Foyer*
19:30–20:30	**Young Professionals Mixer** *Helsinki City Center*

Time	Tuesday, 14 June 2022		
8:30–10:00	**Session 2: Paper & Packaging I** ***Session Chair: Joice Jaqueline Kaschuk, Aalto University*** *Room: Nordia*	**Session 3: Electronic Materials and Photonics for Emerging Applications** ***Session Chair: Katariina Torvinen, VTT Technical Research Centre of Finland, Ltd.*** *Room: Baltica*	**Session 4: Cellulose Nanofibril Modification for Functional Wood** ***Session Chair: Hannes Orelma, VTT Technical Research Centre of Finland, Ltd.*** *Room: Nautica*
8:32	Overcoming the Sheet Sealing Phenomenon in High Nanocellulose Content Papers ***Hamidreza Ahadian, Aalto University***	Strong, Conformal, and Stretchable Cellulose Nanocomposite Films for Skin-mounted Electronics ***Vinay Kumar, VTT Technical Research Centre of Finland, Ltd.***	Use of Microfibrillated Cellulose in Wood Coatings - Enabling High Loadings of Microfibrillated Cellulose for Application in Wood Coatings with Improved Functionalities: A Novel Approach Using Emulsion Polymerisation ***Claudia Schirp, Fraunhofer Institute for Wood Research, WKI***
8:54	In Situ Zinc Oxide Production on Bacterial Nanocellulose for Active Food Packaging ***Francisco de Almeida Garrett Soares da Silva, Universidade Católica Portuguesa***	Dopamine-conjugated Carboxymethyl-cellulose and Intermolecular Self-Assembly with Carbon Nanotubes for Multifunctional Wearables ***Tianyu Guo, University of British Columbia***	Optimization of Surface Tension-directed Self-assembly of Cellulose Nanocrystals for Printing Birefringent Micro-figures ***Mehdi Tajvidi, University of Maine***
9:16	Energy and Sensing Technologies Towards Green Smart Packaging ***Gustav Nyström, Empa***	Cellulose Optical Fibres for Advanced Sensing Applications ***Aayush Kumar Jaiswal, VTT Technical Research Centre of Finland, Ltd.***	Nanoclay-incorporated Oven-dried Cellulose Nanofibril Foam for Eco-friendly Flame Retardant ***Shin Young Park, Seoul National University***

**Invitation Only*
***Additional registration fee required*

Technical Program

Time	Tuesday, 14 June 2022		
9:38	Cellulose-based Biofoam for Temperature-controlled Packaging ***Xiao Zhang, Washington State University***	Sustainable Superblack Materials from Wood For Light Management ***Bin Zhao, Aalto University***	Use of ß-cyclodextrin Grafted Chitosan Immobilized onto Delignified Wood as Adsorbent in Water Remediation ***Diego Gomez Maldonado, Auburn University***
10:00–10:30	**BREAK** *Room: Europaea Foyer*		
10:30– 2:00	**Session 5: Paper & Packaging II** ***Session Chair: Sara Roldan Velasquez, University of Strathclyde*** *Room: Nordia*	**Session 6: Biobased Materials for Energy Storage and Management** ***Session Chair: Yun Jin, FiberLean® Technologies Ltd.*** *Room: Nautica*	**Session 7: CNF for Applied Materials** ***Session Chair: Isabelle Capron, INRAE*** *Room: Baltica*
10:32	Pilot Machine Trials with a New MFC Surface Applicator for Paper and Board Production ***Marc Foulger, Valmet***	Advantages and Drawbacks of Nanocellulose Materials for Solar Cells Substrates ***Joice Jaqueline Kaschuk, Aalto University***	Interfacially Separated Micro-Aerogels from Hybrid Emulsions ***Milad Kamkar, University of British Columbia***
10:54	Cellulose Nanomaterials for Tree Fruit Frost Protection ***Xiao Zhang, Washington State University***	Cellulose Nanomaterials Enable Lithium-ion, Sodium-Ion and Zinc-ion Batteries with Extended Operation Lifespans ***Erlantz Lizundia, University of the Basque Country***	Improvement of the Structural Stability of the Oven-dried CNF Foam ***Hye Jung Youn, Seoul National University***
11:16	Role of Rheology in Roll-To-Roll Coating of High-Solids Content Nanocellulose ***Rajesh Koppolu, Åbo Akademi University***	Dry-Jet Wet Spinning of Tempo Oxidized Nanocellulose Conduits for Energy Storage Textiles ***Guillermo Reyes Torres, Aalto University***	Screen-Printing of Micro/Nano-Fibrillated Cellulose for an Improved Moisture Management and Abrasion Resistant Properties of Flame-Resistant Fabric ***Vanja Kokol, University of Maribor***
11:38	Cellulose Nanofiber Coatings for Food Packaging Applications ***Gilberto Siqueira, Empa***	*Energy Pellets from Whole-wheat Straw Processed with a Deep Eutectic Solvent: A Comprehensive Thermal, Molecular and Environmental Evaluation* ***Ran Bi, BPI***	Morphology and Viscoelastic Properties of Dried-redispersed Organic Acid Modified Cellulose Nanofibrils ***Amaka J. Onyianta, Bristol Composites Institute (ACCIS)***
12:00–14:00	**Session 8: Lunch with Presentation Sponsored by FiberLean® Technologies Ltd. FiberLean®** ***Session Chair: Maria Soledad Peresin, Auburn University*** *MFC – It's Like we are Printing You Money!* ***Sean Ireland, Vice President Business Development*** *Room: Fennia I and II*		
14:00–15:30	**Session 9: Adhesives** ***Session Chair: Yun Jin, FiberLean® Technologies Ltd.*** *Room: Nordia*	**Session 10: Renewable Materials I** ***Session Chair: Bruno Dufau Mattos, Aalto University*** *Room: Baltica*	**Session 11: Biomedical** ***Session Chair: Marcus Johns, University of British Columbia*** *Room: Nautica*
14:02	The Enhancement of UF Glued Particleboard by Cellulose Nanofibers ***John Simonsen, Oregon State University***	Production of Various Carboxylated Cellulose Nanocrystals from Beer Residuals ***Timo Pääkkönen, Aalto University***	Cellulose Nanocrystal Reinforced Amphiphilic Polymer Conetworks Based on Peptide Polymer Hybrids ***Sara Roldan Velasquez, University of Strathclyde***
14:24	*Disperse Nanocellulose into Viscous Polymers as Composite Materials* ***Roland Gong, University of Wisconsin-Stevens Point***	Unique Reactivity of Cellulose Mediated by Confined Water ***Blaise Tardy, Khalifa University***	Brush and Linear PEG-Grafted Cellulose Nanocrystals for Drug Delivery ***Megan Roberts, Mount Allison University***
14:46	Dried vs. Never-Dried Carboxylated Cellulose Nanocrystals: Branching Out to Stickier Nanocomposite Adhesives ***Vida Gabriel, University of Ottawa***	In Situ Oligosaccharide Surface Modification of Cellulose Nanocrystals ***Elina Niinivaara, University of British Columbia***	The Effect of Surface Chemistry Modification of Wood-Based Nanocellulose on Rat Stem Cell Response ***Kristin Syverud, RISE PFI***

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Technical Program

Time	Tuesday, 14 June 2022		
15:08	Cellulose Nanocrystal Surface Property Effects on Emulsion-based Adhesive Performance ***Marc Dubé, University of Ottawa***	Novel Enzymatic Tools to Fabricate Nanofibrillated Cellulose ***Ana Villares, INRAE***	Cellulose Nanocrystals Modified Substrates for Mechanical Compatibility of Stem Cells ***Jeremy Woodcock, NIST***
15:30–16:00	**BREAK** *Room: Europaea Foyer*		
16:00–17:30	**Session 12: In-situ Polymerization & Thermosets** ***Session Chair: Milad Kamkar, University of British Columbia*** *Room: Nautica*	**Session 13: Product Stewardship and Safety in Applications** ***Session Chair: John Simonsen, Oregon State University*** *Room: Baltica*	**Session 14: Rapid Fire Session** ***Moderator: Megan Roberts, Mount Allison University*** *Room: Nordia*
16:02	Nanocellulose for Stronger or Lighter Glass Fiber Polyester Composites ***Kyriaki Kalaitzidou, Georgia Institute of Technology***	Qualifying Novel Bio-Based Materials for the Market: EHS, Sustainability and Beyond ***Jo Anne Shatkin, Vireo Advisors, LLC***	See Conference App
16:22	Cellulose Nano Crystal Acetylation: A Straight-Forward Modification to Improve the Desalination Permeability-Selectivity Trade -Off of Reverse Osmosis Membranes ***Fatemeh Abedi, University of Ottawa***	Safety, Regulation, and Testing of Novel Bio-Based Materials for Food Packaging Applications **Kimberly Ong, Vireo Advisors, LLC**	
16:46	Reactive Cellulose Nanomaterials for Polymer Composites ***Douglas Fox, American University***	Commercializing Microfibrillated Cellulose Products: Regulatory Aspects ***David Skuse, FiberLean Technologies Ltd.***	
17:02	Aqueous Functionalization of Cellulose Nanofibrils By Grafting-Through Polymerizations to Create Reinforcements for Composites ***William Gramlich, University of Maine***	Safer by Design Toolbox to Advance Functionalized Cellulose Nanomaterials ***James Ede, Vireo Advisors, LLC***	
17:30–19:00	**Session 15: Poster Session, Student Poster Competition, and University Product Showcase** *Room: Europaea and Nautica Foyers*		

Time	Wednesday, 15 June 2022		
7:30–8:00	*NANO Research Committee Meeting (Subcommittee Chairs Only) *Room: Pressroom*		
8:00–8:30	*NANO Research Committee Meeting (Full Committee) *Room: Pressroom*		
8:30–10:00	**Session 16: Cellulose Nanocrystals for Applied Materials** ***Session Chair: Elina Nilnivaara, University of British Columbia*** *Room: Baltica*	**Session 17: Renewable Production II** ***Session Chair: Tianyu Guo, University of British Columbia*** *Room: Nordia*	**Session 18: Self-Assembled and Ordered Materials I** ***Session Chair: Blaise Tardy, Aalto University*** *Room: Nautica*
8:32	Octylamine Modified Cellulose Nanocrystal Enhanced Stabilization of Pickering Emulsions for Self-Healing Composite Coatings ***Guofan Xu, Bristol Composites Institute (ACCIS)***	Acidic Thiourea Delignification of Softwood Tt Produce Cellulose Nanofibers ***Juho Sirviö, University of Oulu***	Formation of Channel Structures in the Cellulose Nanofiber Hydrogel ***Jinho Hyun, Seoul National University***

**Invitation Only*
***Additional registration fee required*

Technical Program

Time	Wednesday, 15 June 2022		
8:54	The Sticky Road to Understanding the Effect of Cellulose Nanocrystal Surface Chemistry on the Performance of Latex-Based Pressure-Sensitive Adhesives ***Julia Antoniw, University of British Columbia***	Green Synthesis Approaches to Prepare Lignin Nanoparticles: A Comparison Study ***Maarit Lahtinen, University of Helsinki***	Engineering Functional Nanocellulose Porous Materials through the Assembly of Metal-Phenolic Networks ***Bruno Dufau Mattos, Aalto University***
9:16	Bicontinuous Emulsion & Aerogels via Chitin Nanocrystal Jamming ***Yi Lu, University of British Columbia***	Enzymes Recovery during Cellulose Fibers in Situ Hydrolysis in A Twin-Screw Extruder for Cellulose Nanofibrils Production ***Gabriel Banvillet, University of British Columbia***	3D Printing of Nanocellulose-Based Inks Embedding Diatoms to Assess Water Quality ***Rani Boons, Empa***
9:38	Processes for Drying Cellulose Nanocrystal Pickering Emulsions into Oil Powders ***Marc Massicotte, University of British Columbia***	Sustainable and Tailored Production of Carboxylated Cellulose Nanomaterials (with or without lignin) using Maleic Acid ***Junyong Zhu, USDA Forest Products Lab***	See Conference App
10:00–10:30	**BREAK** *Room: Europaea Foyer*		
10:30–12:00	**Session 19: Understanding Cellulose Nanomaterials for High End Applications** ***Session Chair: Kristin Syverud, RISE, PFI, NTNU*** *Room: Baltica*	**Session 20: Renewable Production III** ***Session Chair: Gabriel Banvillet, University of British Columbia*** *Room: Nordia*	***Session 21: Self-Assembled and Ordered Materials II*** ***Session Chair: Tiffany Abitbol, RISE*** *Room: Nautica*
10:32	Bio-Inspired Preparation of Dissolved Cellulose on Alkali Conditions for Multidimensional Hierarchical Structures ***Guillermo Reyes Torres, Aalto University***	Quality Analysis of Micro-Fibrillated Cellulose Production Trial Results ***Juha-Pekka Huhtanen, Valmet***	Surface Adsorption of Cellulose Derivatives on Cellulose Nanocrystals ***Francesco D'Acierno, INRAE***
10:54	*Phosphorylated Cellulose Nanocrystals: Urea to Acid Ratios and Effects on Surface Charge* ***Anita Etale, Bristol Composites Institute (ACCIS)***	Cellulose Fiber Mechanical Fibrillation Process Optimization: A Computational Flow Dynamics Approach ***Amaud Venard, Univ. Grenoble Alpes, CNRS, Grenoble INP, LGP2***	Exploring the Impact of Functional Groups on the Interfacial Interactions of Constructs of Natural Biopolymers ***Blaise Tardy, Aalto University***
11:16	Coupled Electromagnetic and Heat Transfer Analysis for Drying of Ligninocellulosic Foams Made using Cellulose Nanofibrils ***Mohammad Tauhiduzzaman, University of Maine***	Once Dried Nanocellulose's Functionality After Drying and Redispersing Phase and Performance in Applications ***Jan Lehmonen, Pennsylvania State University***	Self-assembled Nanocellulose Meets Swimming Microalgae: Unveiling Living Colloid Dynamics in Cholesteric Liquid Crystals ***Guang Chu, Aalto University***
11:38	See Conference App	Methods to Produce Dry Nanoscale Cellulose Nanocrystal Powders: Challenges and Opportunities ***Douglas Gardner, University of Maine***	Dense and Organized Cellulose Nanocrystals Emulsion Droplets as Model to Study Enzyme Action ***Hugo Voisin, INRAE - Centre de Recherche Pays de la Loire***
12:00–14:00	**Session 22 - Lunch with Presentation Sponsored by Valmet** ***Session Chair: Mehdi Tajvidi, University of Maine*** *Accelerating New Business Growth from Circular Economy* ***Speaker: Riikka Timonen, Director and Business Accelerator*** *Room: Fennia I and II*		
14:00–15:30	**Session 23: Qualifying Materials for Sustainability** ***Session Chair: Elisa Ferreira, University of British Columbia*** *Room: Nordia*	**Session 24: Elucidating CNCs Structure to Enhance Applicability and Performance** ***Session Chair: Diego Gomez Maldonado, Auburn University*** *Room: Baltica*	**Session 25: Paper & Packaging III** ***Session Chair: Jimmy Jong, FPInnovations*** *Room: Nautica*

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Technical Program

Time	Wednesday, 15 June 2022		
14:02	Consumer Gatekeeping in Sustainable Materials Streams ***Nasreen Khan, Georgia Institute of Technology***	What are the Main Factors Governing the Thermal Stability of Dry Vs. Wet Cellulose Nanocrystals? ***Emily Cranston, University of British Columbia***	Continuous Production of Nanocellulose Films with Limited Heating ***Karl Håkansson, RISI***
14:24	CNC/AgNP Hybrids Designed for Safer-by-design Biocides in Paints ***Isabelle Capron, INRAE***	High-Resolution Solution-State NMR Analysis of Nanocelluloses in Ionic Liquid Electrolyte ***Alistair King, University of Helsinki / VTT Technical Research Centre of Finland, Ltd.***	CNF Coatings for All-biobased Molded Pulp Lidded Containers ***Jeffrey Youngblood, Purdue University***
14:46	Cellulose Nanocrystals for Adsorption and Sensing Applications ***Maria Soledad Peresin, Auburn University***	Tunable and Controllable CNC Surface Properties for Organic Electronic Applications ***Wadood Hamad, FPInnovations***	Modification of Nanocellulose Films in Deep Eutectic Solvents Using Vinyl Esters ***Mathias Lakovaara, University of Oulu***
15:08	Challenges On Specific Surface Area Analysis of Cellulosic Materials ***Anett Kondor, Surface Measurement Systems Ltd.***	Autofluorescent Spectroscopy for Rapid Quality Control Monitoring of Cellulose Nanocrystals ***Marcus Johns, University of British Columbia***	Dewatering of Cellulose Nanofibrils Using Ultrasound ***Udita Ringania, Georgia Tech***
15:30–16:00	**BREAK** *Room: Europaea Foyer*		
16:00–17:30	**Session 26: End User Panel** ***Moderator: Hamdy Khalil, Wood Bridge Foam Corporation*** ***Panelists: Kari Luukko, UPM Biomedicals, Juha Salmela, Spinnova, Estevão Mai, Suzano*** *Room: Europaea*		
18:30–22:00	****Conference Dinner and Awards Ceremony** *Restaurant Saaristo*		

Time	Thursday, 16 June 2022	
8:30–10:00	**Session 27: Biocomposites & Biodegradable Polymers** ***Session Chair: Milad Kamkar, University of British Columbia*** *Room: Nordia*	**Session 28: Responsive Materials** ***Session Chair: Joice Jaqueline Kaschuk, Aalto University*** *Room: Baltica*
8:32	Effect of Chitin-Protein Interactions in the Fabrication of High-Performance Materials ***Luiz Greca, Aalto University***	Bioactive Bacterial Nanoncellulose ***Marina Mehling, University of British Columbia***
8:54	Surface-Modified Microfibrillated Cellulose Reinforced Biocomposites ***Katie Copenhaver, Oak Ridge National Laboratory***	Functionalized Cellulose Nanocrystals as Active Reinforcements for Light Actuated 3D Printed Structures ***Luca Muller, Empa***
9:16	Effect of Electrospinning Parameters on Polylactic Acid / Nanocellulose Biocomposite Fibers ***Burcu Sari, Middle East Technical University***	Cellulose-Based Nanocomposite with High Wet Strength, Antioxidant, and UV-Blocking Properties via Facile Interfacial Design ***Erfan Kimiaei, Aalto University***
9:38	See Conference App	Setting Priorities in CNF Particle Size Measurement: What is Needed vs. What is Feasible ***Andreas Fall, RISE***
10:00–10:30	**BREAK** *Room: Europaea Foyer*	

**Invitation Only*
***Additional registration fee required*

Technical Program

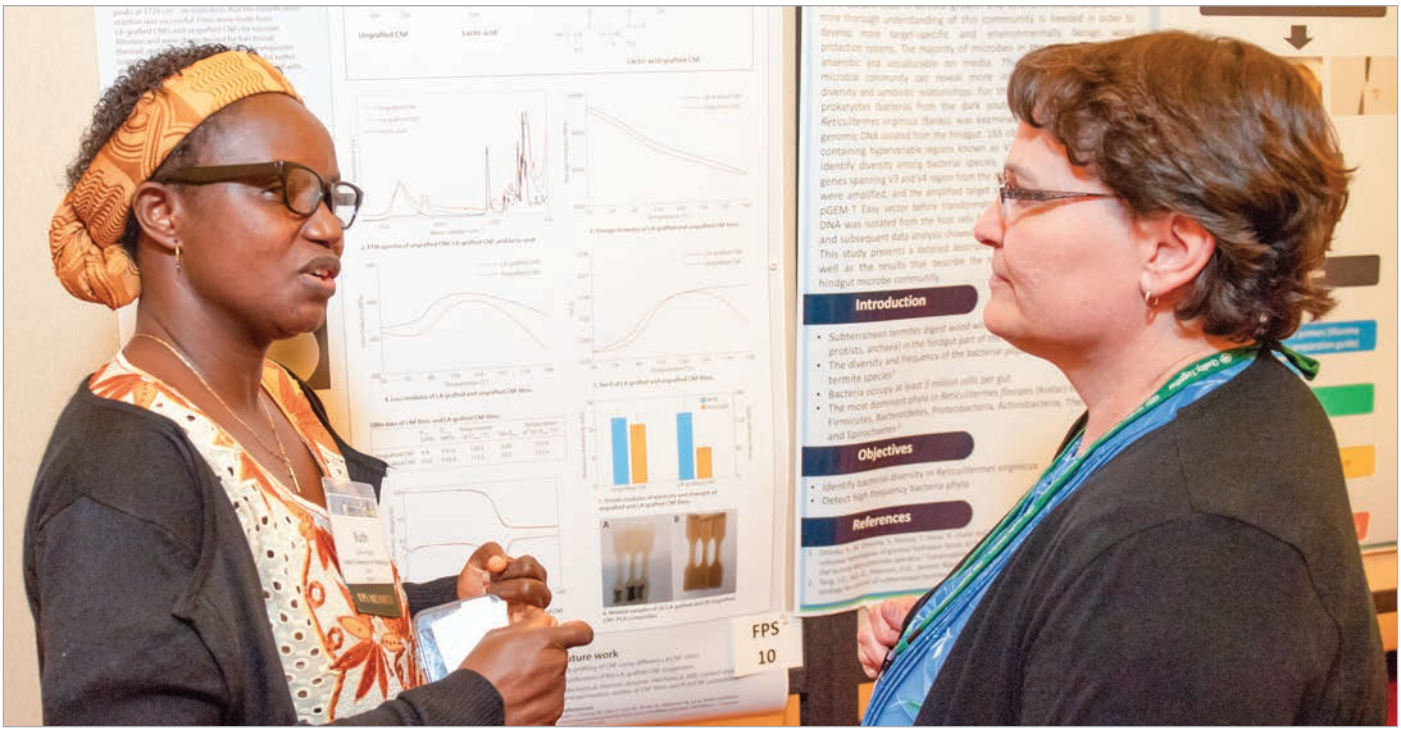
Time	Thursday, 16 June 2022		
10:30–12:00	**Session 29: Grafting & Drying** ***Session Co-Chairs: Katie Copenhaver and Meghan Lamm, Oak Ridge National Laboratory*** *Room: Nordia*		**Session 30: Sustainable Production** ***Session Chair: Guillermo Reyes Torres, Aalto University*** *Room: Baltica*
10:32	A Facile Aqueous-Phase Polyimine Functionalization of Cellulose for Effective Drying and Composite Reinforcement ***Meghan Lamm, Oak Ridge National Laboratory***		Ultrasonic Welding of Papers Coated with Cellulose Microfibrils and Nanocrystals ***Quentin Charlier, LGP2***
10:54	Melt Extrusion of Reactive Cellulose Nanocrystal (CNC)/Poly (Methyl Methacrylate) (PMMA) Nanocomposite ***Whirang Cho, American University***		Sustainable Approaches to Produce Cellulose Nanocrystals with Carboxylic Acid Moieties ***Julien Bras, Univ. Grenoble Alpes, Grenoble INP, CNRS, LGP2***
11:16	Nanocellulose as Reinforcement in PLA Based Packaging Materials: Dry or Wet Addition in Extrusion Processes? ***Pilar Albaladejo Sánchez , ITENE***		Challenges in Water Treatment Based on Cellulose Nanomaterials ***Andreas Mautner, University of Vienna***
11:38	Novel Lattice Structures Made of Wood Flour and Cellulose Nanofibrils Using Microwave Drying ***Islam Hafez, University of Maine***		*Incorporating Cellulose Nanofibers into Biodegradable Polymers for Use in Additive Manufacturing* ***Alyson Manley, University of Maine***
12:00–14:00	**Session 31: Keynote Presentation and Lunch** ***Session Chair: Eero Kontturi, Aalto University*** *Waste, No Waste: Manure as Source for Nanocellulose, Energy and More…* ***Keynote Speaker: Alexander Bismarck, University of Vienna*** *Room: Fennia I and II*		
14:00–15:30	**Session 32: Paper & Packaging IV** ***Session Chair: Ulla Forsström, VTT Technical Research Centre of Finland Ltd.*** *Room: Nordia*	**Session 33: Self-Assembled III** ***Session Chair: Maria Soledad Peresin, Auburn University*** *Room: Baltica*	**Session 34: Student Session: Career Roundtable** ***Moderator: Megan Roberts, Mount Allison University*** *Room: Nautica*
14:02	Nanocellulose from Industrial Residues Applied in Paper and Board Industry ***Rafael Sánchez, ITENE***	Influence of Zeta Potential on the Drainage Rate and Film Properties of Cellulose Nanofiber/Precipitated Calcium Carbonate Suspensions ***Pradnya Rao, University of Maine***	***Panelists: Jeffrey P. Youngblood, Purdue University*** ***Anni Karppinen, Stora Enso*** ***Katarilina Solin, VTT Technical Research Centre of Finland Ltd.*** ***Kimberly Ong, Vireo Advisors***
14:24	Turning Recycled Cardboard Containers into High Gas Barrier UV-Protective Film for Packaging Applications ***Md Ikramul Hasan, University of Maine***	The Presence of Pectin in Birch Glucuronoxylan (GX) Is Essential for the Formation of Nanoscale Oil-in-water Emulsion Droplets ***Maarit Lahtinen, University of Helsinki***	
14:46	Minimizing Oxygen Permeability of Cellulose/Chitin Nanomaterials as Multilayer Coatings by Tuning Chitin Deacetylation ***Yue Ji, Georgia Institute of Technology***	Cellulose Nanomaterials as Flotation Agents: Interactions of Silylated CNCs with Silica and Sulfidic Mineral Surfaces ***Feliciana Ludovici, University of Oulu***	
15:08	The Effect of Feedstock on the Production of CMF ***Colleen Walker, University of Maine***	Alternative Methods to Produce Cellulose Nanofibrils-based Aerogels for Water Treatment Applications ***Md Musfiqur Rahman, University of Maine***	
15:30–16:00	**BREAK** *Room: Europaea Foyer*		

continued on page 18

Technical Program

Time	Thursday, 16 June 2022	
16:00–17:30	**Session 35: Paper & Packaging V** ***Session Chair: Douglas Fox, American University*** *Room: Nordia*	**Session 36: Applications for Sustainable Materials** ***Session Chair: Marina Mehling, University of British Columbia*** *Room: Baltica*
16:02	Adhesion of Microfibrillated Cellulose Layers to Paper and Board ***Lars Axrup, Stora Enso***	Valida – Natural Cellulose as a Multifunctional Stabilizer in Chemically Foamed Concrete ***Yanwu Zhou, Sappi Netherlands Services BV***
16:22	The Unique Properties of Microfibrillated Cellulose and Their Exploitation in Paper and Paperboard ***Jon Phipps, FiberLean® Technologies, Ltd.***	Naturally Hydrophobic Lightweight Materials for Oil Spill Clean Up ***Elisa Ferreira, University of British Columbia***
16:46	Contact Dewatering of Cellulose Nanofibrils Using Polymer Powder: A Feasible and Efficient Method for Bio-Based Composites Processing ***Alexander Collins, University of Maine***	The Adsorption Behavior of Wood-Based Nanomaterials Towards Pharmaceuticals ***Melissa Agustin, University of Helsinki***
17:02	Recyclable Cellulose Nanocomposites For Food Serving Applications with Enhanced Water Resistance ***Rakibul Hossain, University of Maine***	See Conference App
17:30–18:30	**2022 Nano Conference Wrap up Meeting** *Room: Nautica*	
18:30–19:30	**2023 Nano Conference Planning Meeting (Invitation Only)** *Room: Nautica*	

Time	Friday, 17 June 2022
8:00–11:00	**Producers Committee Meeting (Invitation Only)** *Room: Nautica*



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TAPPI Nano Division Awards Winners

This year's awards will be presented on Wednesday, 15 June, 2022 at the awards ceremony which will be held during the conference dinner.

International Nanotechnology Division Award and FiberLean® Technologies Prize

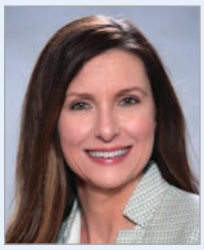
Liangbing Hu
University of Maine

Liangbing Hu received his B.S. in physics from the University of Science and Technology of China in 2002, where he worked on colossal magnetoresistance (CMR) materials for three years. He did his Ph.D. (2002–2007) at UCLA, focusing on carbon-nanotube-based nanoelectronics. In 2006, he joined Unidym, Inc. as a co-founding scientist, leading the development of roll-to-roll printed carbon nanotube films and device integration in touch screens, LCDs, flexible OLEDs, and solar cells. He did his postdoc at Stanford University from 2009–2011, where he worked on various energy storage technologies using nanomaterials/nanostructures. Currently, he is a Herbert Rabin Distinguished Professor at the University of Maryland, College Park. His research group focuses on materials innovations, device integration, and manufacturing, with ongoing research activities on electrified ultrahigh-temperature synthesis, energy storage beyond Li-ion batteries, and novel wood nanotechnologies.

Dr. Hu has published ~400 research papers (including 10 Science and Nature). He has received many awards, including: the Highly Cited Researchers list by Clarivate Analytics (2016-2021), a Blavatnik National Awards Honoree; the TAPPI Nano Middle Career Award (2019); 2018/2020/2021 R&D 100 Winner, the Nano Letters Young Investigator Lectureship (2017), the Office of Naval Research Young Investigator Award (2016), and the Air Force Young Investigator Award (AFOSR YIP, 2013). He is an MRS Fellow.

International Nanotechnology Division's Leadership and Service Award

Lisa Stephens
TAPPI



Lisa Stephens has served as Engineering, Nanotechnology and Pulp Manufacture Division Manager since 2013. In February 2022, she moved into a new role as Division Manager for TAPPI's Converting Division.

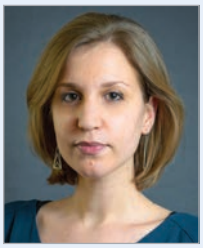
In her role as Manager of Nanotechnology Division, Stephens dedicated herself to ensuring the Division's annual international Conference was a success. Her relationship skills were instrumental in leading and driving the Division's significant growth. As part of her commitment to that growth, Lisa cultivated and nurtured member and volunteer relationships as a way to strengthen connections within the TAPPI Nano community. Additionally, under her leadership, the NANO conference has grown in stature, recognition, participation and attendance.

Stephens has been with TAPPI since 1990. Throughout her tenure, she has served the industry and TAPPI's many volunteers with dedication, commitment, and a true passion to be the best. In previous roles, she was PRESS Operations Manager, E-publishing Team Lead and TAPPI Journal Publisher, as well as having supported Information Services and Executive Team Management. She attended Clayton State College.

In her spare time, Stephens enjoys spending time with her children and six grandchildren. She also enjoys spending time outdoors, running and participating in obstacle course races.

International Nanotechnology Division's Mid-Career Award

Nathalie Lavoine
North Carolina State University



Since 2018, Dr. Nathalie Lavoine is an Assistant Professor in the Department of Forest Biomaterials at NC State University (Raleigh, North Carolina). She received her Ph.D. in 2013 from the Laboratory of Pulp & Paper Sciences, and Graphic Arts under the supervision of Dr. Julien Bras in Grenoble, France. She then conducted two postdoctoral research experiences under the supervision of Prof. Akira Isogai at the University of Tokyo, Japan (2014-2016) and Prof. Lennart Bergstrom at Stockholm University, Sweden (2016-2018).

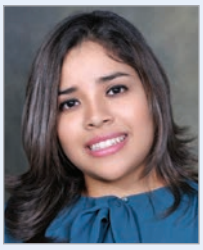
Her research activities center on the development and engineering of advanced sustainable materials from biomass and renewable nanomaterials. She has built a strong research & education integrated program to advance the commercialization of sustainable packaging and renewable nanomaterials and tackles these important research challenges with the help of students, industrial partners, and researchers.

This program fosters entrepreneurial thinking to boost outcomes in sustainable advanced materials while also offering career opportunities and professional development support to undergraduate and graduate students.

Over the years, Dr. Lavoine has worked side-by-side with experts in the field, and thanks to the strong support from the Renewable Nanotechnology community, she has been involved in the leadership of the TAPPI Nano Division. Since 2016, she is a very active member and strong support of this division. She is currently the vice-chair of the TAPPI Paper & Packaging subcommittee and is involved in the TAPPI Award Committee. From 2016-2021, she was a co-Chair of the Research Committee with Dr. Orlando Rojas (UBC, CA), then Dr. Soledad Peresin (Auburn University, AL). She was Chair of the 2019 TAPPI Nano Conference, which was held in Chiba, Japan.

International Nanotechnology Division's Student Award

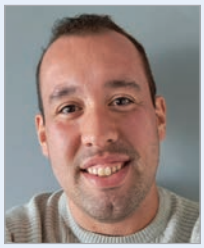
Sara Roldan Velasquez
University of Strathclyde



Sara Velasquez earned a Bachelor's in Materials Engineering from the Federal University of Santa Catarina, Brazil and a Master's in Materials Science from ETH Zurich, Switzerland. She is currently finishing her Ph.D. at the Sustainable Functional Polymers Research Group at the Technical University of Darmstadt, Germany and the University of Strathclyde, Scotland under the supervision of Prof. Nico Bruns. Her Ph.D. is part of the Partnerships for International Research and Education (PIRE): Bioinspired Materials and Systems research collaboration between Swiss and U.S. institutions. She has been heavily involved in several collaborations including with LaShanda Korley from University of Delaware and Prof. Andre Studart at ETH Zurich.

Her research focuses on the Tailoring of Mechanical Properties of Amphiphilic Polymer Conetworks (APCNs) through the use of peptides and Cellulose Nanocrystals (CNCs) and its potential applications. Velasquez has been part of the TAPPI Nano Student committee since January 2020, where she has served as Chair. She is passionate about science outreach at different age levels and has run outreach activities in different countries including Honduras, Brazil, Switzerland and the United Kingdom.

Nano Division Young Professional Award



Renato Damásio
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Poster Session, Student Poster Competition, and University Product Showcase

Acetylated Cellulose Obtained from Chemo-Enzymatic Dissolving Fibers
Julia Fernandez Santos

Cellulose Nanomaterials: A Novel Adjuvant and Delivery System for Aquaculture Vaccine Applications
Kora Kukk, University of Maine

Chitin Nanocrystals-Anionic Surfactant Interactions Studied by Quartz Crystal Microgravimetry and Molecular Dynamics Simulation
Xiaoya Su, University of British Columbia

CNC/PDMS Hybrid Membrane with Improved Permeability and Selectivity for H2O/Air Separation at Elevated Temperatures
Nasim Alikhani, University of Maine

Colloidal Stability Window for Carboxylated Cellulose Nanocrystals: Considerations for Handling, Characterization and Formulated Product Development
Julia Antoniw, University of British Columbia

Dewatering of Cellulose Nanofibrils using Ultrasound
Udita Ringania, Georgia Tech

Effect of the Chemical and Structural Characteristics of Pulp of Eucalyptus and Pinus on the Deconstruction of the Cell Wall During the Production of Cellulose Nanofibrils
Gregory Albornoz, Universidad De Concepción

Effect of Minerals on the Manufacturing Process of MicroFibrillated Cellulose (MFC)
Javier Rodriguez, University of Birmingham - FiberLean Technologies

Encapsulation of Liquid Oil in Cellulose Nanocrystalstabilized Wet-spun Fibres
Marc Massicotte, University of British Columbia

Enzymatic and Mechanical Treatments to Obtain Nanocellulosic Biomaterial from the Wastewater Sludge in a Paper Industry
Noemi Huete, Univesitat Politecnica De Catalunya

Flow Properties of Cellulose Powder Depending on the Morphology and Moisture Content
Hakmyoung Lee, Seoul National University

Investigating the Influence of Sorghum Plant Sections on Derived Carbon Structure and Properties
Rana Arsi Afzal, The University of Queensland

L-Cysteine Modified Cellulose Nanocrystals Improve the Heavy Metal Removal Efficiency of Nanofiltration Membranes for Wastewater Treatment
Fatemeh Abedi, University of Ottawa

MFC: A High Added Value Product from Agro-industrial Waste and Its Potential Use as Food Additive in Food Products
Pilar Albaladejo, ITENE

Nano-Cellulose Based Coating to Obtain High Performance Sustainable Packaging
Peschueux-Sergienko, Foundation Grenoble INP

Nanocellulose for Polymer Electrolyte Membranes Fuel Cells
Joice Jaqueline Kaschuk, Aalto University

New Thermocompression Process of Cellulose Nanofibrils For Sustainable Packaging Application
Emillien Freville, LGP2 / CTP

Oven-dried Foams from Forest Residues for Thermal
Elisa Ferreira, University of British Columbia

Preparation of Hydrophobized Cellulose Nanofibril Powders by Organic Emulsion and Spray Drying
Jinseung Kim, Seoul National University

Pipe Rheometer Study of Microfibrillated Nanocellulose (MFC) Suspensions
Fuaad Panikaveetil Ahmed Kutty, Åbo Akademi University

Production of Nanocellulose Films with Improved Mechanical, Optical and Structural Properties with The Addition of Natural Additives
Julia Fernández-Santos, Universidad Politécnica De Catalunya

Self-extinguishing and Thermal Insulating Hybrid Cellulose Pickering Foams
Roozbeh Abidnejad, Aalto University

Study on the Characteristics of Nanocellulose-Based Nanopaper
Chia-Yun Chang, National Taiwan University

Study on the Lignin-Containing Bamboo-Based Cellulose Nanocrystals Manufacturing Process
Jung-Yu Liang, National Taiwan University

Tailoring The Oil Release Performance of Cellulose Nanocrystal-Stabilized Dried Emulsions
Marc Massicotte, University of British Columbia

The Effect of Nanocellulose Fibrils and SWCNT Dispersing Agent on Thermal, Mechanical, Electro-Conductive and Electro-Chemical Properties of Hybridized Thin Films
Vanja Kokol, University of Maribor

The Influence of Polyelectrolyte Complex Phase Behavior on Water Retention Values of Cellulose Nanofibers
Nasreen Khan, Georgia Institute of Technology

Thermochromic Nanocellulose Hybrid Films for Smart Packaging Application
Mohmmad Karzarjeddi, Oulu University

Turning Mushroom Waste into Valuable Bioactive Packaging Materials
Mehdi Tajvidi, University of Maine

Use of Starch to Improve Coating Ability of Microfibrillated Cellulose
Robyn Hill, Fiberlean

Valorization of Posidonia Oceanica Waste Biomass for The Development of Bio-Based Packaging Structures Pilot Scale-Up and Applicability
Rafael Sanchez Serrano, ITENE

Zero-angle Depolarized Dynamic Light Scattering for Characterization of Cellulose Nanomaterials
Zhaoxian Zhang, Georgia Institute of Technology

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APPITA
Appita is the leading not-for-profit industry association that supports the advancement of the pulp, paper packaging and bioproducts industries.

We have a broad-based membership with over 120 corporate members and over 1300 professional members and student members in Australia, New Zealand and other countries. Appita membership is diverse and currently includes CEOs, mill managers, mill technical personnel, operators, process engineers, consultants, researchers and suppliers.

Formed in 1946, Appita has continued to support and represent the pulp and paper industry in Australia and New Zealand.

BioProducts Institute (BPI)
The BioProducts Institute (BPI) is an innovative ecosystem of high-impact fundamental and applied researchers working on solutions to today's climate and environmental challenges. The Institute brings together inter- and multi-disciplinary researchers comprised of scientists, engineers, and market and policy experts to unlock the full potential of materials, chemicals and fuels produced in nature. Based on the guiding principles of circularity, sustainability and renewability, BPI seeks to reduce society's footprint and tackle rampant environmental challenges such as reducing greenhouse gas emissions and plastic waste.

Our research themes center around biocatalytic transformation and engineering of biomass, bio-nanoparticle enabled materials, bio-based polymers and carbon materials, and biorefinery and biofuels systems. By conducting research, we are able to transform our findings into bioproducts that will serve as catalysts to launch Canada's bioeconomy. With increasing demands for low carbon fuel, plastic alternatives and degradable materials, the BioProducts Institute looks forward to being a world leader in the green economy sector.

FiberLean Technologies
The most abundant and renewable natural polymer on Earth is cellulose. FiberLean Technologies have established an energy efficient and cost-effective industrial process to transform cellulose into its constituent building blocks; microfibrillated cellulose (MFC). FiberLean® MFC enables paper and packaging producers to reduce costs, create value, and develop new products.

Finnish Forest Product Engineers' Association
Finnish Forest Product Engineers' Association is a network for professionals and corporations in the forest industry. Renewable wood-based raw materials can be used in more and more versatile ways in the society. When new technologies and products are developed, technical competence plays a key role. In addition to competence in wood processing, we need competence in chemical engineering and energy technology in order to find new solutions. Since, in theory, we can make all the same products with wood than with oil, we constantly need new competence, without losing sight of the commercial perspective. Most of our members have university-level degrees in technology, bur our operations are open to all professionals in the forest industry.

Georgia Tech Renewable Bioproducts Institute (RBI)
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. www.rbi.gatech.edu.

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Melodea
Melodea is a bio-tech company that offers Cellulose Nano Crystals (CNC) bio-based solutions providing different industries with tools to improve performance while using sustainable materials that do not harm the environment. Melodea offers MelOx and Melodea VBcoat: sustainable high-performance barrier coatings for oxygen, water vapor and oil & grease that can replace existing materials that are harmful to the environment such as plastic and aluminum.

Opall
OPALL is a community of learners at Georgia Tech who strive to improve their mastery of science & engineering, particularly regarding polymers, where learners at all levels help each other. OPALL places top-drawer equipment, including delicate instruments, in the hands of students. It is the only Make-and-Measure space at Georgia Tech that permits and encourages chemically intensive activities.

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Sappi is a global diversified woodfibre group focused on dissolving pulp, paper-based solutions and functional biomaterials. Sappi produces high-quality microcellulose(MFC), nanocellulose(NFC) on a commercial scale, branded as Valida. Valida is delivered in various forms fitting for industrial applications and everyday use in packaging, coating, construction, cosmetics, agriculture, and many others.

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SUGINO is a Japanese machine manufacturer, developing ultrahigh-pressure water jet equipment and waterjet related products. The wet milling/dispersing equipment "STAR BURST" is used for Dispersion, Emulsification and Exfoliation, which is the ideal partner in the development of Advanced Materials. The biomass nanofiber "BiNFi-s" has great potential in new application fields.

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Surface Measurement Systems is the world's leading developer of innovative experimental techniques and instrumentations for physico-chemical characterisation of complex solids. Inventing the Dynamic Vapor Sorption(DVS) technique and the world's most advanced commercial Invest Gas Chromatography (iGC) instrument, we provide unparalleled scientific expertise and technical support for customers around the world.

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UPM Biomedicals
UPM-Kymmene Corporation offers an open innovation nanocellulose platform with existing patents to research institutes. UPM Biomedicals, part of UPM, manufactures nanocellulose in ISO13485 quality, suitable for use in wound therapy, cell culture and tissue engineering. UPM is a well-established forest industry company with 10 B€ turnover and 17,000 employees worldwide. www.upmbiomedicals.com

Valmet
Valmet is a leading global developer and supplier of process technologies, automation and services for the pulp, paper and energy industries. With our automation systems and flow control solutions we serve an even wider base of process industries. We aim to become the global champion in serving our customers. Our 17,000 professionals work close to our customers and are committed to improving our customers' performance – every day.

The company has over 220 years of industrial history and a strong track record in continuous improvement and renewal. In 2022, a major milestone was achieved, when flow control company Neles was merged into Valmet. The combined company net sales in 2021 was approximately EUR 4.5 billion based on the respective company figures.

Student Highlights

TAPPI Nano 2022 Features Two Activities Put On By And For Students

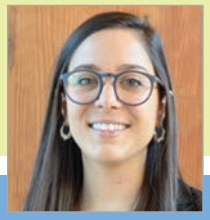
Student Presenters
Stop by the Nano Division Student committee table to see student presenters featured at this year's conference. A looping presentation will feature student bios, photos, and key points about their presentations.

Student Session Co-chairs
Watch for student session co-chairs at selected sessions during the conference. Students will gain experience and knowledge by helping out in this key role.

Student Committee

Megan Grace Roberts
Mount Allison University
Co-Chair

Sara Velasquez
University of Strathclyde
Co-Chair



Maria Celeste Iglesias
Auburn University
Co-Vice Chair

Diego Gomez Maldonado
Auburn University
Co-Vice Chair

Are you a student or young professional working with cellulosic or other renewable nanomaterials?

BE A PART OF SOMETHING BIGGER THAN NANO...

Help build TAPPI Nano's Global Network for Students and Young Professionals

Visit www.tappinano.org to learn more.

FOLLOW US AND JOIN THE CONVERSATION

Linkedin www.linkedin.com/groups/12037880/

Twitter www.twitter.com/TAPPINanoStdnts

Join the TAPPI Nano Division Student Committee and:

- Connect with students and young professionals around the world
- Share knowledge and ideas to make an impact
- Produce student-led webinars, newsletters, forums and surveys that engage students
- Learn how to transition from academia to industry
- Design and shape events for students at TAPPI's annual Nano conference

TAPPI Sustaining Corporate Members

A.G. Stacker Inc.
Air Conveying Corporation
Alliance Machine System Int'l.
American Roller
Andritz
AstenJohnson
Babcock & Wilcox
Baysek Machines Inc.
Bently Nevada LLC
BHS Corrugated North America Inc.
Brown Machine Group (BMG)
Brueckner Group USA
BTG Americas Inc.
Buckman
BW Papersystems
Cargill Inc.
Celulose Nipo-Brasileira S.A.
Columbia Machine
Copar Corporation
Corrugated Gear & Services Inc.
CR Meyer
Crane & Company Inc.
Domtar Paper Co. LLC
DuBois Chemicals
Dunn Paper Inc.
EAM-MOSCA Corp.
EMBA Machinery AB
Engineered Recycling Systems LLC
EPIQ Machinery (EPIQ AD)
ERCO Worldwide
Essco Inc.
Event Capture Systems
Everlight USA Inc.
FiberLean Technologies Ltd.
Fisher Arnold Engineering
FM Global
FNA Inc.
Fosber America Inc.
Geo. M. Martin Company
GOEBEL IMS
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Industrial Physics
Ingredion Incorporated
International Paper
INX International Ink Company
Jacobs
K2 Concepts
Kadant Inc.
Kamin LLC
Kemira
Kiewit Corporation
Kiwiplan Americas
Leo Paper Bags Manufacturing Limited
LyondellBasell
Maintech Co. Ltd.
Maxcess International
Merichem Company
Mica Corporation
Michelman
Miller Mechanical Services Inc.
Mitsubishi Heavy Industries America
Nalco Water, An Ecolab Company
Norske Skog Paper Mills (Australia)
OASIS Alignment Services Inc.
OJI Holdings Corporation
Omya Inc.
OpTest Equipment Inc.
Packaging Corp. of America
Panther Systems Inc.
Poyry (Appleton) LLC
Procemex Oy Ltd
PT. Riau Andalan Pulp & Paper/ APRIL Grp.
Rational Packaging
Rev1 Energy
Samuel Strapping Systems
SAPP Management AG
Sappi North America
Sauer System
SCG Packaging Public Company Limited
Scion (New Zealand Forest Research Institute Ltd.)
Signode
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Techlab Systems S.L.
Technidyne Corporation
Thiele Kaolin Company
Thwing-Albert Instrument Company
Tien Chin Yu Machinery Mfg. Co. Ltd.
Timenow Engenharia E Gestao De Projetos
Trinseo LLC
Triosim Corporation
Unified Purchasing Group
Union Paper Mill
Valmet Inc.
Veritiv Corporation
Voith Paper Inc.
WestRock
Wulftec International Inc.
Yonkers Industries Inc.

As of March 31, 2022

General Information

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.

Commercialism Policy
Although commerce is a driving force for our technologies, TAPPI technical sessions are not a platform for commercial (sales) presentations. Presentations that are technical and objective enhance the credibility of the presenter and his or her organization. Restricting commercialism ultimately benefits both the presenters and the TAPPI audience. Excessive use of brand names, product names or logos, failure to substantiate performance claims, and failure to objectively discuss alternative methods, processes or equipment are indicators of sales presentations.

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. 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 at the 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.

Tax Deduction for Educational Expenses
U.S. Treasury regulation paragraph 1.162.5 permits an income tax deduction for educational expenses (registration fees and cost of travel, meals, and lodging) undertaken to: (1) maintain or improve skills required in one's employment or other trade or business, or (2) meet express requirements of an employer or a law imposed as condition to retention of employment, job status, or rate of compensation. Under the Tax Reform Act of 1993, however, non-reimbursed employment-related educational expenses are deductible only to the extent that they exceed 2% of adjusted gross income. In addition, the new tax law limits the deduction for otherwise allowable business meals and business entertainment to 50% of cost.

Use of Personal Video Recording Equipment at Technical Sessions
The use of personal recording 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.

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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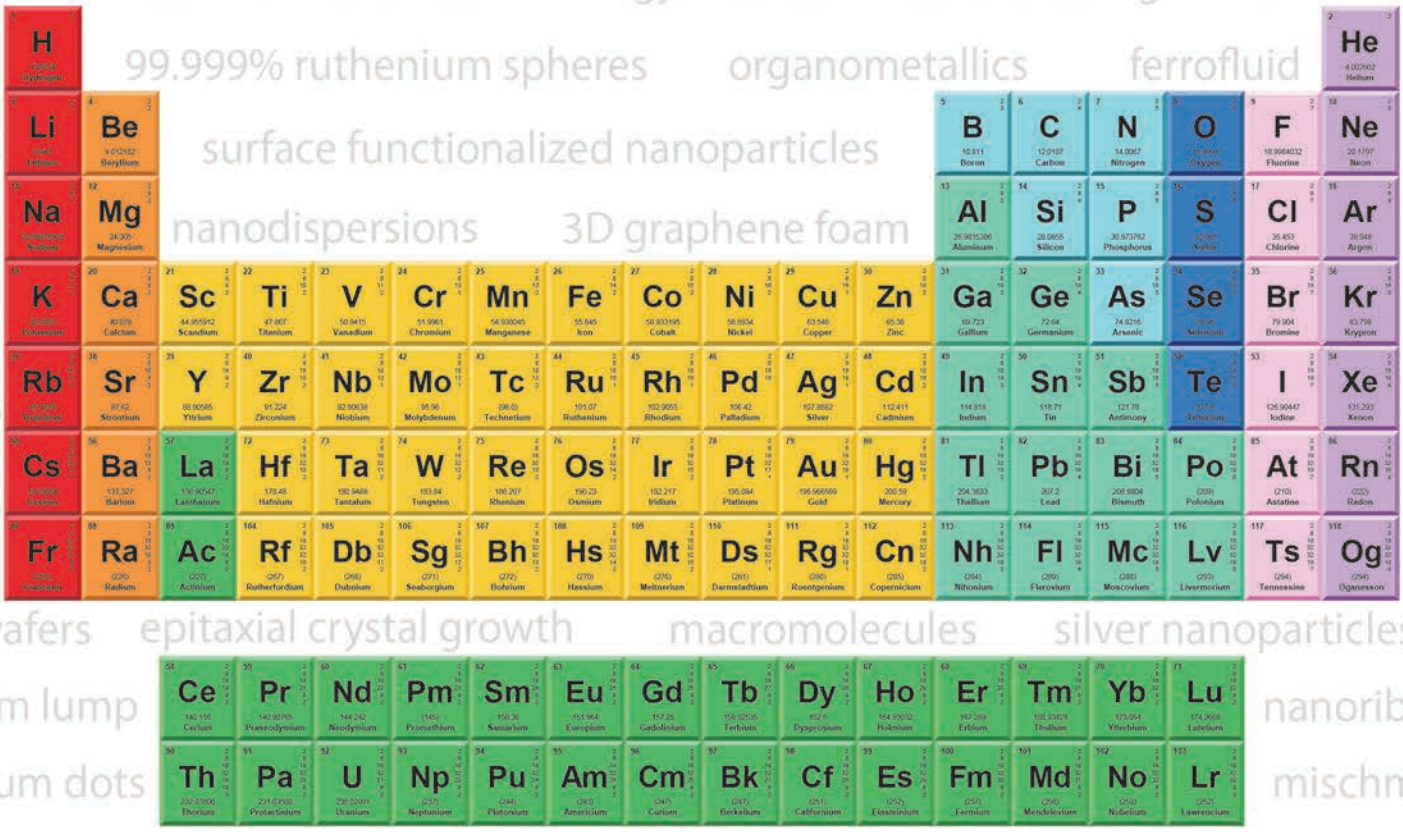
2023 TAPPI International Conference on Nanotechnology for Renewable Materials

12-16 June 2023

The Westin Bayshore, Vancouver
Vancouver, BC Canada

TAPPI NANO DIVISION

Conference.tappinano.org



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