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October 2020 ***EPNOE Newsletter***

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Editorial

Dear Readers,

EPNOE Newsletters have been published since November 2006 and we have the pleasure to welcome you to read our fist ever digital edition. The digital newsletter is one of the initiatives that we are currently working to create new opportunities for networking for our members. Other initiatives include the creation of a new member area that will act as hub to organize research forums, promote exchange of ideas and build project consortia for national and European calls. We are working to create and implement a unique membership package to serve our members and support them to be more successful in project applications, organization of events, publishing of special issues and books and promotion of policies. Covid-19 has had an enormous impact on live events such as conferences and workshops and we have to adapt ourselves to a new reality of online events. The first step was already taken in form of EPNOE Junior Online Seminar that was held in September and successfully organized by Gertrude Kignelman, Reeta Salminen and Wim Thielemans. Lessons learned from this experience will be useful for our next Online EPNOE Junior Conference to be organized in February 2021. We also have the pleasure to introduce Natacha Raes, our new Communication and Administration Officer working in Leuven. She is ready to give you any information about membership opportunities and help you to make the best of the opportunities available for EPNOE members. Polysaccharides play a central role in creating a better future for mankind and collaborative efforts are needed more than ever. Join us in this exciting journey.

Pedro Fardim
President of EPNOE

Find us on

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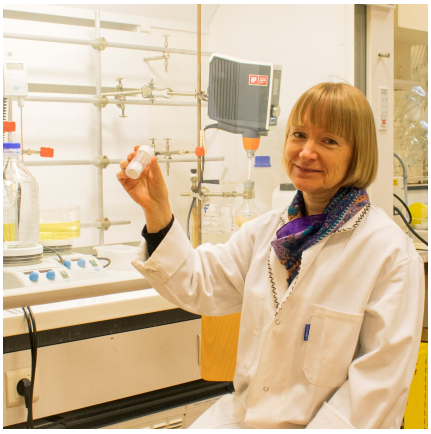
News & Announcements

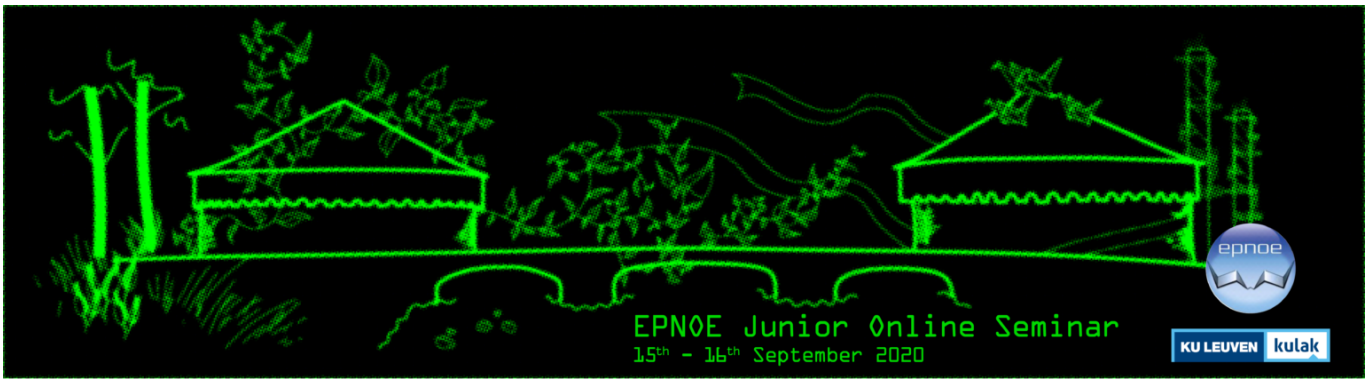


Tatiana Budtova was awarded a silver medal by CNRS in 2020 for outstanding research, in particular, for pioneering work on bio-aerogels that she started in 2003-2004.

Tatiana is senior scientist in the Center for Materials Forming (CEMEF) of Mines ParisTech, France, and she is also Finland Distinguished professor in Aalto university, Finland. Tatiana is one of the editors of Carbohydrate Polymers journal (impact factor 7) and secretary of Cellulose and Renewable Materials division of ACS. She is expert in chemical physics of polymers: polymer solutions, gels, aerogels and composites reinforced with natural fibers.

CNRS is the French National Centre for Scientific Research. The silver medal is presented to a researcher for the originality, quality, and importance of their work, which is recognised at national and international level.

Congratulations to Tania for her outstanding work and for this important recognition!



1st EPNOE Junior Online Seminar - Sept. 15- 16, 2020 was a success!

The 1st Edition of the EPNOE Junior Online Seminar was an initiative of the local organizing committee with the support of the board of EPNOE Association.

In line with the EPNOE Junior 2020 Meeting, which was postponed due to the COVID-19 pandemic, EPNOE Junior Online Seminar aimed not only at providing a platform for academically young researchers to present their work but also at enabling scientific discussions in the field of polysaccharides. Along the theme “Polysaccharide Research – Fundamentals and Beyond”, the audience had the opportunity to listen to 2 keynotes and 12 oral communications ranging from basic research about the chemical modification of polysaccharides and understanding the interactions between within polysaccharide matrices to applications including 3D printing, dental adhesives, and green catalysis.

The local organizing committee: Gertrude Kignelman, Reeta Salminen, and Wim Thielemans

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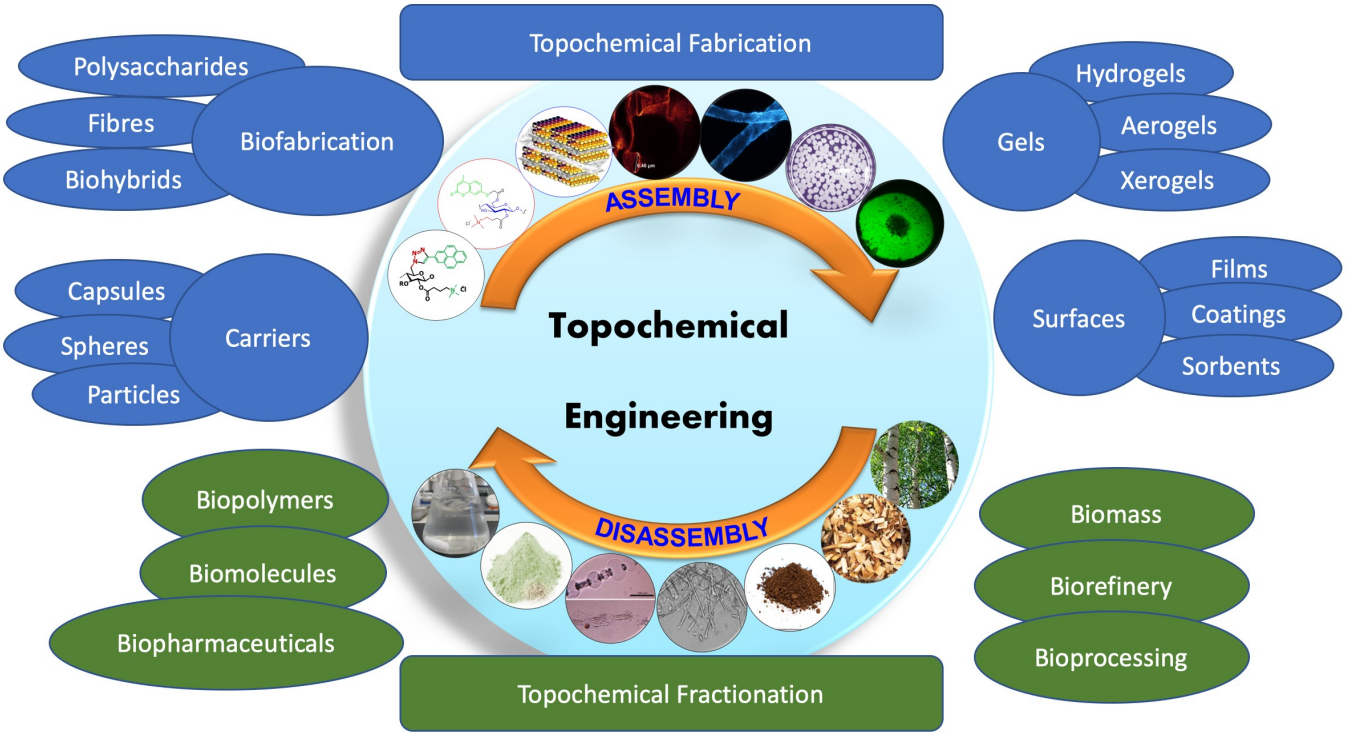
The Renewable Carbon Initiative

Two EPNOE members, Lenzing and Cosun, are amongst the 12 founding members of the Renewable Carbon Initiative (11 companies and the Nova Institute). The newly launched Renewable Carbon Initiative strives to herald the end of the fossil age for all organic chemicals and materials by 2050.

Lenzing Press Release

New Laboratory at KU Leuven: Topochemical Engineering and biOinterfaceS (TEOS)

A new laboratory equipped with unique devices for processing and characterization of polysaccharides and polysaccharide-based materials is now operational at the KU Leuven Chem&Tech building located at Campus Arenberg in Leuven. The research facilities include reactors for green extraction and fractionation of polysaccharides, fabrication of films and porous materials, encapsulation of pharmaceuticals, cells and enzymes, biofabrication of polysaccharides and preparation of functional microspheres.



Research activities at TEOS Lab focusing on advanced technologies for human health, personal and home care.

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Meet the EPNOE Ambassadors

EPNOE Ambassadors are distinguished scientists and individuals that have done outstanding contribution to promote research, innovation and collaborations in polysaccharide science and technology. Meet Professor Elisabete Frollini, our EPNOE Ambassadress in Brazil.

Professor Elisabete Frollini leads the Macromolecular Materials and Lignocellulosic Fibers Group, and coordinates the Center of Research on Science and Technology of BioResources at Chemistry Institute of Sao Carlos, University of Sao Paulo, Sao

Carlos, Sao Paulo, Brazil. Her research focuses on multiple applications of cellulosic and lignocellulosic raw materials. She is a member of the Editorial Board of Cellulose journal, and Editor-in-Chief of Industrial Crops and Products journal. She was president of the Research Committee (Chemistry Institute of São Carlos) until 2017. Professor Frollini graduated in Chemistry at the Federal University of São Carlos (Brazil), pursued master's and doctorate in Physical Chemistry at the Chemistry Institute of São Carlos (University of Sao Paulo, Brazil), and post-doctorate at the Centre de Recherches sur les Macromolécules Végétales (Grenoble, France). Prof. Frollini has actively contributed to build international collaboration between EPNOE members and Brazilian researchers and has supported the organization of EPNOE conferences since its first edition in 2009. She is also currently active to create and support joint events between EPNOE and Brazilian institutions and associations.

Call for Nominations EPNOE Young Scientist Awards

EPNOE Association is inviting nominations for the EPNOE Young Scientist Award in the field of polysaccharide science and technology. The prize will be given to outstanding work of doctoral students and scientists with up to seven years of experience since completion of their doctoral studies. This award is international, and all young scientists conducting research in the polysaccharides field are elegible. The deadline to nominate is December 31st, 2020. The process of nomination is strictrly confidential and can only be done by EPNOE members. Self-nomination is discouraged.
The winner will be announced during the EPNOE Junior Conference in February 2021.

Submit your nomination

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New Projects

New Projects at BOKU, Austria

- **Oxidative Modification of Cellulose**
  PI Potthast, A.
  The aim of the planned work is to achieve lean, cost-efficient and green chemical routes to improve the properties of kraft pulp for thermoplastic materials. The cellulose chain is intrinsically rigid, which is one of the causes of its high glass transition and melting temperatures. The offered research targets to increase the mobility of the cellulose chain through oxidation chain cleavage methods, that decrease H-bonds in which the anhydroglucose units are involved and induce a major release of molecular motions within and between the chains.

- **Lignin Binder**
  PI Potthast, A.
  The aim of the development in the project "Lignin as a binder" is to modify or select lignin (as raw material) in such a way that it can be used alone or in combination as a binder for wood-based materials. Different lignins will be tested and analysed to establish valid structure-property relationships. In addition to the analytical characterisation, special application tests are carried out which can show suitability even outside of an analytical scale.

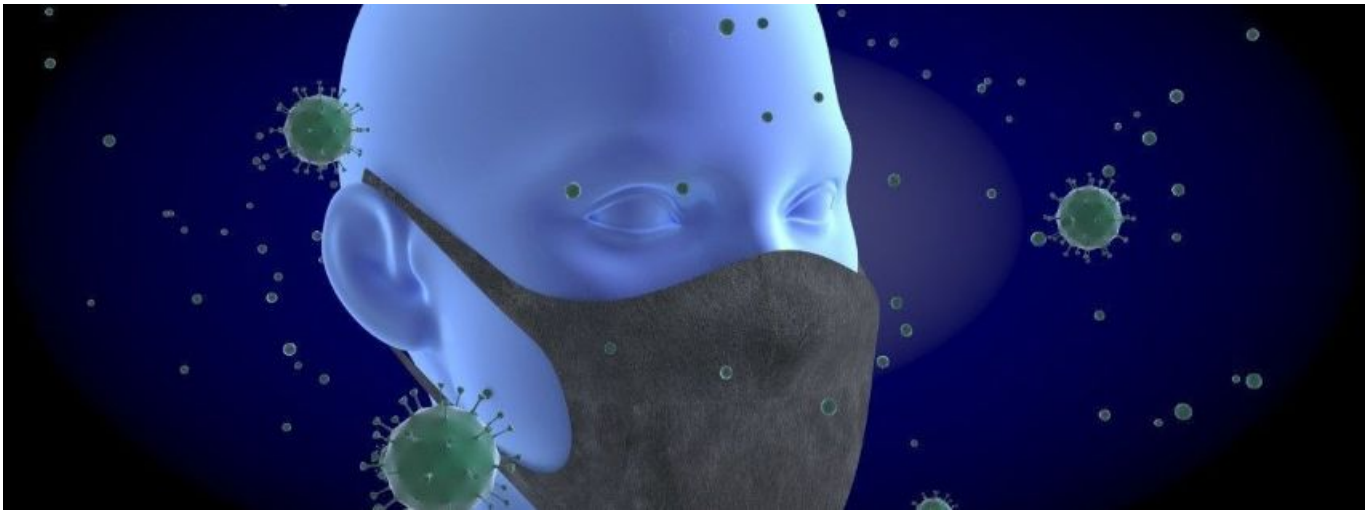
- **5D-Click-Druck zur Herstellung von Strukturen mit Mechanischen und Funktionellen Gradient**
  PI Beaumont, M.
  The research hypothesis is the development of a novel gradient printing approach, named 5D Click Printing, combining cutting-edge bioprinting technology with state-of-the-art materials and crosslinking chemistry. This will be realized by using functional nanocellulose and polyoxazoline as ink formulations to produce 3D objects with mechanical (+1D) and

functional gradients (+1D). The proposed ink formulations are based on functional cellulose nanofibrils and polyoxazolines.

Read More

New Project at Mid Sweden University, Sweden

- **Can triboelectricity provide more effective respiratory protection against viruses?**
  Dr Christina Dahlström.
  A research group at the FSCN research centre, Mid Sweden University will develop more effective filter materials for respiratory protection that can be used to reduce the spread of viruses, similar to Cov-SARS-2, to counter pandemics.



The respiratory protection is based on cellulose material with triboelectric properties, which makes it easier to breathe than with today's respiratory protection. Illustration: Fredrik Dahlström.

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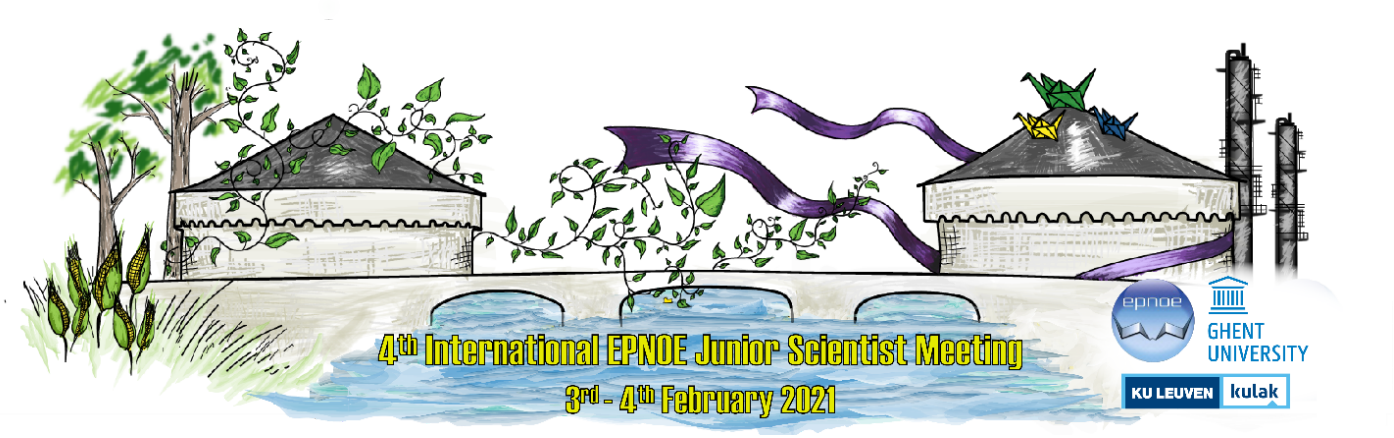
Events

The ***4th International EPNOE Junior Scientist Meeting***, initially scheduled to take place in Kortrijk (Belgium), will take place ***online on 3rd - 4th February 2021.*** This will allow us to extend the submission deadline to 30th November 2020. More information, current updates, submissions and registrations are available on the meeting website.

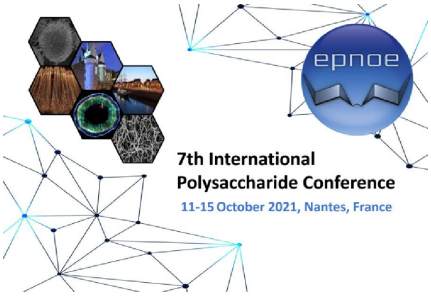
Registration fee: 20€ for EPNOE Members, 70€ for non EPNOE Members

Hopefully, we will “see” you online in plentiful numbers in February!



To Event Website

Abstract Submission



Welcome to France, welcome to Nantes!

The 7th **EPNOE Conference** will be organized by a French consortium from 11th to 15th of October, 2021, in Nantes, France. This conference is held every two years and jointly organized with other professional societies, Cellulose and Renewable Materials (CELL) Division of the American Chemical Society and the Cellulose Society of Japan. The conference will cover a wide range of topics proposed by recognized researchers in the field of polysaccharides.

- ***Gels and porous materials***
- ***Structure-property relationship of plant cell walls***
- ***Polysaccharides for drug delivery***
- ***Bioactive polysaccharides***
- ***Polysaccharides for bioprinting, scaffolds and regenerative medicine***
- ***Chemical and enzymatic modifications of polysaccharides***
- ***Sustainability and end-of-life assessment of bio-based materials***
- ***Polysaccharide-based materials for energy and electronics***
- ***3D/4D printing of polysaccharide-based solutions, gels and composites***
- ***Advanced nanocellulose-based materials***
- ***Colloidal assembly***
- ***Natural fibre-reinforced composites***
- ***Polysaccharides as natural binders and fillers in construction***
- ***Polysaccharide solutions and materials from them***
- ***Polysaccharides in food processing and digestion***
- ***Characterisation of polysaccharides: problems and prospects***

the **EPNOE 2021 Conference** will be held at La Cité Nantes Congress Center, a large infrastructure dedicated to the reception of international events, located in the heart of the city, close to the train station and connected to the “Nantes Atlantique” airport by shuttle bus. Nantes is the 6th French Metropolis and is easily accessible from all European countries. Nantes region is very dynamic and is also an attractive touristic city: the castle of Anne of Brittany, “passage Pommeray”, “les machines de l’île”, “le Bouffay” district, the home city of Jules Verne and more. Nantes is also close to the “chateaux de la Loire”, Atlantic coast and is an amazing place to enjoy French style of life. Presented as "the most pleasant city in Europe" by Time magazine in 2004, Nantes receives the European Green Capital Award in 2013 and the European Capital of Innovation Award in 2019.

The hosting consortium

- ***Bernard Cathala*** *and* ***Johnny Beaugrand****, INRA BIA, Nantes*
- ***Tatiana Budtova****, CEMEF/MINES ParisTech, Sophia Antipolis*
- ***Alain Dufresne****, LGP2-PAGORA, Grenoble*
- ***Etienne Fleury****, IMP-INSA, Lyon*
- ***Nicolas Le Moigne*** *and* ***Stéphane Corn****, C2MA / IMT Mines, Alès*

For more information, visit the website

Online conference: Materials for tomorrow: The forest

This year's Materials for Tomorrow organized by Chalmers University of Technology is all about new and exciting materials from the forest. Find out how the forest can provide new solutions for electronics, cars, textiles, hydrogels, composites, and more! Several internationally recognized speakers will participate in this free, one-day online event, taking place on Nov 18.

For registration and more information

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Research

Investigation of anti-reflux suspension for raft properties:
Novel method of raft strength determination

Matthias Knarr[1], Sangmesh Torne[2], Tejas Gunjikar[2], Rathnakar Palarapu[2], Vinay Muley[2]
[1] *DuPont Nutrition and Bioscience, Bomlitz, Germany*
[2] *DuPont Nutrition and Bioscience, India*

PURPOSE & OBJECTIVE
Alginate suspensions are used in the treatment of gastroesophageal reflux disease (GERD). These suspensions are formulated to provide relief from symptoms by forming a physical barrier on top of stomach contents in the form of gel or raft. A literature review indicates that rafts formed in the stomach encounter shear forces due to churning of stomach contents and gastric pressure that might drive the rafts into the lower esophagus. It is important to characterize the mechanical properties of alginate rafts by exposing rafts to the shear forces.

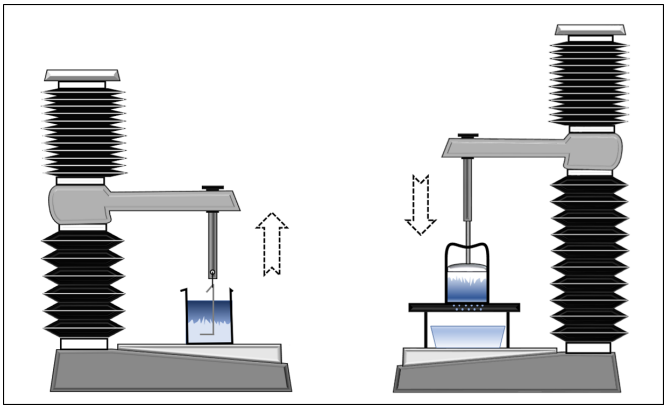

Fig. 1 *Raft strength acc. British Pharmacopoeia (left) vs. Novel Forward Extrusion Raft Gel Strength Method (right)*

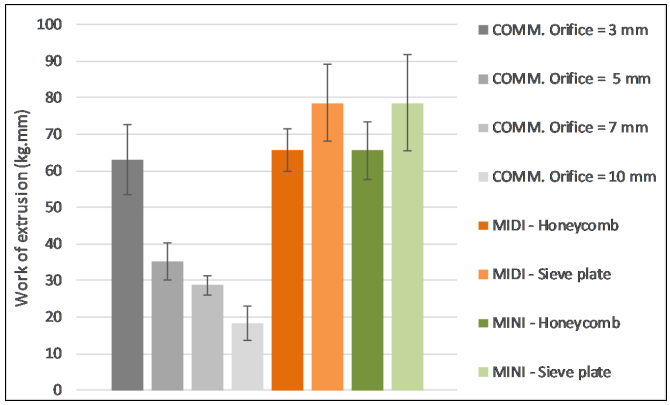

Fig. 2 *Raft Strength of Anti Reflux Suspension Using Novel Extrusion Cells*

More on method and results

Cellulose Nanocrystals/Silver Hybrid Nanoparticles

Dafne MUSINO,[1] Camille RIVARD,[2,3] Gautier LANDROT,[2] Isabelle CAPRON[1]*

[1]INRAE - BIA, Nantes, France ; [2]SOLEIL Synchrotron, L'Orme des Merisiers, Gif-sur-Yvette, Saint-Aubin, France ; [3]INRAE, TRANSFORM, Nantes, France

In the last decades, silver nanoparticles (AgNPs) arose as one of the most efficient agents for la large range of actions including biocideal properties preventing bacteria growth. For a long-term antimicrobial activity, AgNPs are however usually added in large excess. This approach leads to excessive instantaneous Ag^+ release or to persistence of unused AgNPs which can have a negative impact on human health and environment. Minimizing the amount of AgNPs without detrimental performance remains an outstanding challenge. A good alternative may come from hybrid materials, where small amounts of AgNPs are grafted on the surface of a bio-based substrate.

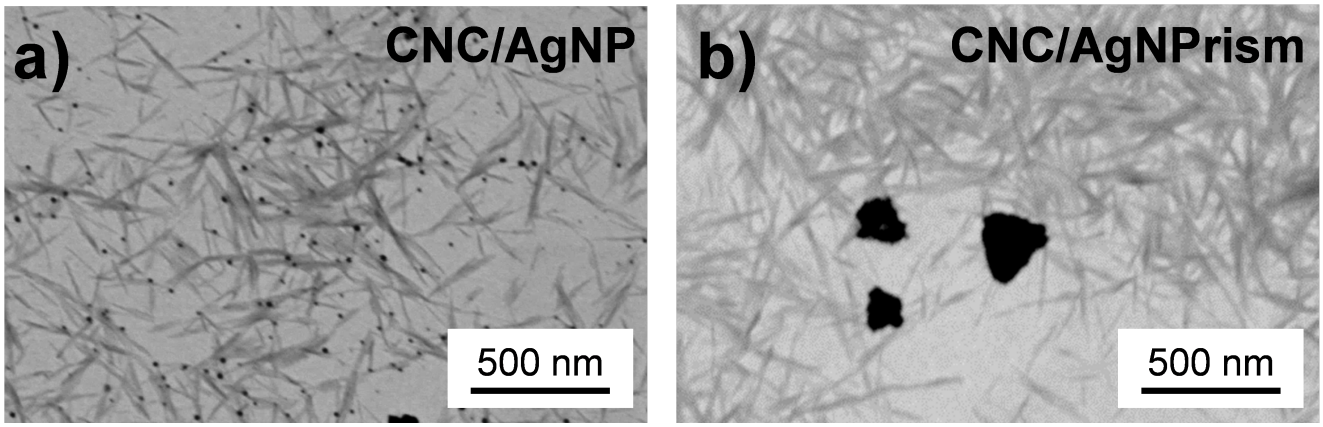

***Figure**: CNC-AgNP hybrid containing 20% of a) spherical AgNPs and b) bigger AgNPrisms grafted on CNC surface.*

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New "world record" in triboelectricity

Renyun Zhang

In a recent research study, researchers from Mid Sweden University show that cellulosic materials can generate an electrical power density of more than 300 watts per square meter. The research has been published in the highly ranked journal Advanced Materials.

***Photo**: Dr. Christina Dahlström, Mid Sweden University, showing the triboelectric cellulose material.*

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Bioactive, in situ modified, fibrous membranes based on bacterial cellulose: processing, characterisation and

assesment of biomedical potential

Selestina Gorgieva[1,2], Janja Trček[3,4], Peter Veranič[5] and Silvo Hribernik[1,2]

[1] Institute of Engineering Materials and Design, Faculty of Mechanical Engineering, University of Maribor, Maribor, Slovenia

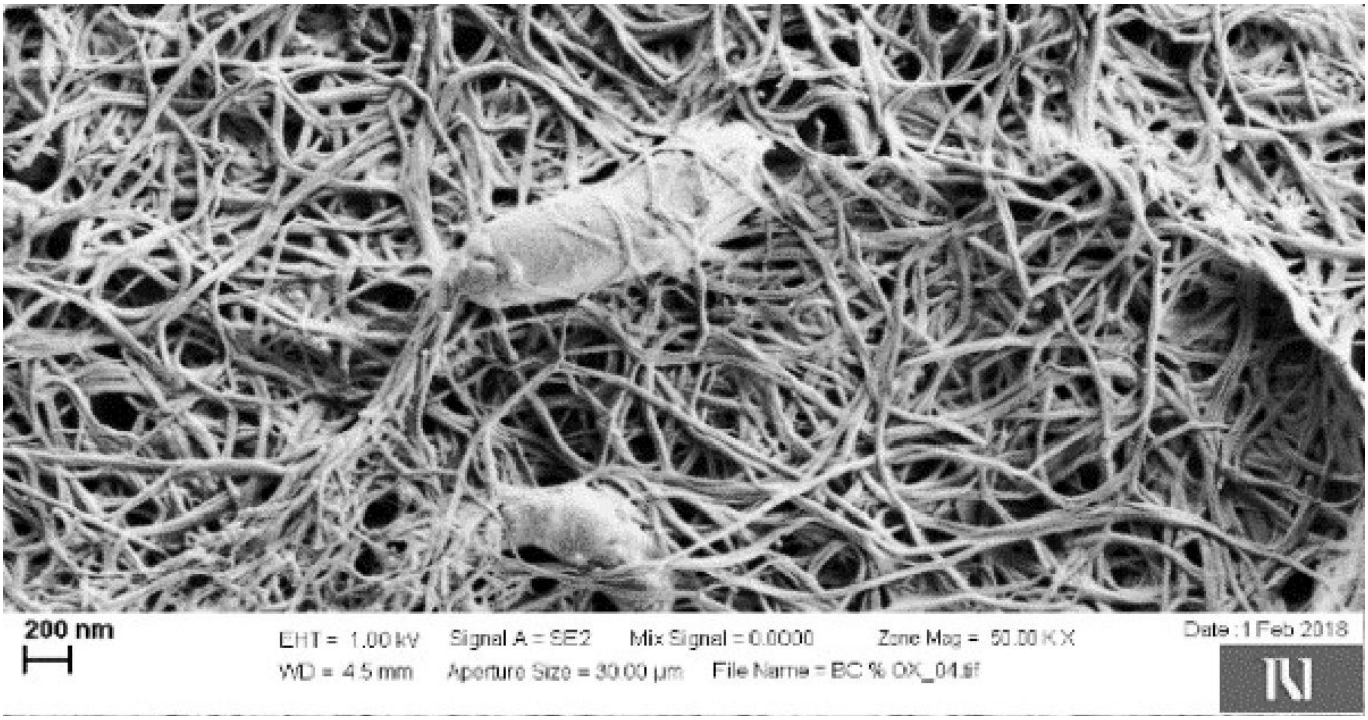
[2] Institute of Automation, Faculty of Electrical Engineering and Computer Science, University of Maribor, Maribor, Slovenia

[3] Department of Biology, Faculty of Natural Sciences and Mathematics, University of Maribor, Maribor, Slovenia

[4] Faculty of Chemistry and Chemical Engineering, University of Maribor, Maribor, Slovenia

[5] Institute of Cell Biology, Faculty of Medicine, University of Ljubljana, Ljubljana, Slovenia

The interdisciplinary national project (J2-2487, September 1, 2020 – August 31, 2023) presents initiation of complementary research activities between 3 research groups from University of Maribor (Faculty of Mechanical Engineering, Faculty of Natural Sciences and Mathematics and Faculty of Electrical Engineering) and University of Ljubljana (Faculty of Medicine), with aim to develop bioactive, nanofibrillar bacterial cellulose (BC) membranes as a new biotextile for biomedical application, while utilizing the grape pomace as a new carbon source and an innovative *in situ* modification pathway.



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Cannabis extracts as potential therapeutics in malignant melanoma

Laura Činč Ćurić[1], Uroš Maver[1,2], Jan Rožanc[1,3]

[1] Institute of Biomedical Sciences, Faculty of Medicine, University of Maribor, Taborska 8, 2000 Maribor, Slovenia (laura.cinc@um.si jan.rozanc@um.si, uros.maver@um.si)

[2] Department of Pharmacology, Faculty of Medicine, University of Maribor, Taborska 8, 2000 Maribor, Slovenia

[3] BioCore Institute, Nad izviri 8, 2204 Miklavž na Dravskem polju, Slovenia

Cannabis (*Cannabis sativa*) has been used for centuries in traditional medicine as an analgesic, anxiolytic, anticonvulsant, sedative, and hypnotic. Various recent studies have shown that it can also modulate tumor growth, making cannabis a potential therapeutic agent against cancer.

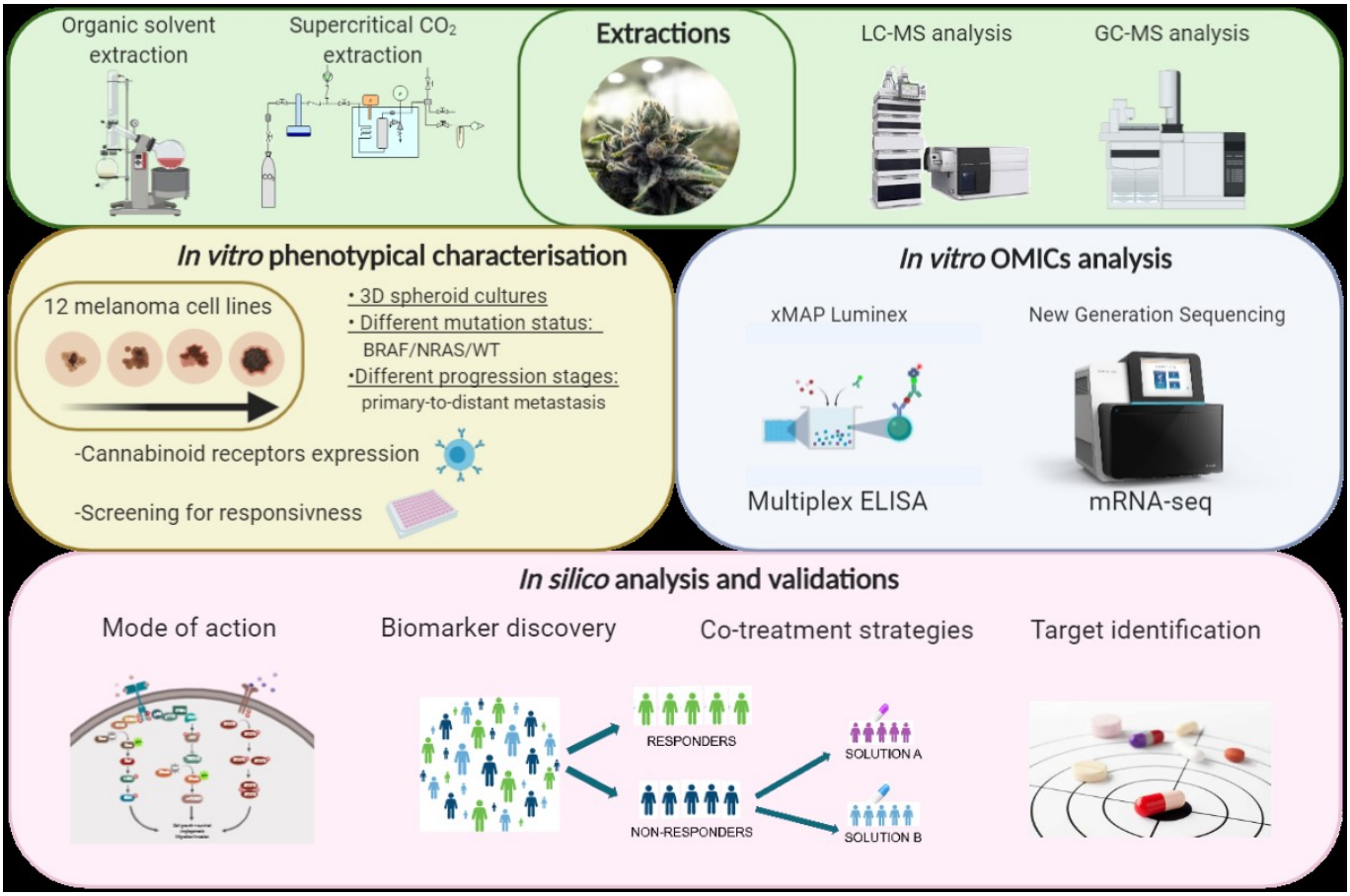

Figure 1: *Schematic description of activities.*

Afrin F, Chi M, Eamens AL, et al. Can Hemp Help? Low-THC Cannabis and Non-THC Cannabinoids for the Treatment of Cancer. Cancers (Basel). 2020;12(4):1033. Published 2020 Apr 23. doi:10.3390/cancers12041033

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Successful research collaboration between the University of Ljubljana and the Friedrich-Schiller-University of Jena

Jaka Levanič,[1] Primož Oven,[1] Martin Gericke,[2] Thomas Heinze[2]
[1]Department of Wood Science and Technology, Biotechnical Faculty, University of Ljubljana, Jamnikarjeva 101, 1000 Ljubljana, Slovenia
[2]Friedrich Schiller University of Jena, Institute for Organic Chemistry and Macromolecular Chemistry, Center of Excellence for Polysaccharide Research, Humboldtstraße 10, D-07743 Jena, Germany
Correspondence to: jaka.levanic@bf.uni-lj.si, thomas.heinze@uni-jena.de

The European research landscape offers many locations at which polysaccharides and polysaccharide-based compounds are studied intensively from different points of view, ranging from fundamental studies on their physical, chemical, and biological properties to applied material developments. In this context, the mobility of researchers is of the upmost importance in broadening their knowledge and connecting transnational research efforts.
During a research stay, *Jaka Levanič* from the U*niversity of Ljubljana*, Slovenia (Biotechnical Faculty) studied aspects of his PhD work on cellulosic hydrogels at the *Friedrich-Schiller-University of Jena*, Germany (Institute of Organic Chemistry and Macromolecular Chemistry). His studies were focused on the crosslinking of surface charged TEMPO cellulose nanofibrils (TCNF) with iodinated alkanes to produce stable and elastic nanocellulose gels.

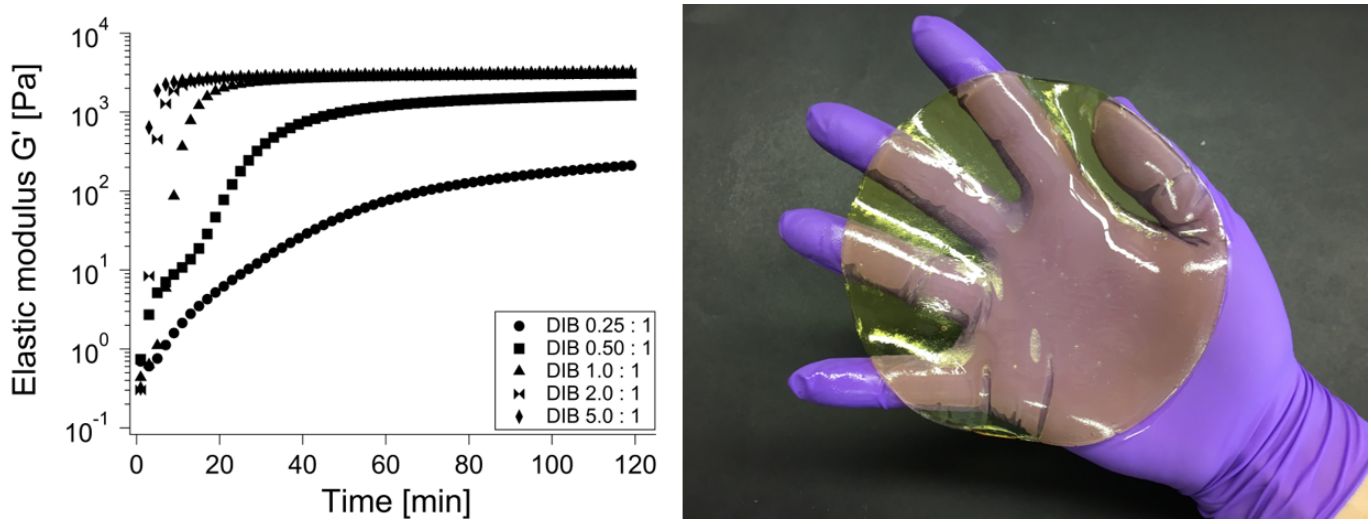

Figure 1. *Crosslinker to TEMPO nanocellulose ratio dependent evolution of elastic modulus under small angle oscillatory shear (left) and the final crosslinked product (right).*

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Education

Welcome to new students and researchers

- New post-doc at IMT Mines Alès : **Pankaj Yadav** joined the centre of materials to work on the swelling nad visco-leastic behaviour of wood in mixed solvent. Supervision : Nicolas Le Moigne, Stéphane Corn
- New PhD at IMT Mines Alès : **Erwan Huguet** joined the centre of materials to work on the dimensional and mechanical characterization of natural fibres under controlled hydrothermal conditions. Supervision : Nicolas Le Moigne, Stéphane Corn, Patrick Ienny
- New PhD in chemistry at Jan Dlugosz University in Czestochowa (from Janusz): **Arkadiusz Żarski**. Supervision: Prof. Janusz Kapusniak (Jan Dlugosz University), PhD Eng. Krzysztof Bajer (Lukasiewicz Research Network) Topic of PhD thesis: Biocatalysed synthesis and structural studies of hydrophobic starch derivatives to obtain polymer materials for the production of biodegradable packaging
- New post-doctoral researcher: **Dr. Daniel Aguilera-Bulla** joined the 'Bio-based Polymers and Composites' group in the frame of the ANR (French National Research Agency) project 'Oligosaccharidic (multi)block copolymers with tunable composition and properties (OLIBLOCK)'. He is supervised by Sijtze Buwalda, Tatiana Budtova and Patrick Navard
- New trainee students: **Yitong Jiang** joined the group with the project "Amplification of fluorescence in biobased gels and aerogels", supervised by Tatiana Budtova
- **Juliette Gaudillat** joined the group with the project "Understanding cellulose dissolution in aqueous basic solvents", supervised by Tatiana Budtova

PhD defenses

- **Arianna Lucia**, *Dialdehyde cellulose-based binder for mineral wool.* Supervisors: Thomas Rosenau, Hendrikus Van Herwijnen (Wood K plus). BOKU, Austria
- **Julien Jaxel**, *Tailoring of supercritical carbon dioxide technologies for the coloration of solid wood.* Supervisors: Falk Liebner, Christian Hansmann (Wood K plus). BOKU, Austria
- **Peter Schulze** defended his PhD thesis entitled "Functional nanoparticles based on cellulose"; supervized by Thomas Heinze Marvin Kayser defended his PhD thesis entitled "Studies on chemical modification of pectin and polygalacturonic acid"; supervized by Thomas Heinze

Diploma / Master theses

- **Patrick Geiger**, Chemical and mechanical analysis of Danubian Myriophyllum spicatum. Supervisors: Thomas Rosenau, Marco Beaumont. BOKU, Austria
- **Ezgi Özkan**, *Secondary metabolite production during sexual development in Trichoderma reesei and its analysis by HPTLC and DESI-MS. Supervisors:* Stefan Böhmdorfer, Monika Schmoll (AIT Bioresources). BOKU, Austria
- **Maria Pichler**, *Investigation of metabolite-based effects of T. asperellum on M. laxa.* Supervisors: Siegrid Steinkellner, Karin Hage-Ahmed, Stefan Böhmdorfer. BOKU, Austria

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Open Positions

- **PhD position in CEMEF, Sophia Antipolis, France, more info click here**
- **Master (trainee) position in Pagora, Grenoble, France, more info click here**

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In Memoriam

John Mitchell: at the heart of the creation and establishment of the European Polysaccharide Network of Excellence

Prior to the creation of EPNOE, the universities which could and would like to participate in EPNOE were selected. Such initiative bringing together research and education groups dealing with many different polysaccharides in totally different fields was seen in 2002-2003 as a real challenge. Several scientists declined on the ground that building such a consortium would never work. Among the different scientific areas was food and as an evidence, the university of Nottingham, UK, was approached. The response was highly enthusiastic from a man I did not know (food is not my field of research), Professor John Mitchell. He was a blend of a brilliant scientist, a man engaged in promoting polysaccharides (he was the founder of Carbohydrate Polymers) and an extraordinary warm and pleasant character. He was the oldest scientist involved in EPNOE, and he was seen as the father, always joking, but being sharp and efficient, always helping me to coordinate EPNOE using his vast experience. I know that it is usual to say in these circumstances that everybody was loving him, but this is incredibly true. EPNOE held many meetings all over Europe. He was one of the best supporters of EPNOE, confident that it is via these types of organizations that science in Europe would progress by bringing closer researchers from different cultures and countries. During all these years, there were many non-scientific events, in particular dinners where John, most of the time accompanied by his wife Margaret, was entertaining us with hilarious stories. He liked good food and good wine. He loved life.

It was with a great sadness that I learned that John passed away. I remember all the wonderful times we all spent in his company.

We are missing him.

Patrick Navard
Founder and former president of EPNOE

During the first official meeting of EPNOE in 2005, we visited the small medieval village of Biot, between Nice and Cannes on the French Riviera. Guess who is proudly smiling in the center of the group?

Lina Zhang: Inspiring China's green chemistry technologies

Professor Lina Zhang passed away on October 17th, 2020. She was a pioneer as the first female Academician of the Chinese Academy of Sciences from Wuhan University and the first Chinese scientist to receive the Anselm Payne Award of the American Chemical Society. Prof. Zhang was in the vanguard to promote China's green chemistry and published more than 600 papers, 16 books and over 100 patents. I had a pleasure to visit her group in Wuhan in 2010 and it was a memorable experience to see the dedication of her students and co-workers and her humble and gracious approach to life and research. Prof. Zhang was passionate about green technologies and inspired a new generation of scientists that will carry her work and vision forward. She is survived by the love and admiration of her husband and two children, grandchildren, students, co-workers and collaborators.

Pedro Fardim

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Recent Scientific Publications of EPNOE Members

View List of Publications

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