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**March 2022**

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**Editorial**

Dear readers,

The news about the Russian invasion in Ukraine and the humanitarian crisis it created, came as a shock to many of us. We are confronted with suffering of entire nations, children and their families. EPNOE members were fast and several initiatives to support refugees were created. You can find them on our website. You will also find information about our exciting activities planned for this year. We are organizing two training schools, one workshop, two sessions in conferences and our EPNOE Junior Conference where we will present our second edition of the EPNOE Junior Scientist Award. We are also happy to announce our collaboration with the ISEKI-Food Association and our plans to co-organize conference activities, workshops and webinars starting in November this year. EPNOE is now eligible to be a partner offering dissemination activities in your national or international project applications. This opportunity is also for non-members. Please consider the great advantages of becoming our member to benefit from discounts in our events and many opportunities for networking. Our EPNOE member area has very nice content including videos, profiles of researchers and opportunities to build consortia for national and European funding applications. We will be happy to welcome you and your organization to EPNOE. Together we can build a sustainable future for materials, food, and human health.



Pedro Fardim  
President of EPNOE **ed us on**

Follow us on



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**News & Announcements**

**Call for Abstracts deadline has been extended till April 15th**



**EPNOE Junior Scientist Meeting 2022**

**Abstract Submission deadline has been extended to April 15<sup>th</sup>**

Our major event in 2022 will be the EPNOE Junior Scientist Meeting in Aveiro, Portugal. The website for abstract submissions and registration is now available! The 5<sup>th</sup> EPNOE Junior Scientist Meeting 2022 will be held from 8<sup>th</sup> to 9<sup>th</sup> of September 2022 at the University of Aveiro, Portugal. This is a bi-annually organized conference designed for young researchers (i.e., PhD students, Post-Doctoral Researchers, Junior Assistant Professors at an early stage of their scientific career) to meet and build their personal network in the polysaccharide field, while also presenting their recent work and brainstorming the direction and future of polysaccharides research. Senior scientists and industrial researchers are invited to join for transfer of knowledge beyond generations of scientists.

Submit your abstract today, and don't miss this major event in the Polysaccharides field.

[To the website](#)

[Submit your abstract](#)



## European Partnerships in Horizon Europe

We are happy to announce that EPNOE is now registered to be a partner in EU Horizon projects!

We offer dissemination and communication support services for European research and technological development projects related to bio-based and circular economy, and polysaccharides related fields in materials science & engineering, food & nutrition and biomedical applications.

We are registered on the EU funding & tender portal as: European Polysaccharide Network of Excellence (EPNOE Association)

[Click here for more details](#)

# Support Ukraine

CLICK TO SEE HOW EPNOE MEMBERS HELP!



See what our members are doing to support

Save the dates for two upcoming Summer Schools!

**KU LEUVEN**



*Training School – Leuven, Belgium*  
Tuesday 07<sup>th</sup> June – Friday 10<sup>th</sup> June 2022

## Aerogels for biomedical applications

*For more information, contact [natacha.raes@kuleuven.be](mailto:natacha.raes@kuleuven.be)*







**SURE2022** INTERNATIONAL SUMMER SCHOOL

# SUSTAINABLE MATERIALS FOR RENEWABLE ENERGY APPLICATIONS

[sure2022.icmab.es](http://sure2022.icmab.es)

11-15 JULY 2022 AT ICMAB - REGISTER BEFORE 15 MAY 2022

**ESEIA** European Sustainable Energy Innovation Alliance

**epnoe**

**ICMAB** INSTITUTO DE CIENCIA DE MATERIALES Y NANOCIENCIA

**CSIC** CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS



**SAPIENZA** UNIVERSITÀ DI ROMA  
DEPARTMENT OF CHEMISTRY AND TECHNOLOGIES OF DRUGS  
DEPARTMENT OF CHEMISTRY

**epnoe**  
European Polysaccharide Network Of Excellence

**universidade de aveiro**

## EPNOE WORKSHOP

### POLYSACCHARIDES IN DRUG DELIVERY - ON THE ROAD TO INNOVATION!

FOR AGENDA AND MORE INFO: [EPNOE.EU](http://EPNOE.EU)

ROME, SAPIENZA UNIVERSITY  
OCTOBER 27-28, 2022

#### EPNOE Webinar March - material available now!



**Plenary lecture by Prof. Henk Schols, Stichting Wageningen Research, Netherlands**

Structural characterisation and enzymatic fingerprinting of oligo and polysaccharides

Structural characterisation and enzymatic fingerprinting of oligo and polysaccharides

Henk A. Schols  
Laboratory of Food Chemistry

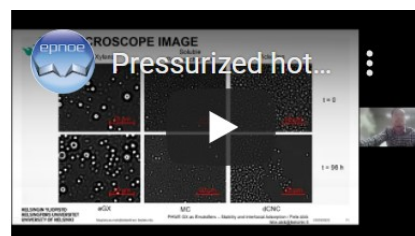


Research Presentation by

**Felix Abik, University of Helsinki, Finland**



Pressurized hot water-extracted birch glucuronoxylan as emulsifier: stability and interfacial adsorption studies.



**Upcoming EPNOE Webinar – April 7<sup>th</sup> , from 13:00 to 14:30 CET**



Plenary lecture by **Prof. Anna Roig**, Institut de Ciència de Materials de Barcelona, ICMA-B-CSIC, Catalunya ([www.icmab.es](http://www.icmab.es)), Nanoparticles and Nanocomposites Group ([www.icmab.es/nn](http://www.icmab.es/nn) )

*Bacteria farming to harvest functional nanocellulose materials*



Research lecture by **Dr. Martin Gericke**, Friedrich-Schiller-University of Jena (Germany)

*Nanoparticles Based on Hydrophobic Polysaccharide Derivatives—Formation Principles, Characterization Techniques, and Biomedical Applications*

To register for this webinar

**Save the Dates for Webinars 2022 (from 13:00 to 14:30 CET):**

May 5<sup>th</sup>, June 9<sup>th</sup>, Oct 6<sup>th</sup>, November 10<sup>th</sup>, December 1<sup>st</sup>



**Young Scientist Award: Lenzing's new prize for research projects on ethical and sustainable fashion**

A new competition has been launched for bachelor's and master's degree students who are working on innovative solutions to address the environmental challenges facing the textile industry. The deadline for applications is June 15, 2022. The winning project will receive a prize of EUR 5,000.

Lenzing – The Lenzing Group, a world-leading provider of wood-based specialty fibers, will present the Young Scientist Award for outstanding research in the field of fibers and textiles for the first time in 2022. The Dornbirn Global Fiber Congress (GFC Dornbirn) is an ideal platform for the recently launched research competition. Bachelor's and master's degree students will have the opportunity to submit their scientific work in the categories of fashion and the circular economy, textile recycling and the innovative use of biobased fibers to a jury of well-known industry experts.

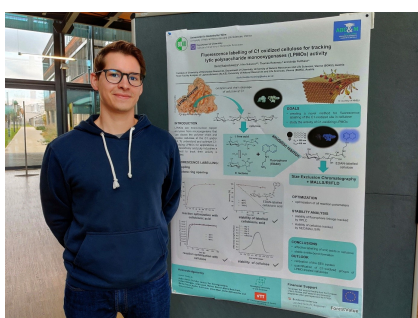
[Read More](#)



### BOKU - Best Paper Award goes to Dr. Marco Beaumont

Fundamental research on confined and water-promoted cellulose chemistry was selected as one of the top publications from all BOKU subject areas in 2021.

*Picture credit: BOKU-IT/Christoph Gruber*



### BOKU - Poster Award of EPNOE 2021 conference goes to

**David Budischowsky**

The research of DI David Budischowsky (Institute for Chemistry of Renewable Resources at BOKU) "Fluorescence labelling of oxidized reducing ends of cellulose" wins the poster prize of the EPNOE (European Polysaccharide Network of Excellence) 2021 conference in Nantes, France.

October 20, 2021  
Volume 143  
Number 41  
pubs.acs.org/JACS

# J | A | C | S

JOURNAL OF THE AMERICAN CHEMICAL SOCIETY



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### BOKU - Individualized Cellulose Nanofibrils for the Production of Super-materials

Elementary cellulose nanofibrils are among the strongest known polymer materials. An international team of researchers led by Institute of Chemistry of Renewable Resources (BOKU) has now developed a reversible and sustainable chemical process to reveal their full potential. The results were published in the renowned Journal of The American Chemical Society and showcased on the cover of the October issue.

DOI: [10.1021/jacs.1c06502](https://doi.org/10.1021/jacs.1c06502)

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**Projects**



**Phase transitions in bio-gels: towards structure/properties control of bio-aerogels and of responsive biomaterials****grant number:** ANR-21-CE43-0017-01**funding agency:** Agence National de Recherche, France**start date:** November 1st, 2021**end date:** February 28th, 2025

Synthetic polymer gels are known as «intelligent» materials able to undergo conformation changes in response to external inputs. In view of transition to bio-based economy, we want to replace petrol-based gels by bio-based ones and suggest new applications. The goal of this project is two-fold: i) to provide a fundamental understanding of bio-gels' phase transitions in non-solvents and ii) to use this knowledge for the development of bio-aerogels and of bio-gel based sensors. Bio-aerogels are nanostructured ultralight networks with high specific surface area. They are made from a gel followed by solvent exchange and drying with supercritical CO<sub>2</sub>. Solvent exchange is a key step controlling formation of bio-aerogel structure. For making stimuli-responsive bio-gels, high sensitivity towards changes in solvent/non-solvent composition is required. Thermodynamics and kinetics of bio-gel behaviour in a non-solvent will be studied experimentally and quantified with thermodynamic methods.

**BOKU - Stereoselective Molecular Recognition Materials****grant number:** LS20-002**funding agency:** GFF Gesellschaft für Forschungsförderung Niederösterreich m.b.H.**start date:** November 01, 2021**end date:** October 31, 2024

In this research project, polysaccharide-based selectors for the separation and analysis of chiral compounds by high-performance liquid chromatography (HPLC) will be developed and evaluated. The research work is thematically located at the interface between organic and analytical chemistry, the chemistry of renewable raw materials (cellulose and other polysaccharides), and in the field of pharmaceutical analysis. The separation of chiral compounds into the respective enantiomers is an omnipresent analytical and preparative challenge in medical, pharmaceutical, and chemical disciplines. This applies to, for example, the production and purity determination of chiral drugs (e.g. ibuprofen), the pharmacokinetic profiling of optically active pharmaceuticals in both human and veterinary medicine, as well as the investigation of food contaminants (e.g. mycotoxins) and environmental pollutants (e.g. chiral fungicides and pesticides). A large number of HPLC column materials based on a wide variety of chiral selectors is already commercially available, with polysaccharide-based silica gel hybrid phases having emerged as the most powerful ones. However, these are only available in neutral form. Chiral compounds also contain acidic and basic molecular structural motifs and are therefore often present in their respective ionized form as organic salts. The aim of the project is thus to study the potential of novel chiral ion-exchangers based on polysaccharide derivatives, which can be used in the above-mentioned disciplines for the separation of chiral organic acids and bases that were previously difficult to separate. The underlying molecular recognition mechanisms will also be investigated for a better understanding of the separation parameters.

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## Events

**RRB 2022**  
RENEWABLE RESOURCES & BIOREFINERIES

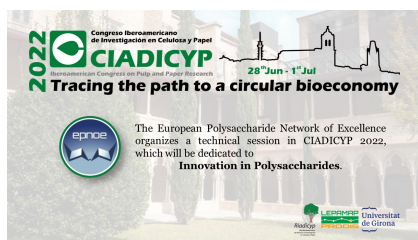
**The international conference on Renewable Resources and Biorefineries**

**(RRB 2022)** will take place on 1<sup>st</sup> -3<sup>rd</sup> June 2022 in Bruges, Belgium. The conference is expected to welcome about 300 international participants from over 30 countries and is being organized for the 18<sup>th</sup> time. Topics discussed on RRB 2022 are a.o. biobased chemicals, biodegradable materials, biocatalysis, fermentation, polysaccharides, wood and forestry as well as the upcycling of waste streams.

On June 2<sup>nd</sup>, a biobased market will take place, where young entrepreneurs, companies and research institutions can showcase their prototypes, ideas and products. This market is free of cost for exhibitors and conference participants. Additional information on the conference or the biobased market is available on the website: [www.RRBconference.com](http://www.RRBconference.com).

**CIADICYP 2022**

The twelfth edition of the Iberoamerican Congress on Pulp and Paper Research (CIADICYP 2022) will take place in Girona (Spain) from 28th June to 1st July 2022.

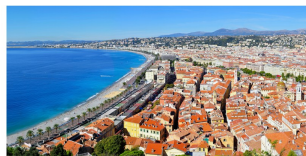


EPNOE will organize a session on “Innovation in Polysaccharides” in the frame of the conference, where renowned speakers in the field of polysaccharides will discuss about the challenges and opportunities in this field. We hope to meet you in Girona next June and work together in the definition of the path that will bring us closer to a more sustainable society. For further details on topics, submission guidelines and registration, please visit [the website](#) or contact [ciadicyp2022@udg.edu](mailto:ciadicyp2022@udg.edu)

#### AFPM

Advanced Functional Polymers for Medicine 2022

1-3 June 2022  
CEMEF  
Nice, France



#### Advanced Functional Polymers for Medicine (AFPM) Conference 2022

Advanced Functional Polymers for Medicine (AFPM) 2022 conference will be organised 1 - 3 June 2022 by the Centre for Materials Forming (CEMEF) in Sophia Antipolis, France. The purpose of the AFPM conference series is to strengthen the interactions within the community of chemists, material engineers, physicists, biologists and clinicians in the development of Advanced Functional Polymers for Medicine.

The current status, challenges and requirements for future developments of polymers for medicine will be presented by leading experts. The conference provides an outstanding opportunity to help young scientists in their career development and offers them an interdisciplinary discussion forum within an exclusive circle. The AFPM 2022 conference will offer delegates innovative and stimulating topics with a well-balanced programme of invited speakers and poster presentations.

[Website](#)

#### Call for abstracts

**2022 International Symposium on Polymer Nanocomposites: 28-30<sup>th</sup> September 2022 @ Lorient**



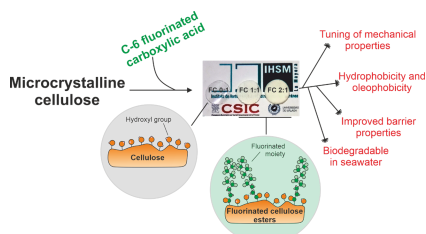
The objective is to create an international forum to discuss the latest results, progress and remaining challenges related to Polymer Nanocomposites, from elaboration to applications through modeling.

**Deadline for abstract submission: April 15<sup>th</sup> 2022**

Template and instructions available on the symposium website

[To the website](#)

## Research



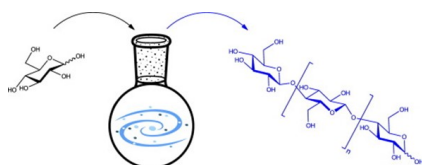
#### Greaseproof, hydrophobic, and biodegradable food packaging bioplastics from C6-fluorinated cellulose esters

Susana Guzman-Puyol, Giacomo Tedeschi, Luca Goldoni, José J. Benítez, Luca Ceseracci, Andreas Koschella, Thomas Heinze, Athanassia Athanassiou, José A. Heredia-Guerrero (2022), *Food Hydrocolloids* 2022 (128): 107562.



<https://doi.org/10.1016/j.foodhyd.2022.107562>

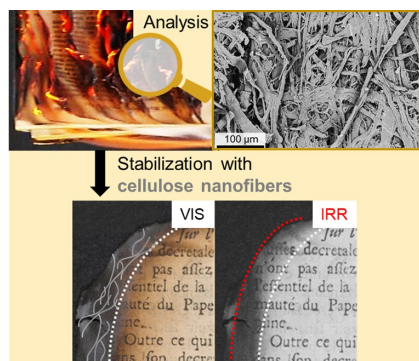
This article was published in Food Hydrocolloids. It focuses on the preparation of new bioplastics by chemical esterification between cellulose and a C6-fluorinated carboxylic acid at different molar ratios. The resultant free-standing films were mechanically characterized and a plasticizer effect was observed. Moreover, wettability, hydrodynamic properties, and oil resistance, were systematically analysed, resulting in materials with similar or better values of those of other food packaging materials. Finally, a successful biodegradation was checked by determination of the biological oxygen demand (BOD) through immersion in seawater for a 30-days period. In view of the interesting results, the bioplastic synthesized at a molar ratio 1:1 was proposed as a realistic alternative to current petroleum-based food packaging materials.



**BOKU - The in vitro synthesis of cellulose – A mini-review**

Lehrhofer, A. F.; Goto, T.; Kawada, T.; Rosenau, T.; Hettegger, H. The in Vitro Synthesis of Cellulose – A Mini-Review. Carbohydrate Polymers 2022, 285, 119222. <https://doi.org/10.1016/j.carbpol.2022.119222>.

The implementation of cellulose as a green alternative to classical polymers sparks research on the synthesis of defined derivatives of this biopolymer for various high-tech applications. Apart from the scientific challenge, the in vitro synthesis of cellulose using a bottom-up approach provides specimens with absolutely accurate substituent patterns and degrees of polymerization, not accessible from native cellulose. Synthetic cellulose exhibiting a comparably high degree of polymerization (DP) was obtained starting from cellobiose by biocatalytic synthesis implementing cellulase. Cationic ring-opening polymerization has been established in the last two decades, representing an excellent means of precise modification with regards to regio- and stereoselective substitution. This method rendered isotopically enriched cellulose as well as enantiomers of native cellulose (“l-cellulose”, “d,l-cellulose”) accessible. In this review, techniques for in vitro cellulose synthesis are summarized and critically compared – with a special focus on more recent developments. This is complemented by a brief overview of alternative enzymatic approaches.



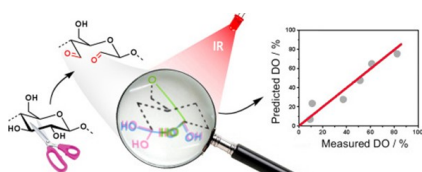
**BOKU - Assessing Fire-Damage in Historical Papers and Alleviating Damage with Soft Cellulose Nanofibers**

Völkel, L.; Beaumont, M.; Johansson, L.; Czibula, C.; Rusakov, D.; Mautner, A.; Teichert, C.; Kontturi, E.; Rosenau, T.; Potthast, A. Assessing Fire-Damage in Historical Papers and Alleviating Damage with Soft Cellulose Nanofibers. Small 2022, 2105420.

<https://doi.org/10.1002/smll.202105420>.

The conservation of historical paper objects with high cultural value is an important societal task. Papers that have been severely damaged by fire, heat, and extinguishing water, are a particularly challenging case, because of the complexity and severity of damage patterns.

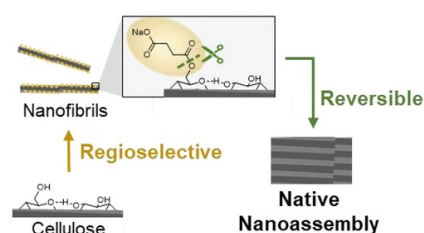
In-depth analysis of fire-damaged papers, by means of examples from the catastrophic fire in a 17th-century German library, shows the changes, which proceeded from the margin to the center, to go beyond surface charring and formation of hydrophobic carbon-rich layers. The charred paper exhibits structural changes in the nano- and micro-range, with increased porosity and water sorption. In less charred areas, cellulose is affected by both chain cleavage and cross-linking. Based on these results and conclusions with regard to adhesion of auxiliaries, a stabilization method is developed, which coats the damaged paper with a thin layer of cellulose nanofibers. It enables the reliable preservation of the paper and—most importantly—retrieval of the contained historical information: the nanofibers form a flexible, transparent film on the surface and adhere strongly to the damaged matrix, greatly reducing its fragility, giving it stability, and enabling digitization and further handling.



**BOKU - Fast Method to Measure the Degree of Oxidation of Dialdehyde Celluloses Using Multivariate Calibration and Infrared Spectroscopy**

Simon, J.; Tsetsgee, O.; Iqbal, N. A.; Sapkota, J.; Ristolainen, M.; Rosenau, T.; Potthast, A. A Fast Method to Measure the Degree of Oxidation of Dialdehyde

The properties of dialdehyde celluloses, which are usually generated by periodate oxidation, are highly dependent on the aldehyde content, i.e. the degree of oxidation (DO). Thus far, the established methods for determining the DO in dialdehyde celluloses lack simplicity or sufficient speed. More than 60 dialdehyde cellulose samples with varying aldehyde content were analysed by near-infrared and Fourier-transform infrared spectroscopy. This was found to be a reliable method for quickly predicting the DO if combined with partial least squares regression (PLSR). The proposed PLSR models can predict the DO with a high determination coefficient ( $R^2$ ) of 99% when applied to a single pulp type and 94% when applied to multiple types. This new approach quickly and reliably determines the DO of dialdehyde celluloses. It can be easily implemented in everyday research to save money, time and resources, especially because the raw datasets and measured DO values are provided.



### **BOKU - Assembling Native Elementary Cellulose Nanofibrils via a Reversible and Regioselective Surface Functionalization**

Beaumont, M.; Tardy, B. L.; Reyes, G.; Koso, T. V.; Schaubmayr, E.; Jusner, P.; King, A. W. T.; Dagastine, R. R.; Potthast, A.; Rojas, O. J.; Rosenau, T. Assembling Native Elementary Cellulose Nanofibrils via a Reversible and Regioselective Surface Functionalization. *J. Am. Chem. Soc.* 2021, 143 (41), 17040–17046. <https://pubs.acs.org/doi/10.1021/jacs.1c06502>

Selective surface modification of biobased fibers affords effective individualization and functionalization into nanomaterials, as exemplified by the TEMPO-mediated oxidation. However, such a route leads to changes of the native surface chemistry, affecting interparticle interactions and limiting the development of potential supermaterials. Here we introduce a methodology to extract elementary cellulose fibrils by treatment of biomass with *N*-succinylimidazole, achieving regioselective surface modification of C6-OH, which can be reverted using mild post-treatments. No polymer degradation, cross-linking, nor changes in crystallinity occur under the mild processing conditions, yielding cellulose nanofibrils bearing carboxyl moieties, which can be removed by saponification. The latter offers a significant opportunity in the reconstitution of the chemical and structural interfaces associated with the native states. Consequently, 3D structuring of native elementary cellulose nanofibrils is made possible with the same supramolecular features as the biosynthesized fibers, which is required to unlock the full potential of cellulose as a sustainable building block.

## Call for Papers

**Advertise your editorial activities in books, journals and special issues in the newsletter!**

**send an email to [contact@epnoe.eu](mailto:contact@epnoe.eu)**

### **Polymers | Submission Invitation to Special Issue of Polymers [IF 4.329] "Starch and Starch-Based Materials: Food and Non-Food Application"**

Special Issue: Starch and Starch-Based Materials: Food and Non-Food Application

Guest Editors: ;Dr. Arkadiusz Zarksi; Dr. Sergiu Coseri; Prof. Dr. Janusz Kapusniak

Submission deadline: 30 April 2022

More info: [click here](#)

Keywords: native starch; starch derivatives; starch nanoparticles; starch composites; structure properties; modifications; functions; food applications; non-food applications

**EPNOE SpringerBriefs on Biobased Polymers | [click here](#)**

## Education

## ***Welcome to new students and researchers***

### **Armines – Mines Paristech**

- Loris Gelas, PhD with Prof. Tatiana Budtova, project: Phase transitions in bio-gels: towards structure/properties control of bio-aerogels and of responsive biomaterialsPhase transitions in bio-gels: towards structure/properties control of bio-aerogels and of responsive biomaterials (see more details under project)

### **Jena University - Germany**

- M. Sc. Catharina Fechter defended her PhD Thesis entitled "Wood pulps for chemical industry"
- B. Sc. Lennart Skodda defended his Master Thesis entitled "Modular synthesis of reactive xylan derivatives for functionalization and gelation via 1,3-dipolar cycloaddition"
- B. Sc. Kennedy Emmanuel joined the group as master student and is working in the field of immobilization of histondeacetylase inhibitors on polysaccharide-based nanoparticles (supervised by Andreas Koschella and Thomas Heinze )

### **KTH Fibre and Polymer Technology Department, Wallenberg Wood Science Center- Sweden**

students Hui Chen PhD student and Céline Montanari, working on transparent wood defended in March. The thesis work

presentations have been recorded and made available on treesearch website. Links below:

<https://treesearch.se/defences/hui-chen-thesis-defense/>

<https://treesearch.se/defences/celine-montanari-thesis-defense/>

### **BOKU - University of Natural Resources and Life Sciences, Vienna (BOKU), Institute of Chemistry of Renewable Resources, Austria**

- Irina Sulaeva, Senior ScientistTopic, Analysis of Lignocellulosics, BOKU, Core Facility of Analysis of Lignocellulosic
- Marco Beaumont, Assistant Professor, topic: Chemistry of bio-based colloids
- Stefano Barbini, Postdoctoral researcher, topic: Green chemicals and technologies for the wood-to-textile value chain
- Anna F. Lehrhofer, PhD Student, topic: Stereoselective Molecular Recognition Materials based on Cellulose  
Supervisors: Dr. Hubert Hettegger, Prof. Dr. Thomas Rosenau

## **Open Positions**

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### **PhD Studentship: 3D-Printable Functional Biopolymer Composite Materials**

*Newcastle University, UK*

*Apply by 31 March 2022*

For more information: [click here](#)

### **PhD Chemist (m/f/d) – Material Science / Polymer Chemistry**

*IFF R&D Innovation Center in Bomlitz, Lower Saxony, Germany*

This position is for a Material Science Specialist / Polymer Chemist to build a knowledge base on structure-property relationships of native and derivatized polysaccharides and use this knowledge base to develop new products working closely with peers within research, analytical, application development and market facing teams in a cross-functional and international team environment.

*Apply before 15 April 2022*

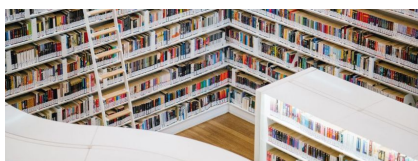
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