



European Polysaccharide
Network Of Excellence

N°32 - JANUARY 2016



**“Nature makes polysaccharides,
EPNOE turns them into products”**

editorial

Dear Readers of the EPNOE Newsletter,

In the name of all EPNOE members, I wish you, your family and the ones you love a very enjoyable, successful, healthy and peaceful year 2016.

A start of a new year is the perfect occasion to recall what a member of EPNOE is. EPNOE is a legal, non-profit organization. Its members are all legal bodies like companies and universities. It means that as soon as one company or university is joining EPNOE, any member of its staff can participate to all EPNOE activities.

2016 will be an active year for EPNOE with the organization of several meetings aimed at favouring collaboration and project building. Up to now, only EPNOE members were participating to these meetings. We are planning to organize mid-2016 a meeting where non-EPNOE persons or organizations will be able to meet individually representatives of all EPNOE members. This meeting is not fixed yet and we will send you all information regarding its venue as soon as possible.

I am happy to announce that the next EPNOE conference will take place in Germany in 2017. It will be organized jointly by our colleagues of the Kompetenzzentrum Polysaccharidforschung of the Friedrich-Schiller university of Jena and of the Thuringische Institut für Textil und Kunststoff Forschung (TITK) in Rudolstadt. It will take place in Erfurt, a very beautiful city easily reached from Frankfurt airport from September 4 to September 7, 2017 with, as usual, a pre-conference course on Sunday 3 September.

You are all welcome to Erfurt.

Wishing you again all the best for 2016, I send you my best regards,



Dr. Patrick Navard
Coordinator of EPNOE
Armines/Mines ParisTech/CNRS
CEMEF - Centre for Material
Forming
Sophia-Antipolis
(France)

news

Member's info



Award:

- At **ARMINES-C2MA, France:**

- Raphaël Ménard (PhD): Prize for the best poster at FRPM 22 - 25 June 2015, Berlin, "Comparison of additive and reactive phloroglucinol-based phosphorus/sulfur-containing flame retardants in epoxy resin".

New staff:

- At **ARMINES-CEMEF, France:**

- Lucile Druel (CEMEF, Mines ParisTech) from January 2016 is starting a PhD in CEMEF on cellulose aerogels in the frame of the European project Nanohybrids.

- Sophie Groult started a PhD in CEMEF in November 2015 on bio-aerogels (supervisor Tatiana Budtova).

- At **ARMINES-C2MA, France:**

- PhD Benjamin Chollet, on the study of fire behavior of polymers containing bionanoparticles. Work supervised by L. Ferry.

- PhD William Garat, on the characterization and modelling of natural fibres behavior in controlled environment. Work supervised by A. Bergeret, S. Corn and N. Le Moigne.

- PhD Raymond Hajj, on the influence of coating processes on functional properties and durability of natural fibers. Work supervised by J.M. Lopez Cuesta, M. Nakhil, R. Sonnier and R. El Hage in the framework of CEDRE program - Franco Lebanese cooperation.

- Post-doc Karthik Ram Ramakrishnan, on the development of (bio)composites in freight wagons and facilities for improved transport of granular multimaterials. Work supervised by S. Corn and N. Le Moigne in the frame work of HERMES H2020 project.



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EPNOE Member's info (continued)

▶ Member's info

New staff:

- At the **Friedrich Schiller University of Jena**, Germany:

- B. Sc. Sascha Blohm joined the group as master student working in the field of amino cellulose derivatives (supervisor: Prof. Dr. Thomas Heinze)
- Dr. Feng Peng (Beijing Forestry University) joined the group as postdoc working in the field of hemicellulose chemistry.

Masters & PhD defenses:

- At **ARMINES-CEMEF**, France:

- Lucile Druel (CEMEF, Mines ParisTech) defended her Master degree in December 2015 on starch aerogels (supervisor Tatiana Budtova).
- Ahmed Abdennadher (CEMEF, Mines ParisTech) defended his PhD in December 2015 on the morphology and properties of injected polypropylene reinforced with natural fibres (supervisors Michel Vincent and Tatiana Budtova). The work was performed in the frame of the Industrial Chair in Bioplastics sponsored by Arkema, l'Oreal, Nestle, PSA and Shneider Electric.

- At **ARMINES-C2MA**, France:

- Raphaël Ménard defended his PhD in November 2015, on the synthesis of new biobased phosphorous flame retardants for epoxy resins. Work supervised by L. Ferry and G. David
- José Acéra Fernandez defended his PhD in December 2015, on the modification of flax fibres for the development of epoxy-based biocomposites. Work supervised by A. Bergeret and N. Le Moigne
- Morgan Chabannes defended his PhD in November 2015, on the formulation and study of the mechanical properties of insulating lightweight rice husk and hemp-based concrete for green building. Work supervised by E. Garcia Diaz, L. Clerc and J.C. Bénézet
- Guilherm Apolinario Testoni defended his PhD in December 2015, on the in situ long-term durability analysis of biocomposites in marine environment. Work supervised by P. Lenny, J.M. Haudin, S. Corn and R. Léger
- Kahina Igguy defended her PhD in September 2015, on the study of nanobiocomposites PHBV / organomodified montmorillonite durability in different environments. Work supervised by A. Bergeret and N. Le Moigne
- Pauline Ponge defended her Master degree at INSA Lyon in September 2015, on the processing of bio-based materials from microalgae. Work supervised by N. Le Moigne

- At **JENA University**, Germany:

- Michael Schöbitz finished his PhD thesis "Dendronised polysaccharides as bioactive coating materials preparation and application examples".



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EPNOE Member's info (continued)

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Masters & PhD defenses:

- At **Jan Dlugosz University in Czestochowa**, Poland:

- Joanna Antczak successfully defended her master thesis in October 2015 (supervisor: Dr Janusz Kapusniak) on physico-chemical properties of prebiotic dextrins from potato starch.
- Katarzyna Zamelska defended her master thesis in October 2015 on lipase catalysed esterification of starch with higher fatty acids in the microwave field. Work supervised by Dr Janusz Kapusniak.
- Katarzyna Przybylska defended her master thesis in October 2015 on enzymatic synthesis of starch esters in ionic liquids. Supervisor: Dr Janusz Kapusniak.
- Agata Kubicka defended her master thesis in October 2015 on preparation and chemical properties of oxidised starch. Work supervised by Dr Przemyslaw Siemion.
- Ewa Balcerzak defended her master thesis in October 2015 on preparation and physico-chemical properties of oxidised starch. Work supervised by Dr Przemyslaw Siemion.
- Agata Szymczyk defended her master thesis in September 2015 on determination of the effect of low- and high- calorie diet enriched in native starch on the number and part of selected intestinal microbiota. Work supervised by Dr Renata Barczynska-Felusiak.
- Dominika Olczyk defended her master thesis in September 2015 on determination of the effect of low- and high-calorie diet enriched in dextrin from maize starch on the number and part of selected intestinal microbiota. Work supervised by Dr Renata Barczynska-Felusiak.

- At **University of Natural Resources and Life Sciences Vienna (BOKU)**, Austria:

- Assistant Professor Dr. Ute Henniges has successfully defended her habilitation thesis to obtain the Venia Legendi in the field of "Paper Conservation Science" and has been promoted to Associate Professor at the University of Natural Resources and Life Sciences, Vienna.
- Dr. Hubert Hetteger has successfully defended his PhD thesis "Chemical Composition and Biological Activity of Essential Oils and Extractives from Selected Tree Species of Uganda" (Supervisors: S. Böhmendorfer, T. Rosenau).
- Dr. Johannes Hell has successfully defended his PhD thesis "Oxidative Modification of Cellulosic Fibers" (Supervisors: A. Potthast, T. Rosenau).

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Open positions:

- At **FSCN research centre and the research group in Surface and Colloid Engineering, Mid-Sweden University**, Sweden:

- 1 Postdoc / Postdoctoral Fellowship in the area of functional regenerated cellulose composites.
- 1 PhD student in the area of native cellulose dissolution and cellulose-stabilized emulsions.

The planned work is mainly experimental in the field of surface and colloid chemistry, but the projects might also be complemented by numerical modeling.

Prerequisites for the post doc position are PhD in chemistry, physics, engineering, or a related area, and a strong scientific record. For the PhD student position a master's exam in chemistry, physics or engineering is required. Good oral and written communications skills in English and a flair for teamwork is important.

The successful candidate will encounter an active research group, well-equipped laboratories, and excellent working conditions. Earliest starting date is March 1, 2016, or as agreed. Review of applications starts February 1, 2016, and continues until the position is filled.

For general information, see <http://www.miun.se/en/fscn> . To apply, email a note of interest, your CV, and 2-3 professional references including complete contact details to magnus.norgren@miun.se, bjorn.lindman@fkem1.lu.se or hakan.edlund@miun.se . If anyhow possible, send your entire application in a single pdf-file (zip-files or 7z-files are currently not acceptable).

FSCN – Fibre Science and Communication Network is a multi-disciplinary research centre at Mid Sweden University. FSCN develops research that improves the forest industry's profitability and create new applications and business opportunities based on sustainable bio-materials from the forest.

Our research is developed in close collaboration with the forest industry and companies in Sweden. Our aim is to increase industry profitability by improving energy efficiency and support the development of new products and business based on forest products. Resource management, environmental issues and new technologies are the focus of the research. The research contributes to the development of the industrial ecosystems.

FSCN is part of the university's research environment Transformative Technologies. We are more than 70 researchers and we co-operate close with the research centre STC at Mid Sweden university. FSCN brings together colleagues in chemistry, chemical engineering, electronics, materials physics, media technology and graphical design. FSCN started in 1999.

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Open positions:

- At **ETH Zurich, Switzerland:**

Open position for a PhD student

The group is looking for a PhD student to an ERC funded project "BINDING FIBRES: Soluble dietary fibre: unraveling how weak bonds have a strong impact on function". The topic of this PhD project is to study supramolecular binding mechanisms between soluble dietary fibres and nutritionally relevant small molecules using nanoparticle-based probes in combination with other analytical techniques.

We seek for a highly motivated student with good skills in organic chemistry and chemical analysis. In particular experience in organic synthesis, NMR and mass spectrometry is considered a benefit, in addition to the other standard analytical techniques (GC, HPLC, various spectroscopies). Due to the multidisciplinary nature of the research topics the applicants should be motivated to adapt new techniques quickly.

Successful applicant has excellent academic qualifications, good communication skills, and strong self-motivation. The candidate should also have a Master's degree in organic chemistry, polymer chemistry, food chemistry, or a related subject. Regardless of background, the successful applicant will have an interactive and highly motivated personality, excellent English language skills, the ability to carry out research in an interdisciplinary and international environment, and a strong desire to disseminate the results in conference talks and journal articles.

Review of applications will start in mid-January and will continue until the position is filled. The application should include your CV, publication list, a PDF file of the Master's thesis, an academic transcript of your studies, a one page statement on your motivation, past research experience and research interests (in English), and contact details for three academic references. Please apply online: Link to the application form will be added by mid January 2016. Address your application to: ETH Zürich, Ms. Nadja Lang, Human Resources, 8092 Zürich.

Starting date: April 1, 2016 (or as agreed)

Length of contract: 3 years, including 3 months probation

Further information: laura.nystroem@hest.ethz.ch (no applications)

The advertisement can be found under the following website: <http://www.foodbiochem.ethz.ch/the-lab/open-positions.html>

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EPNOE Member's News

New Bio-based Polymers and Composites group in CEMEF (Materials Forming Center) of Mines ParisTech, in Sophia Antipolis.

A reorganisation of the activities of the Polymers and Composites department of CEMEF took place recently and led to the creation of a new research group fully dedicated to bio-based materials.

The objective of the **Bio-based Polymers and Composites (BIO)** group is to develop the fundamental understanding of natural polymers and to create biomass-based functional materials. More specifically, research activities will be focused on three areas:

Polysaccharide solutions

- Understand dissolution mechanisms of polysaccharides, with the focus on cellulose, coming from various sources. Methods to improve dissolution.
- Study solution thermodynamics and rheology in new solvents.
- Control coagulation.

Biomass-filled composites

- Develop plant biomass-reinforced composites
- Understand the relations between genotype characteristics and polymer composite properties.
- Study the rheology and flow-induced structures in natural fibre reinforced polymer composites.
- Develop plant-based concrete.
- Develop algae and seaweed by-products filled composites.

Bio- aerogels

- To prepare and control the structure of polysaccharide-based aerogels.
- To develop various applications of bio-aerogels as thermal super-insulation, bio-medical, adsorption and electro-chemical.

The BIO group has three members of staff, Tatiana Budtova (head), Patrick Navard and Bruno Vergnes (1/3 of time) and several post-doctoral, PhD and trainee students.

Current national and international projects:

French agency for large projects “Investissements d’Avenir: *Biomass for the Future*
Woodwisdom-Net +: *Hemicell* and *Aerowood*

European project: *Nanohybrids*

Ademe (French agency for energy and environment): *Aerofibres*

ANR(French agency for research): *Defibrex*



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EPNOE News

EPNOE representatives at Starch Update 2015 in Bangkok

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BIOTEC-NSTDA, in collaboration with the Kasetsart Agricultural and Agro-Industrial Product Improvement Institute (KAPI), Kasetsart University, the Thailand Research Organizations Network (TRON) and the French Agricultural Research Centre for International Development (CIRAD), organized the Starch Update 2015: The 8th International Conference on Starch Technology on 3-4 December 2015 in Bangkok. The biennial Conference serves as platform to share and discuss the advancement on starch technology.



The program of Starch Update 2015 consisted of lectures from the international experts such as Prof. Jay-lin Jane from Iowa State University (USA), Prof. Yong-Cheng Shi from Kansas State University (USA), **Dr. Waltraud Vorweg from Fraunhofer Institute for Applied Polymer Research (Germany)**, Dr. Kerry C. Huber from Brigham Young University-Idaho (USA), Dr Ya-Jane Wang from University of Arkansas (USA), Dr. Agnes Rolland-Sabate from French National Institute for Agricultural Research (INRA), and **Dr. Janusz Kapusniak from Jan Dlugosz University in Czestochowa (Poland)**. This year, the event was successfully held with 160 participants from 14 countries.

This article was proposed by Dr. Janusz Kapusniak, Jan Dlugosz University in Czestochowa, Poland



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EPNOE News

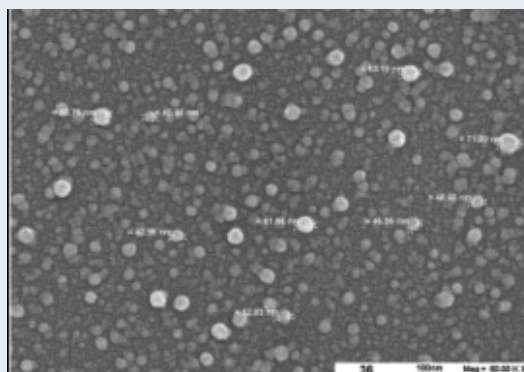
Polysaccharide Bioshapes (PShapes)-Chemical Design and Shaping into New Biomaterials

Webpage: www.bioshapes.net

PShapes is an international collaborative project with a goal of creating functional nano, micro and millimeter sized particles from wood components for various value added chains utilizing the expertise and knowledge of research partners and closely listening to the demands of the industrial partners.

The main concept applied for preparation of nanoparticles involves the dissolution of functionalized polysaccharides e.g amino cellulose, hydrophobic cellulose esters and xylan in compatible solvents (mostly organic solvents) followed by regeneration in anti-solvents via dialysis or emulsification evaporation. This strategy resulted in particles of 50 nm – 1 µm with narrow particle size distribution. Another approach for the preparation of micro - millimeter sized particles involves dissolution of cellulose and hemicellulose and formation of droplets via spin drop atomizing technique and coagulation in non-solvent medium. Particles of diameter 50 µm to 4 mm can be prepared with an outstanding porosity of 90% and very high specific surface area of 400 m²/g. The biocompatibility and robustness of the natural polysaccharides in the form of nanoparticles and beads has allowed them to be successfully applied in the biomedical area, such as pH sensors in living cells, controlled delivery of active ingredients, immobilization and separation of proteins and enzymes, chelating sorbents and filter materials.

This consortium encompasses the entire research and development, starting from the selection and functionalisation of the polymers, physical and chemical design of the particles and ultimately applications in the immunodiagnostics, bio-chromatography and controlled drug delivery fields. This synergistic approach allow us establishing a clear structure- property relationship for the particles with respect to the way of preparation and the starting material, beyond the state-of-the art. The consortium has provided opportunities to all the partners to exchange fundamental knowledge gained during the research and development studies to optimize the level of work to reach the desired goals related to consumer oriented applications.



SEM image of cellulose derivative nanoparticles



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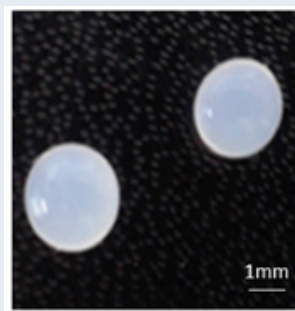
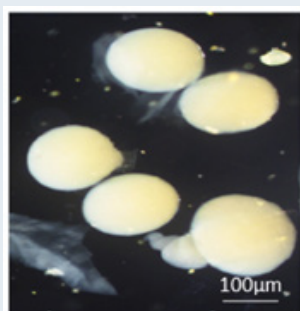


EPNOE News (continued)

Polysaccharide Bioshapes (PShapes)-Chemical Design and Shaping into New Biomaterials

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Images of cellulose beads of different size, microbeads (left) and millibeads (right)

During the year 2015 the PShapes project members had four research meetings and two steering group meetings. Research meetings are excellent to exchange ideas, boost collaboration and find creative ways to work in a multidisciplinary joint venture. The steering meetings are used to manage project activities, to visit facilities of project partners and to promote close collaboration with industry and SMEs while keeping focus on dissemination of new scientific and technological results. All research partners of PShapes are members of EPNOE. Current results were presented at the 4th EPNOE conference in Warsaw in 2015.



This article was proposed by Pedro Fardim, Abo Akademi University, Finland



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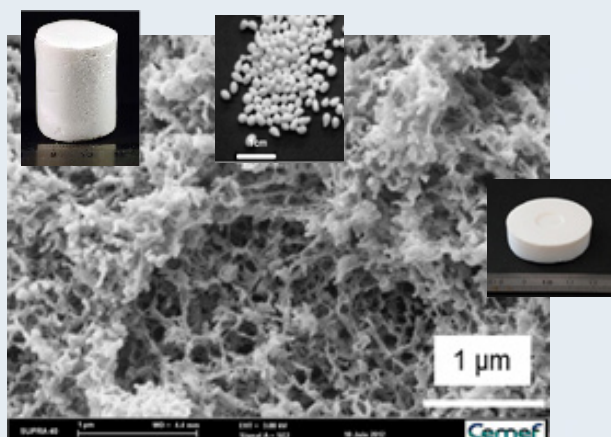
EPNOE Member's research

New generation of nanoporous organic and hybrid aerogels for industrial applications: from the lab to pilot scale production



New EU project called "Nanohybrids" started in November 2015 in the frame of Horizon 2020, NMP-03-2015 "Manufacturing and control of nanoporous materials". The goal is to develop a pilot scale production system of the new generation of nanoporous organic and hybrid aerogels with multiple functions, especially in the form of particles. Bio-aerogels from various polysaccharides are one of the major materials that will be produced. Their coupling with inorganic precursors will also be studied. The main applications are gas and humidity adsorption, personal care and food additives.

The project is coordinated by Hamburg University of Technology (Germany), with academic partners from MINES ParisTech (CEMEF and PERSEE centers, France); the German Aerospace Center, DLR; KOÇ University (Turkey); the University of Patras (Greece); the National and Kapodistrian University of Athens (Greece) and Mendeleev University of Chemical Technology of Russia. The industrial partners are BASF (Germany); Nestlé/Nestec (UK); Dräger Safety AG & Co. KGaA (Germany); Arçelik (Turkey) and Innventia (Sweden).



Cellulose aerogels



This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 685648. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

This article was proposed by Dr. Tatiana Budtova, Armines-CEMEF, France



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EPNOE Member's research

Authors: Maša Kavčič (Institute for the Protection of Cultural Heritage of Slovenia)
Črtomir Tavzes (Institute for the Protection of Cultural Heritage of Slovenia) (University of Primorska)
Manja Kurečič, (University of Maribor)

Innovative Renewable Material Uses Living Laboratory of InnoRenew CoE project (LL InnoRenew)

In the framework of InnoRenew CoE project, already introduced in the 31st EPNOE Newsletter, the consortium has created an Innovative Renewable Material Uses Living Laboratory (LL InnoRenew). Living laboratories are a public-private-people relationship established with stakeholders representing industry, consumers, researchers, and policy makers. The stakeholders collaboratively explore, design, and validate new innovative solutions for their area of concern, in the case of LL InnoRenew solutions based on renewable materials.

LL InnoRenew was set in order to establish most effective business plan for the InnoRenew CoE and with intention to advance scientific excellence in Slovenia in wide range of fields related to renewable materials, such as wood materials, construction, biology, polymers, social sciences, cultural heritage, computing, mathematics, psychology, kinesiology, modelling, simulation, design, logistics, deployment, risk-assessment, decision making and management. The objective of the LL InnoRenew is to create an environment to discuss the InnoRenew CoE project, develop creative and innovative new ideas, provide critical feedback, and ensure stakeholder involvement in the development of the business plan of the new CoE. Members of LL InnoRenew are all partners of InnoRenew CoE project, and stakeholders, who can be categorised into six main groups: national and international R&D institutions, associations, SMEs and large companies, government bodies, citizens, and national municipalities.

The stakeholders appointed as close collaborators of the InnoRenew CoE were asked to sign the Declaration of Intent to Participate and are active, along with the InnoRenew CoE partners, in all LL activities, whereas other interested parties are involved through the social media. Based on the defined objective of the LL InnoRenew, many activities of the LL were selected: workshops, personal meetings, on-line forum on the InnoRenew CoE webpage, social media, round table discussions, conferences, fairs, etc. Amongst other mentioned activities, three workshops were organised so far between October and December 2015: InnoRenew CoE Services Workshop, Impact and Communication Workshop and Understanding Innovation Workshop. First two workshops were led by representatives of the coordinator of the project, University of Primorska, who gave presentations on the topics in question and the work already made on the project, followed by exhaustive discussion and a direct exchange of ideas between InnoRenew CoE partners and stakeholders joined in the LL InnoRenew. The third workshop was led by Prof. Dr. Eric Hansen, a global expert in forest sector business and innovation from Oregon State University in Oregon, USA. This hands-on workshop explored the importance of group dynamics, culture, and team work in innovation. The day ended with a discussion to identify opportunities to increase innovation in the Slovene wood sector and within the LL InnoRenew CoE.



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EPNOE Member's research (continued)

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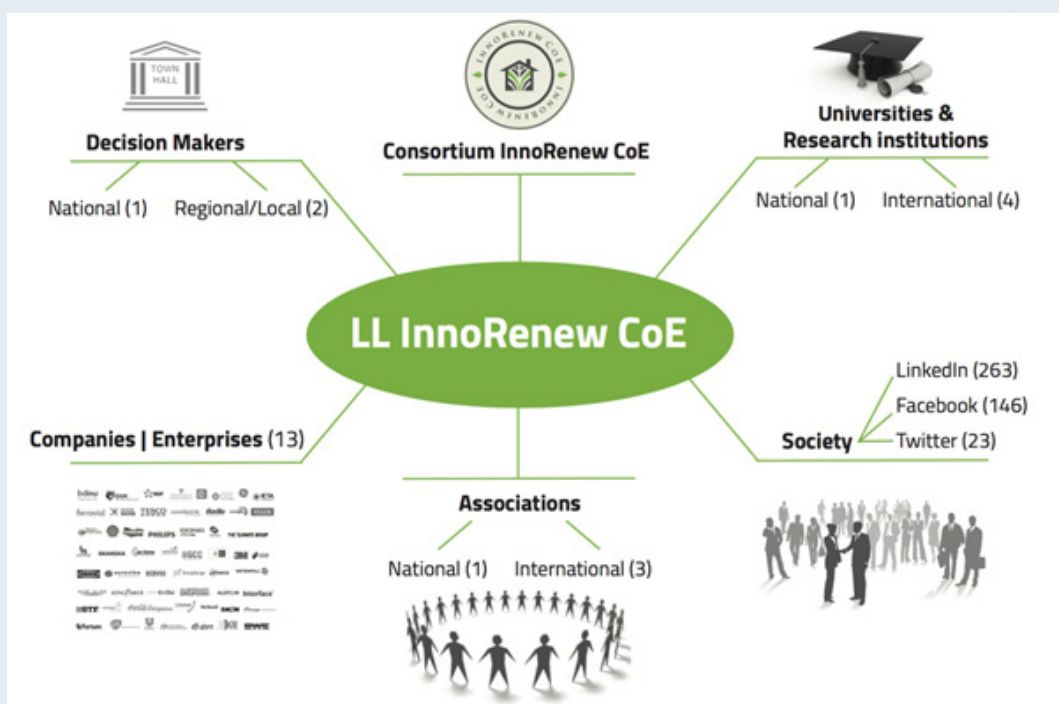


Figure 1: A graphical representation of the LL InnoRenew structure

The LL InnoRenew is open for all interested parties. For more information on how to become a LL InnoRenew member, please follow the links provided below.

More: <http://innorenew.eu/en>

Facebook – <https://www.facebook.com/pages/InnoRenew-CoE/454740938032850>

LinkedIn – <https://www.linkedin.com/groups/8347719>

Twitter – @InnoRenewCoE

Contact us: CoE@innorenew.eu

This article was proposed by University of Maribor, Slovenia



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EPNOE Member's research

Reed waste as a new resource for renewable board material

Wageningen UR is to develop with Royal DSM, Compakboard and Natuurmonumenten, a renewable board material based on perennial reed from the society's land.

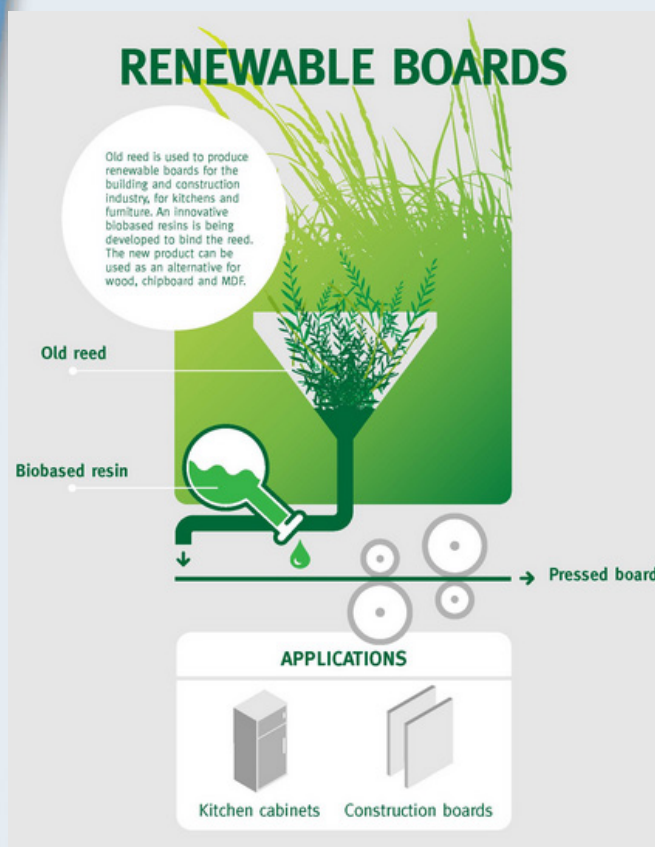
The ultimate goal of the four parties is to market a new, sustainable product: a board material made from reed with a biomass-based resin as binder which can be used as an alternative to wood, chipboard and MDF in the building and construction sector and for kitchen and furniture manufacturing. The green resin will be developed by Wageningen UR Food & Biobased Research and DSM.

The so-called Glue Reed project is part of the public private sponsored research programme called Biobased Performance Materials (BPM), dedicated to developing high-quality materials based on biomass. BPM focuses on two types of polymer materials, namely polymers produced by plants and polymers made from biobased building blocks using biotechnology or chemical catalysis. Glue Reed is an interesting combination of these two research lines. BPM is partly financed by the Dutch government's Top Sector Chemistry approach and led by Wageningen UR Food & Biobased Research.

"This development also provides the opportunity to develop high-quality applications for more heterogeneous biomass resources such as perennial reed which contains very interesting polymer properties but is more difficult to process," concludes senior scientist in natural polymers and project leader, Jan van Dam.

The reed used to make the plate material comes from nature reserves owned by Natuurmonumenten, a private nature conservation organisation. Mowing and processing the perennial reeds is expensive and using the biomass as a source for renewable plate material will generate funds which the society can reinvest in its nature reserves.

According to Christiaan Bolck, Director of BPM and responsible for the applied research in the field of materials at Wageningen UR, developing the new resin is a major technological challenge that will also represent a significant step towards a circular and biobased economy. "This biomass-based binder will allow us to produce a high-quality board material from reed waste that meets all technological and ecological demands. This will provide the building and construction industry and kitchen and furniture producers with a sustainable alternative for board material with synthetic resins from petroleum."



This article was proposed by Wageningen University, the Netherlands



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EPNOE Member's Scientific Publications

ARMINES- CEMEF, France:

- S. Zhao, W. J. Malfait, A. Demilecamps, Y. Zhang, S. Brunner, L. Huber, Philippe Tingaut, Arnaud Rigacci, Tatiana Budtova, Matthias M. Koebel, "Strong, Thermally Superinsulating, Biopolymer-Silica Aerogel Hybrids by Cogelation of Silicic Acid with Pectin", *Angewandte Chemie International Edition*, 54 (48), 14282–14286 (2015)
- A. Abdennadher, M. Vincent, T. Budtova, "Rheological properties of molten flax- and Tencel-polypropylene composites: Influence of fiber morphology and concentration", *Journal of Rheology*, to appear in January 2016

ARMINES-C2MA, France:

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XXVIII International Carbohydrate Symposium in New Orleans, Louisiana. 17-21 July 2016

Abstracts submission for the 2016 International Carbohydrate Symposium is now open
To know more, see: www.ics-2016.org

9th International Conference on Bio-based Materials 5 - 6 April 2016, Maternushaus, Cologne, Germany

More information at www.bio-based.eu/conference

Bio-based Start-up Day 7 April 2016, Maternushaus, Cologne, Germany

High-potential start-ups from the field of bio-based chemistry, polymers and biotechnology are invited to present themselves to industry and investors!

The Bio-based Start-up Day will bring start-ups, investors and industry together by giving the floor to everyone and providing great opportunities of networking. The day will start with a keynote speech followed by the presentation of the start-ups. Clusters such as CLIB2021 and IBB Netzwerk will also have the chance to present their own start-ups. The audience will then have the opportunity to meet the start-ups in person. Investors will afterwards provide an insight into their incentives and experiences working with start-ups in the bio-based and biotech sector. The day will end with a discussion and a coming together.

2nd Food Structure and Functionality Forum Symposium – from Molecules to Functionality, Singapore from 28 February to 2 March 2016

Conference Themes

- Underlying Mechanisms of Functional Behaviour and Properties.
- Colloidal and Interfacial Design and Behaviour.
- Sensory and Consumer Sciences, and Food-Body Interactions.
- New Concepts and Processes for Creating Functionality.
- New and Advanced Approaches for Functionality Characterization.

More information at www.foodstructuresymposium.com

Nanotechnology Videos Available from TAPPI conference

This June TAPPI held its 2015 International Conference on Nanotechnology for Renewable Materials in Atlanta, GA. Videos of some presentations are available. The three presentations below are all free of charge at www.summithub.com/tappi (click on the "21 videos" link).

"Nanotechnology: A Revolution Inspired By Nature" presented by Marie D'Iorio from National Institute of Nanotechnology

"Georgia Tech Nanocellulosic Research: Innovating Renewable Bioproducts", presented by Norman Marsolan and Bernard Kippelen from Georgia Institute of Technology's Renewable Bioproducts Institute

"Rethink Trees", presented by Theodora Retsina from American Process Inc.

The remaining 18 videos from our conference are priced at either 10 USD to buy, or only 8 USD for a 72-hour rental.



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This 7th semi-annual workshop is for the third time arranged in cooperation between Umeå University and Karlstad University and it is focused on basic and applied studies in the field of dissolving pulps, cellulose, nanocellulose, regenerated cellulose and cellulose derivatives. The workshop is sponsored by leading suppliers of dissolving pulps and machinery which guarantees that the workshop will have a mix of academic and applied presentations.

Deadlines for abstracts October 31, 2016.

For more information visit the homepage www.cellworkshop.se or contact Professor Ulf Germgård at ulf.germgard@kau.se