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**“Nature makes polysaccharides,  
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## editorial

**D**ear Readers of the EPNOE Newsletter,

As you may know, EPNOE has a long standing collaboration with North America, in particular with the American Chemical Society.

This year, we will start to intensify our relations with South America. We already have an agreement with our South American colleagues, RIADICYP (Red Iberoamericana de Docencia e Investigación en Celulosa y Papel), for a common distribution of newsletters.

In 2016, EPNOE will actively participate in the IX Ibero-American Conference on Pulp and Paper Research, which will take place in Espoo (Finland) on September 26-28, 2016 and in the First I&S Workshop on insights and strategies towards a bio-based economy, which will be held in Montevideo (Uruguay) 22-25 November 2016.

We think that polysaccharide scientists from these two continents have much to gain from these exchanges, which could cover education, science and knowledge transfer in next years.

2016 will see for EPNOE the coming of younger scientists in its management, a move which is the sign of its vitality. They will organize the 2nd International EPNOE Junior Scientists Meeting “Future perspectives in polysaccharide research” in Sophia Antipolis (France), October 13-14, 2016. More information about this conference is available in this issue.

Best wishes



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

## news

### Member's info



#### Award:

- At **IBWCh Institute**, Poland:
  - Gold Medal at the World Exhibition of Innovation, Research and New Technologies BRUSSELS INNOVA 2015 - for the invention "Method of producing a composite nonwoven fabric", Brussels, 2015
  - Gold Medal at the World Exhibition of Innovation, Research and New Technologies BRUSSELS INNOVA 2015 - for the invention "Method of producing biodegradable films and forms from starch-protein material", Brussels, 2015
  - Gold Medal at the International Trade Fair for Economic and Scientific Innovation INTARG'2015 for the invention of "A process for producing cellulose nanofibers of stems of annual plants," Krakow, 2015

#### New staff:

- At **ARMINES-CEMEF**, France:
  - Severine A.E. Boyer, CR CNRS, an expert in the fields of Polymers Patterns Formations (Crystallization) and Thermo-Chemo-Diffuso-Mechanical Behaviors. She joined the 'Polymers & Composites / Rheology, Morphologies, Processing' research group.
  - Loan VO and Erika di Guiseppe have started post-doctoral stays on the study of plant-based polymer composites and concrete. The work is supervised by Patrick Navard.
- At **ARMINES-Douai**, France:
  - DRAOU RENOUX Jennifer has started PhD in TPCIM, Mines Douai on “Development of isolated protein based blends and nanocomposites: processing, structure and properties”. Supervisor Prashantha Kalappa.
  - DANI Jagadeesh has started his post doctoral research in TPCIM, Mines Douai on “Development of isolated protein based polymeric materials from biomass”. Supervisor Prashantha Kalappa.



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## 2nd International EPNOE Junior Scientists Meeting

### FUTURE PERSPECTIVES IN POLYSACCHARIDE RESEARCH

Sophia Antipolis (France) October 13-14, 2016

The European Polysaccharide Network of Excellence ([www.epnoe.eu](http://www.epnoe.eu)) is dedicated to promote young academics at the very beginning of their scientific career. In this context, the 1st International EPNOE Junior Scientists Meeting was held in January 2015 at Wageningen University (The Netherlands). The 2nd International EPNOE Junior Scientists Meeting that will be held October 13-14, 2016 in Sophia Antipolis (France) will continue this action.

The call for abstracts is explicitly addressed to PhD students, Post-Doctoral scientists and junior Assistant Professors (or equivalent) in an early stage of their scientific career.

#### Contacts

- General issues: Martin Gericke  
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- Registration: Sylvie Massol  
([sylvie.massol@mines-paristech.fr](mailto:sylvie.massol@mines-paristech.fr))

The 2nd International EPNOE Junior Scientists Meeting is co-sponsored by Carbohydrate Polymers (Elsevier) and Cellulose (Springer).

Second circular available at [www.epnoe.eu](http://www.epnoe.eu)

## news

### Member's info



#### New staff:

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

- B. Sc. Lars Gabriel (*xylan derivatives*) - Master student (Supervisor Prof. Thomas Heinze)

- B. Sc. Franziska Obst (*self healing materials*) - Master student (Supervisor Prof. Thomas Heinze)

#### Masters & PhD defenses:

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

- Velina Sarbova finished her PhD thesis entitled "*Application of n-propylphosphonic acid anhydride in cellulose chemistry and cellulose derivatives capable of forming nanostructures*"

- At **BOKU University, Austria:**

Erratum to the 32nd EPNOE Newsletter:

- Dr. Hubert Hetteger has successfully defended his PhD thesis "*Modification of Biopolymers for Improved Wound-Healing*" (Supervisors: T. Rosenau, A. Potthast).

- Dr. Johannes Hell has successfully defended his PhD thesis "*Advanced Analytical Strategies for in depth Characterisation of Wheat Bran Fractions*" (Supervisors: S. Böhmdorfer, T. Rosenau).

- At **INP Toulouse/Ensiacet, France:**

- Natalia Castro successfully defended her PhD thesis in february 2016, on the "Incorporation and release of organic volatile compounds in a bio-based matrix by twin-screw extrusion". Supervised by Dr. Christine Raynaud, Dr. Vanessa Durrieu and Dr. Antoine Rouilly.





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## EPNOE News

### Activities performed by EPNOE in 2015

The following activities were done in 2015:

#### **Knowledge transfer**

- Face-to-face meeting in 9-10 July in Paris in order to build collaborative R or R&D projects within members.
- Agreement with Céréales Vallée, Polintegra and Bioeconomy cluster. The agreements signed with each cluster have for goal to promote collaboration, increase contact members and boost the research innovation & business.

#### **Scientific dissemination**

- Organisation of the first Junior Scientist meeting held in January 2015 in Wageningen, the Netherlands. Preparation of the second Junior Scientist meeting (Sophia Antipolis, 13-14 October 2016)
- EPNOE 2015 Conference, organised by IBWCh in Poland, 19-22 October 2015, with 330 participants.
- EPNOE SpringerBrief series on Biobased Polymers (23 books already planned in 2016-2017)
- Collaboration with the American Chemical Society
  - EPNOE 2015 was under the auspices of ACS.
  - One symposium (Research on Renewable Materials: US & EU Perspectives) was organised in 2015 in the National ACS meeting in Denver
- The EPNOE Newsletter is now distributed by our South American colleagues, RIADICYP (Red Iberoamericana de Docencia e Investigación en Celulosa y Papel).

#### **Training-education: organisation of four courses in 2015**

- Polysaccharides in health and personal care 21-22 January 2015 in Wageningen (the Netherlands). Organizers: Karin Stana-Kleinschek (U. Maribor), Carmen Boeriu and Jan van Dam (Wageningen University and Research), Zdenka Persin (U. Maribor), Ewa Wesolowska (IBWCh Lodz).
- Pretreatment and dissolution of cellulose 7-9 April 2015 at the Friedrich Schiller University in Jena, Germany. Co-organised with COST 1205. Organizer: Andreas Koschella.
- Polysaccharides in building construction June 2015 in Clermont-Ferrand (France). Organizers: Jan van Dam, Patrick Navard.
- Physics and Chemistry in Polysaccharide Research: From Molecules to Materials 18 October 2015 in Warsaw (Poland). Pre-EPNOE 2015 conference course. Organizers: Danuta Ciecchanska, Patrick Navard

#### **Stronger implication of junior scientists in EPNOE management**

Six junior scientists volunteered to start moving into EPNOE management (Carmen Freire (Alveiro, Portugal); Rupert Kargl (Maribor, Slovenia); Nicolas LeMoigne (Alès, France); Avinash Manian (Dornbirn, Austria); Soledad Peresin (Espoo, Finland); Stefan Sprik (Graz, Austria))



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## EPNOE News

### Centre Polintegra

#### Activity of Centre POLINTEGRA - “(BIO)-Polymers-Materials - Technologies for Economy”

26 January 2016 in the Rector's Building of Technical University of Lodz, a scientific-industrial Seminar of Center POLINTEGRA has been organized, whose aim was the integration of cooperation science-business for the development of modern polymer technologies in the industry. The Seminar was attended by 60 people, including representatives of science, industry and business. The organizers of the Seminar were: Director of the Institute of Biopolymers and Chemical Fibres, coordinator of Center POLINTEGRA – PhD, DSc; Danuta Ciechańska, prof. IBWCh and Rector of the Technical University of Lodz - prof. PhD, DSc; Stanislaw Bielecki. The Seminar concerned the presentation of invited guests on the strategic activities of science policy for economy development, goals and assumptions of the Sectoral Programs and rules for obtaining funding for research activity according to the obligatory criteria in the Sectoral and EU Programs.

#### **The program of the Seminar consisted of the following presentations:**

1. "European Congress of the Bio-economy" - Jacek Skwierczyński (Department of Enterprise of the Marshal Office in Lodz)
2. "The schedule of calls in 2016" - Danuta Ciechańska (Director IBWCh)
3. "Strategic Program TECHMATSTRATEG" - Anna Rogut (University of Social Sciences)
4. "Sectoral Program INNOCHEM" - Beata Tylman (PricewaterhouseCoopers)
5. "Sectoral Program INNOTEXTIL" - Izabella Krucińska (Technical University of Lodz)
6. "Horizon 2020, the European Cooperation Platform" - Gabriela Dziworska (IBWCh)

An example of a successful combination of cooperation between science and business are sectoral programs, in whose preparation have been involved, among others, members of the Center POLINTEGRA:

- INNOCHEM - to finance industrial research and development work on innovative solutions for the chemical industry.
- INNOBIO - for the development of bio-industry and bio-economy
- INNOTEXTIL - for the development of textile and clothing sector

During Seminar the possibilities of cooperation in the framework of the center POLINTEGRA for the commercialization of research, as well as the conditions for the participation of industrial companies in the Sectoral Programs and Horizon 2020 were discussed.

*This article was proposed by IBWCh Institute of Biopolymers and Chemical fibres, Poland*



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## EPNOE News

### EBiocatalysed esterification of starch with fatty acids-new opportunities and challenges

Janusz Kapusniak, Sylwia Ptak, Arkadiusz Zarski, Magdalena Roczkowska

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Worldwide industry strives to reduce the pollutants associated to raw materials processing and new materials production. More and more attention is paid to the use of clean, environmentally friendly technologies. There is a search for cheap, natural and biodegradable materials. One of them is starch. Food, pulp and paper, cosmetics and packaging industries mainly need modified starch with improved processing properties compared to native starch. One of the most commonly used modification of this biopolymer is esterification using acid anhydrides and fatty acids. Toxic solvents like DMSO, DMF used for decades in starch processing, were not a part of the assumptions of green chemistry and sustainable development. Elimination or reduction in the use of harmful solvents from the process of starch modification became possible due to an application of solvent free synthesis in microwave field, enzymes, as well as the new type solvents-ionic liquids.

Biocatalysed esterification of potato starch with oleic acid in microwave field was carried out by Biocatalysis Research Group. Immobilised fungal lipases from *Candida antarctica* and *Thermomyces lanuginosus* were used as catalysts. The esterification reaction was proven to be successful in product obtained by heating equimolar blend of oleic acid with potato starch, in the presence of lipase B from *Candida antarctica*, in a microwave oven at 105 W for 2 min. with 10 s. intervals. The reaction was confirmed by FTIR, <sup>1</sup>H NMR, XRD and SEM [1].

The same group carried out research on optimisation conditions for preparation new functional materials based on starch, by biocatalysed esterification with unsaturated fatty acid in ionic liquid. Thus potato starch was esterified with oleic acid in the presence of immobilised fungal lipase from *Thermomyces lanuginosus* as a catalyst and 1-butyl-3-methylimidazolium chloride as a reaction medium. The product with the highest degree of substitution was obtained for the reaction carried out at 60°C for 4 h [2].

The advantages of enzymatic esterification – controlled and efficient synthesis; starch esters advantages – hydrophobicity, thermoplasticity, improved mechanical and processing properties, and finally, the advantages of ionic liquids –able to design, green solvents, these are the arguments that prompt to the intensification of the research on processes combining all these elements.

[1] Ptak, S., Zarski, A., Antczak, T., Kapusniak, J. (2016). Esterification of potato starch with oleic acid in the presence of lipase from *Candida antarctica* in a microwave field and under conventional heating. *Polimery*, 3.

[2] Zarski, A., Ptak, S., Siemion, P., Kapusniak, J. (2016). Esterification of potato starch by a biocatalysed reaction in an ionic liquid. *Carbohydrate Polymers*, 137, 657-663.

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





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## EPNOE News

### Microwave heating as an alternative for conventional heating for starch modification?

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Institute of Chemistry, Environmental Protection and Biotechnology, Faculty of Mathematics  
and Natural Sciences, Jan Dlugosz University in Czestochowa  
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Nowadays, the European starch industry produces more than six hundred products, from native starches to physically or chemically modified starches. Modified starches are used widely in the food, paper, textile, oil, adhesives, fermentation and pharmaceutical industries. Since, consumption of starch and starch derivatives only in EU reached ca. 9 million tons in 2014, the development and improvement of modification process of this polysaccharide meets a great attention among scientists from all over the world. Among chemical modifications, microwave radiation is currently used among others in the reactions of starch modification.

From the other side, extensive research of starch behavior treated with microwave radiation should be constantly undertaken to follow changes in chemical structure of this polysaccharide. It is dictated by fact that, recently, microwave radiation is commonly used in various processing methods such as toasting, heating, thawing, and sterilization in industrial applications as well as at home. Microwave heating has number of advantages compared with conventional heating like shorter reaction time, saving energy, limitation of heavy metal catalysts, oxidants, better targeting of energy toward modified mixture etc. Moreover, microwave activation often leads to improved yield and selectivity of the reaction.

With this respect, works on the use of microwave radiation in order to improve the oxidation of starch are ongoing. It affects the mechanism of gelation and rheological properties of starch and also causes a change in the structure of grains and crystalline form of the molecule. In general, microwave effect on the starch leads to an increase of gelation temperature and decrease of the process enthalpy, which occurs under the influence of structural changes of the starch macromolecules, reduced its viscosity and increase solubility.

New approaches related to the use of microwave oven toward starch modification to improve its processability and usefulness for food and packaging industry are currently being proceeded in laboratories of Institute of Chemistry, Environmental Protection and Biotechnology of Jan Dlugosz University in Czestochowa, Poland.

- [1] Brasoveanu, M., Nemtanu, M. R. (2014). Behaviour of starch exposed to microwave radiation treatment. *Starch- Stärke*, 66, 3–14.  
[2] Lewicka, K., Siemion, P., Kurcok, P. (2015). Chemical modifications of starch: microwave effect. *International Journal of Polymer Science*, Article ID 867697.

*This article was proposed by Piotr Rychter, Jan Dlugosz University in Czestochowa, Poland*



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## EPNOE News

### Microstructure in multiphase systems: Contribution of a counter-rotating shear cell

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Polymer materials are designed to have different properties which imply multicomponent systems and complex microstructures. It is of prime importance to understand the exact role of each component on microstructure and resulting properties. The transparent counter-rotating shear cell was designed to study how a phase suspended in a fluid phase can be dispersed under shear. In-situ observations are performed by optical microscopy. The originality of this geometry is to set the velocity of a suspended object to zero by adjusting the relative velocities of the two rotating plates (see schema). The shear cell is temperature controlled.

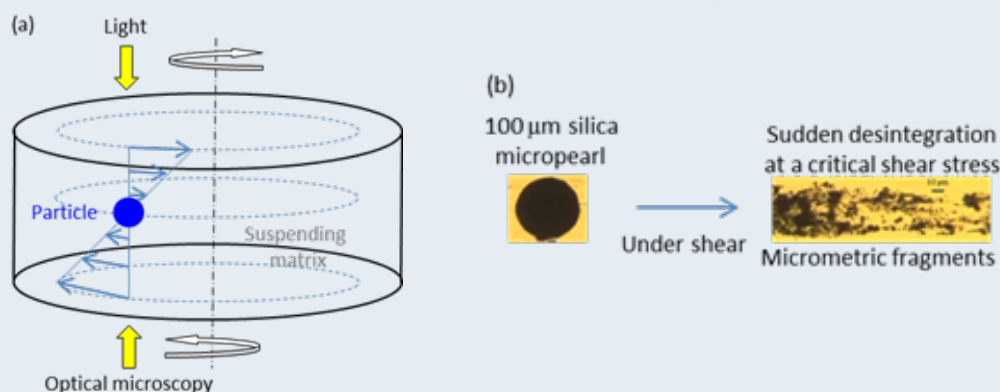


Figure :

- (a) Principle of the counter-rotating shear geometry,
- (b) Example of dispersion mechanism for a silica micropearl immersed in a rubber matrix under shear

This specific geometry is well adapted to investigate:

- motion of individual particles in suspension playing with the nature of the suspending fluid, confinement and concentration,
- dispersion mechanisms in immiscible polymer blends: deformation, rupture and relaxation of droplets with modified interfaces, measurement of interfacial tension which is a key parameter,
- controlled release from soft gel particles under shear,
- dispersion mechanisms of agglomerated fillers: characterization of the dispersability, relationship between the agglomerate microstructure and the criterium for dispersion, role of the interactions between the filler and the polymer matrix,
- behaviour of natural fibers in a polymer matrix, mechanisms of fiber breakage.

In all these systems, the role of the interface needs to be better understood.

The rheo-optical approach brings new insights on elementary mechanisms. This information is complementary to processing studies where microstructure is investigated versus processing parameters. The two approaches are necessary for a better understanding of the microstructure in multiphase industrial systems.

*This article was proposed by Edith Peuvrel-Disdier, MINES ParisTech - CEMEF, France.*





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## EPNOE News

### Crystallization of polymers, a key domain of Polymer Science

S  verine A.E. Boyer, Jean-Marc Haudin

MINES ParisTech, PSL – Research University, CEMEF,  
CNRS UMR 7635, Sophia Antipolis, France

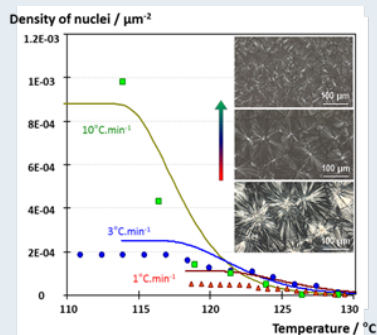
\*[Severine.Boyer@mines-paristech.fr](mailto:Severine.Boyer@mines-paristech.fr), [Jean-Marc.Haudin@minesparistech.fr](mailto:Jean-Marc.Haudin@minesparistech.fr)  
– <http://www.cemef.mines-paristech.fr/>

Polymer crystallization is an important domain which has developed for a long time its concepts, theories and experimental methods, extensively applied to synthetic and natural polymers with historical studies concerning for example the crystallinity of cellulose or the strain-induced crystallization of natural rubber. The purpose of this short paper is to give an overview of selected works performed at CEMEF on the understanding and modelling of polymer crystallization and on the development of new experimental tools [1].

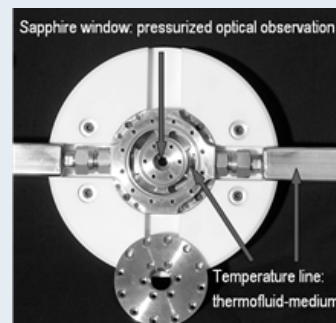
We developed a system of physically-based morphological laws, for quiescent and shear constraints, describing the two steps in polymer crystallization, i) the appearance (nucleation) and ii) the development (growth) of semi-crystalline entities (e.g., spherulites). It takes into account the overall kinetics of structure formation. Because the crystallization, especially the nucleation stage, is by nature a statistical phenomenon with large discrepancies between the sets of experimental data, the analytical extraction of the relevant crystallization parameters is optimized by a Genetic Algorithm Inverse Method. All these processes are governed by a set of differential equations, differential equations seeming most suitable for numerical simulation (**Figure 1**).

We also developed new experimental tools. For instance, one is dedicated for high-cooling rate induced crystallization with the CRISTAPSEED cell working in the range from 30 to 2000 °C/min. One is dedicated for high-pressure induced crystallization with the originally designed CRISTAPRESS cell working in the range from 30 to 300 °C and pressure up to 200 MPa (**Figure 2**).

This expertise, which has been mainly directed so far towards synthetic polymers is fully applicable to molten polysaccharides and can be very useful for polysaccharides crystallized from solution, in order to understand and model nucleation and growth processes and predict structure development.



**Figure 1.** Crystallization of isotactic PolyPropylene (iPP, synthetic polymer), quiescent and nonisothermal (full-lines, physically-based morphological laws)



**Figure 2.** CRISTAPRESS cell to bring new insights on the role playing by the pressure (liquid, gas) on structure development.

[1] Boyer, S.A.E.; Grolier, J.-P.E.; Yoshida, H.; Haudin, J.-M.; Chenot, J.-L. (2011). Chapter 23. "Thermodynamics - Interactions Studies - Solids, Liquids and Gases", Juan Carlos Moreno-Pirajan (Ed.), Intech, 641-672

This article was proposed by S  verine A.E. Boyer and Jean-Marc Haudin, Armines-CEMEF, France.





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## EPNOE Member's Scientific Publications

### Armines-Cemef, France:

- T. BUDTOVA et P. NAVARD "Cellulose solutions in NaOH-water based solvents: a review", *Cellulose*, 23(1), 5-55 (2016)

### University of Natural Resources and Life Sciences Vienna (BOKU), Austria:

- Zweckmair, T., Oberlerchner, J., Böhmendorfer, S., Bacher, M., Sauerland, V., Rosenau, T., Potthast, A., Preparation and analytical characterization of pure fractions of cellooligosaccharides. *J CHROMATOGR A* 1431 (2016) 47-54.

- Lackinger, E., Hettegger, H., Schwaiger, L., Zweckmair, T., Sartori, J., Potthast, A., Rosenau, T., Novel paper sizing agents based on renewables. Part 8: on the binding behavior of reactive sizing agents-the question of covalent versus adsorptive binding. *CELLULOSE* 23/1 (2016) 823-836.

- Schedl, A., Korntner, P., Zweckmair, T., Henniges, U., Rosenau, T., Potthast, A., Detection of cellulose-derived chromophores by ambient ionization-MS. *ANAL CHEM* 88/2 (2016) 1253-1258.

- Pircher, N., Carbajal, L., Schimper, C., Rennhofer, H., Nedelec, J.-M., Lichtenegger, H., Rosenau, T., Liebner, F., Impact of selected solvent systems on the pore and solid structure of cellulose aerogels. *CELLULOSE* 2016, in print.

### INP Toulouse/Ensiacet, France:

- Castro, N., Durrieu, V., Raynaud, C. Rouilly, A., Rigal, L., Quellet, C. "Melt Extrusion encapsulation of flavors: a review, *Polymer Reviews*" (2016) online version: january 2016, DOI:10.1080/15583724.2015.1091776

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## News from outside the EPNOE Network

### **International Seminar on AEROGELS - Synthesis-Properties-Applications in Sophia-Antipolis, France. 22-23 September 2016**

The International Seminar on AEROGELS - Synthesis-Properties-Applications will be organised by MINES ParisTech (Sophia-Antipolis, France) on 22-23 of September 2016.

Sessions will deal with aerogels from polysaccharides and natural products.

For more details please see <http://www.cemef.mines-paristech.fr/sections/actualites/3eme-seminaire>.

Please submit your abstracts to [Francoise.Brionne@univ-lorraine.fr](mailto:Francoise.Brionne@univ-lorraine.fr), the dead-line being June 1st.

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### **Post-doctoral position open in France: Preparation and characterization of lignocellulosic nanoparticles for Pickering emulsions**

A post-doctoral position for 24 months is open in Nantes to prepare and characterize emulsions stabilized by lignocellulosic nanoparticles. This is a part of a larger program aiming at preparing alternative sustainable particles to be included in various formulations for industrial application. It will be located at INRA (the French National Institute for Agricultural Research) in Nantes in the Biopolymers, Interactions Assemblies unit (about 170 people involved in research on biopolymers).

Applicants should send (see email address below) a CV and description of research interests, and provide letters of recommendation if possible. A good experimental background is required. Knowledge of at least one of the following topics is particularly welcome: Cellulose/lignocellulose, Physico-chemistry of biopolymers, nanotechnology.

Isabelle Capron

Unité de Recherche sur les Biopolymères, Interactions et Assemblages  
Rue de la Géraudière – B.P. 71627 – 44316 NANTES Cedex 3 - France  
Contact : [isabelle.capron@nantes.inra.fr](mailto:isabelle.capron@nantes.inra.fr) - Tel : +332 40 67 50 95

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### **5th Biobased Performance Materials symposium will take place in Wageningen, The Netherlands on Thursday, 16 June 2016.**

The 2016 edition of the BPM symposium will focus on biobased materials R&D in times of Paris climate goals and volatile oil prices. R&D strategies will be presented via an attractive array of interactive presentations by key industry players and research organisations.

For more information, contact

BPM Project Office

Email: [bpm.projectoffice@wur.nl](mailto:bpm.projectoffice@wur.nl)

<http://www.biobasedperformancematerials.nl/uk>





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## News from outside the EPNOE Network (continued)

### **TAPPI 2016 International Conference on Nanotechnology for Renewable Materials**

13-16 June 2016. Grenoble, France

Learn more about the NANO 2016 Technical Program and  
Networking Events at [www.tappi.org/16nano](http://www.tappi.org/16nano)

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### **European Biomass Conference and Exhibition 24th EUBCE 2016 Conference, Amsterdam (the Netherlands). 6-9 June 2016**

Selection among 1070 abstracts by more than 3000 authors and co-authors from 75 nations applying for presentation. The Conference Programme is structured along the following main topics: Biomass Resources; Biomass Conversion Technologies For Heating, Cooling And Electricity; Biomass Conversion Technologies For Liquid And Gaseous Fuels, Chemicals And Materials; Biomass Policies, Markets And Sustainability; Bioenergy In Integrated Energy Systems.

Register before 18 March 2016 and take advantage of Early Bird Discounts  
More information on [www.eubce.com](http://www.eubce.com).

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### **The 20th Annual Green Chemistry & Engineering Conference "Advancing Sustainable Solutions by Design" June 14-16, 2016 in Portland, Oregon**

Register Now for the best prices to the 20th Annual Green Chemistry & Engineering Conference (GC&E).

Held by the ACS Green Chemistry Institute®, this event is the premier conference on green chemistry and engineering. Hundreds of participants from industry, government, and academia come together every year to share research as well as education and business strategies to ensure a green and sustainable future.

If you have any questions, please don't hesitate to contact us at [gceconferences@acs.org](mailto:gceconferences@acs.org) or visit us at [www.gcande.com](http://www.gcande.com).

Booth space in the Green Expo and conference sponsorships are still available for your organization.

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### **Exploring Lignocellulosic Biomass! ! 23 & 24 June 2016 - Reims, France**

FARE (Fractionation of AgroResources and Environment) is a joint lab between the French National Research Institute for Agricultural Research (INRA) and the Reims Champagne-Ardenne University (URCA).

FARE will celebrate its 15th anniversary in 2016, so we organize the next 23-24 June a scientific seminar for presenting the state-of-the-art in the field of lignocellulosic biomass transformation, at different scales. Some renowned international experts will present their work and foresight, some fruitful exchanges between participants will take place during poster sessions and during the gala diner in a Champagne House.

We thus invite you to join us in the superb city of Reims, which hosts three exceptional UNESCO World Heritage sites.

<https://colloque.inra.fr/explorebiomass>



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## News from outside the EPNOE Network (continued)

### 2015 Preliminary Statistics Report from CEPI

The 2015 Preliminary Statistics Report is now available on the CEPI website, and can be downloaded clicking on the following link: <http://www.cepi.org/node/20088>

Paper and board production by CEPI member countries fell slightly, by around 0.3% in 2015 according to preliminary figures, after -0.2% in 2014. Total production in 2015 was around 91 million tonnes. Mill and machine closures in Europe in 2015 amounted to 2.4 million tonnes whilst new capacities or upgrading of existing ones reached 1.3 million tonnes only.

It is estimated that the production of pulp (integrated + market) has decreased by around 0.5% when compared to the previous year, with total output of approximately 36 million tonnes.

It is estimated that output of market pulp decreased by around 2.6%. It is estimated that utilisation of paper for recycling by CEPI members decreased by around 0.4% when compared to 2014 at 44 million tonnes. As in recent years, the fall of the graphic paper sector demand, was partly offset by the more positive development in the packaging paper and board sector. It appears that the overall consumption of paper and board in CEPI countries in 2015 was relatively stable when compared to 2014, based on the latest data available.

For your information, more information on CEPI Statistics are available at the following page of the CEPI website: [www.cepi.org/topics/statistics](http://www.cepi.org/topics/statistics)

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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](http://www.ics-2016.org)

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### 7th Workshop on Cellulose, Regenerated Cellulose and Cellulose Derivatives, Örnsköldsvik, Sweden. November 15-16, 2016

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.

Abstracts of one A4 page are welcome to [ola.sundman@chem.umu.se](mailto:ola.sundman@chem.umu.se) latest May 30, 2016.

For more information visit the homepage [www.cellworkshop.se](http://www.cellworkshop.se) or contact Professor Ulf Germgård at [ulf.germgard@kau.se](mailto:ulf.germgard@kau.se) at Karlstad University, Sweden. Tel +46(0)547001780 or +46(0)703219584

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### Cellulose Symposium 2016, Frankfurt/Main (Germany) June 29, 2016

The Cellulose Symposium 2016 will be held on June 29, 2016 in the frame of the annual meeting of the Zellcheming Association in Frankfurt/Main.

More information at: <http://www.zellcheming.de/en/general-annual-meeting-and-congress.html>.





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## News from outside the EPNOE Network (continued)

**12th International Conference on Polysaccharides-Glycoscience, 19th-21th October  
2016 Prague, Czech Republic**

more information: <http://www.polysaccharides.csch.cz>

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**International Conference on Advanced Polymers, Biomaterials, Bioengineering and Nano-  
drug delivery, APA 2016, September 5-7, 2016, Mauritius**

More information: <http://www.apa2016.com/>

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**13th International Conference of the European Industrial Hemp Association (EIHA), Wesse-  
ling (near Köln), Germany. 1 - 2 June 2016**

The industrial hemp business is growing every year. The strong fibres are used for insulation materials and biocomposites, mainly in automotive interiors. Hemp food products are increasing in market volume and with the extraction of Cannabidiol (CBD) for pharmaceutical applications, farmers can maximise profits. The conference will focus on the latest developments concerning industrial hemp and other natural fibres as well as hemp seeds, oil, proteins and pharmaceuticals.

To know more : <http://www.eiha-conference.org/registration>