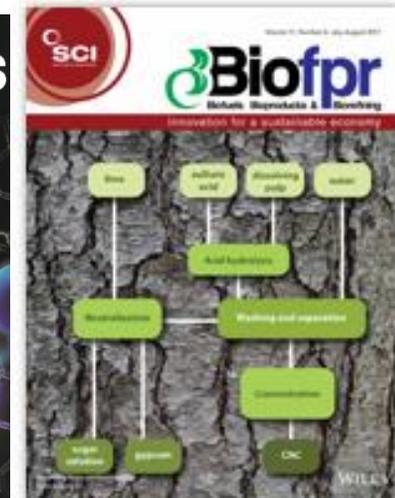
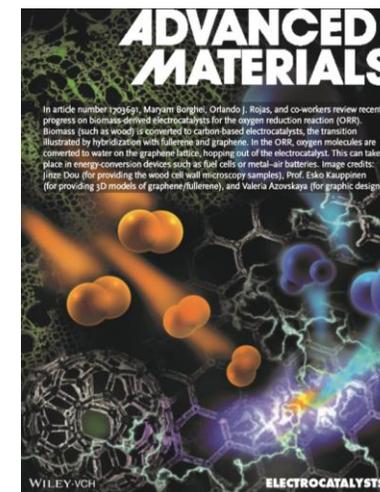
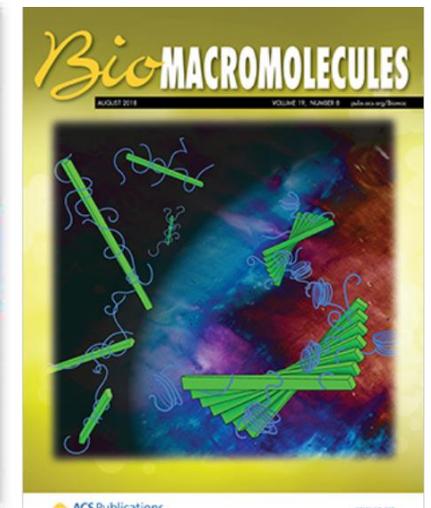


Research Strategy

Our core activities involve biobased materials at different size scales, mainly those displaying large interfacial areas such as fibers (micro/nano fibers), fiber networks, particles, colloids and multiphase systems.

Focus areas

- Nano/microfibrillar ligno-cellulose, nanocrystals & bacterial cellulose. Nanochitin and dairy colloids
- Multiphase systems: dispersions, foams, gels, membranes and aerogels.
- Stimuli-responsive materials.
- Proteins, enzymes and (bio)sensing.



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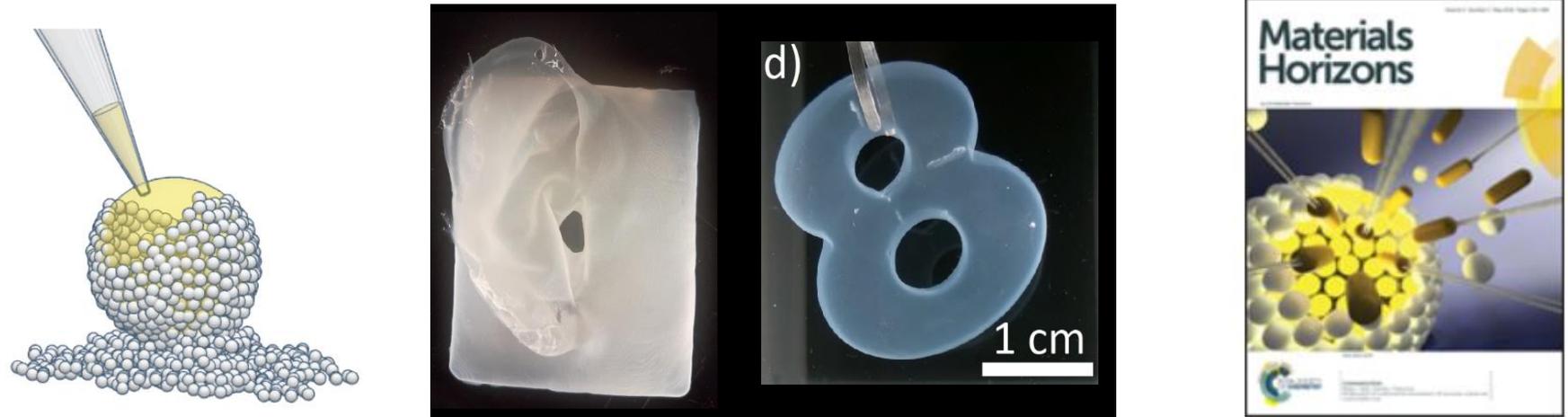
Book and book chapters (4)

Conferences and Invited seminars (> 48)

Editorial activities

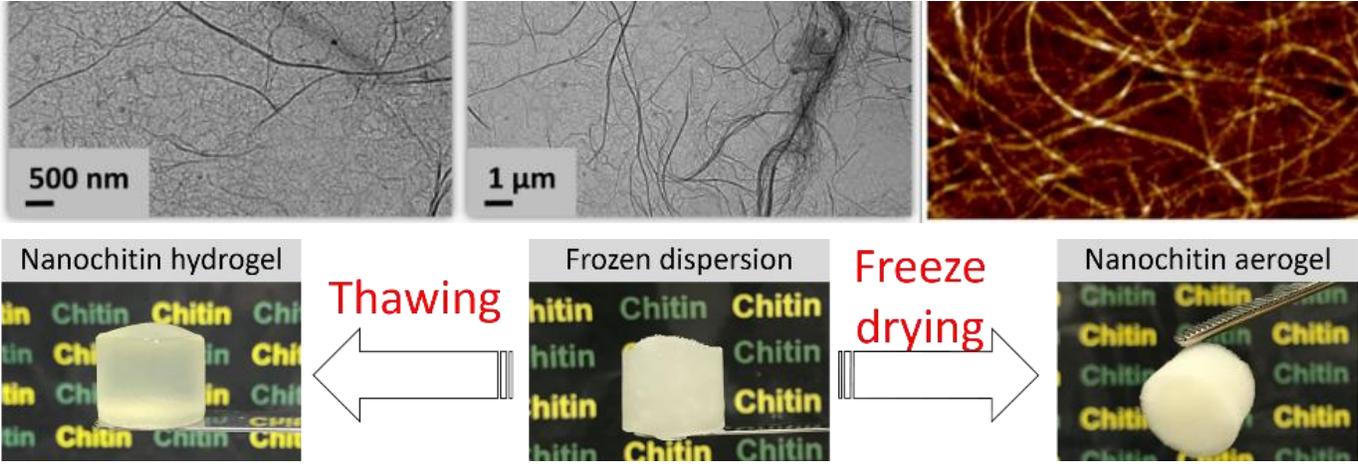
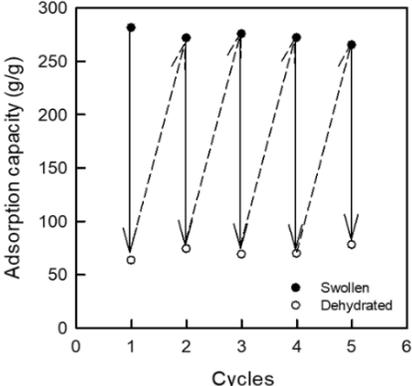
2018 highlight 1

Biobased Colloids and Materials (BiCMat) group

Topic	Biofabrication of multifunctional nanocelulosic 3D structures
What?	Novel approach to integrate biofilms in the development of advanced materials
How?	<p>Cellulose-producing microorganisms form membranes inside designed shapes that follow the “liquid marble” framework</p>  <p>Greca, Lehtonen, Tardy, Guo, Rojas, <i>Materials Horizons</i> (2018), DOI: 10.1039/C7MH01139C</p>
Possible application	Tissue engineering, biomedical; organ (bio)printing; capsule-in-capsule solutions; multi-compartmentalization; food

2018 highlight 2

Biobased Colloids and Materials (BiCMat) group

Topic	High axial ratio nanochitins for ultra-strong and shape-recoverable hydrogels and cryogels																		
What?	Nanochitin is produced at low energy and high yield (~90%) to produce ultra-elastic hydrogels and cryogels																		
How?	<p>Following hydrolysis for partial deacetylation of chitin, nanofibrils ultra-high axial size (500) are produced. Ice templating upon freezing and thawing is performed with simultaneous crosslinking.</p>  <p>The figure shows the conversion of a nanochitin hydrogel to an aerogel. It includes three micrographs at the top: two grayscale images of nanochitin fibrils with scale bars of 500 nm and 1 μm, and one fluorescence image showing a dense network of fibrils. Below these is a process diagram: a yellow hydrogel is shown on the left, labeled 'Nanochitin hydrogel'. A double-headed arrow labeled 'Thawing' points to a white, porous 'Frozen dispersion' in the middle. A single-headed arrow labeled 'Freeze drying' points to a white, porous 'Nanochitin aerogel' on the right. The background of the hydrogel and aerogel images features a repeating pattern of the word 'Chitin'.</p>  <p>The graph plots Adsorption capacity (g/g) on the y-axis (0 to 300) against Cycles on the x-axis (0 to 6). The data shows a consistent cycle of swelling and dehydration. Swollen states (filled circles) maintain a high adsorption capacity of approximately 270 g/g, while dehydrated states (open circles) drop to about 70 g/g. The cycles are numbered 1 through 5.</p> <table border="1"><thead><tr><th>Cycles</th><th>Swollen (g/g)</th><th>Dehydrated (g/g)</th></tr></thead><tbody><tr><td>1</td><td>~270</td><td>~70</td></tr><tr><td>2</td><td>~270</td><td>~70</td></tr><tr><td>3</td><td>~270</td><td>~70</td></tr><tr><td>4</td><td>~270</td><td>~70</td></tr><tr><td>5</td><td>~270</td><td>~70</td></tr></tbody></table> <p>Liu, Bai, Tripathi, Yu, Wang, Borghei, Fan, Rojas, ACS Nano, (2019)</p>	Cycles	Swollen (g/g)	Dehydrated (g/g)	1	~270	~70	2	~270	~70	3	~270	~70	4	~270	~70	5	~270	~70
Cycles	Swollen (g/g)	Dehydrated (g/g)																	
1	~270	~70																	
2	~270	~70																	
3	~270	~70																	
4	~270	~70																	
5	~270	~70																	
Possible application	Antibacterial and antifungal systems for thermal insulation and air filtration. Drug delivery.																		

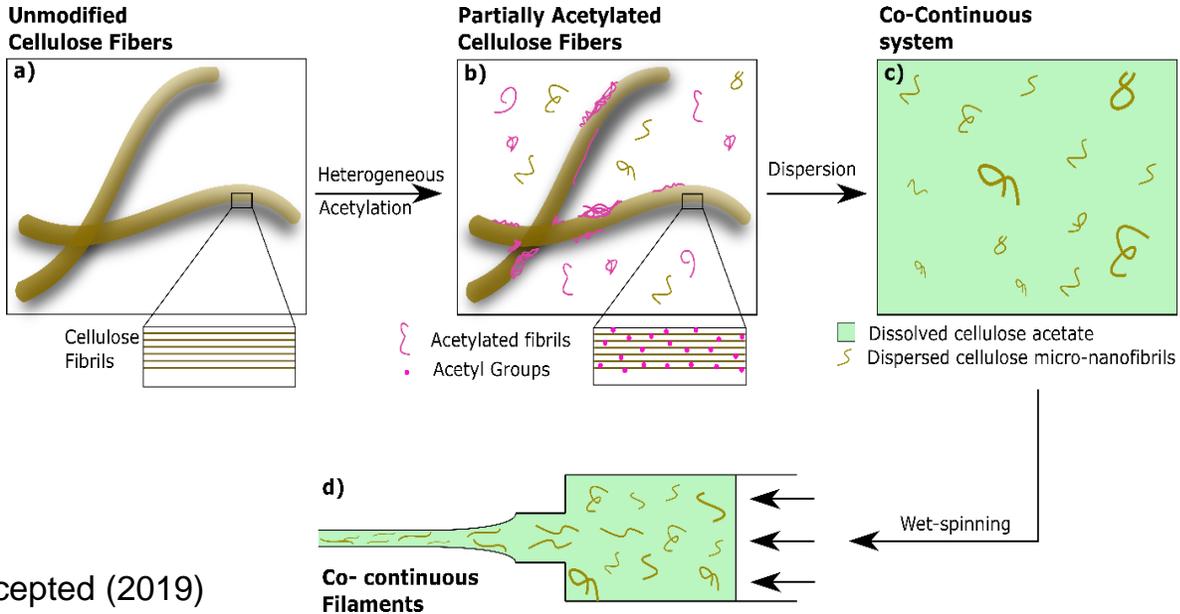
2018 highlight 3

Biobased Colloids and Materials (BiCMat) group

Topic	CNC for structural color and coffee rings effects via drying flux inhomogeneities
What?	Cross-disciplinary work with ART and CHEM to exploit coffee ring effects from cellulose nanocrystals and produce visual designs
How?	<p>Klockars, Yau, Tardy, Majoinen, Kämäräinen, Miettunen, Boutonnet, Borghei, Beidler, Rojas, Cellulose, (2019). DOI: 10.1007/s10570-018-</p>
Possible application	Non-fading coatings in textiles; future design of materials for photonics application using reflection from nano-scaled architectures.

2018 highlight 4

Biobased Colloids and Materials (BiCMat) group

Topic	Micro- and nanocelluloses for the synthesis of highly-stretchable, tough and water-resistant co-continuous filaments
What?	Heterogeneous acetylation of wood fibers weakens interfibrillar hydrogen bonding, which facilitates microfluidization and formation of continuous filaments
How?	<p>Suspension forms a co-continuous assembly with a matrix that interacts strongly with the micro- and nanofibrils in the dispersed phase. This facilitates uninterrupted and defect-free wet-spinning.</p> <p>Tripathi, Ago, Khan, Rojas, ACS Applied Materials and Interfaces, Accepted (2019)</p>  <p>Unmodified Cellulose Fibers a)</p> <p>Partially Acetylated Cellulose Fibers b)</p> <p>Co-Continuous system c)</p> <p>Co-continuous Filaments d)</p> <p>Heterogeneous Acetylation</p> <p>Dispersion</p> <p>Wet-spinning</p> <p>Cellulose Fibrils</p> <p>Acetylated fibrils</p> <p>Acetyl Groups</p> <p>Dissolved cellulose acetate</p> <p>Dispersed cellulose micro-nanofibrils</p>
Possible application	Advanced filaments that are water resistant, with remarkable stretchability (30 %) and ultra-high toughness.

2018 highlight 5

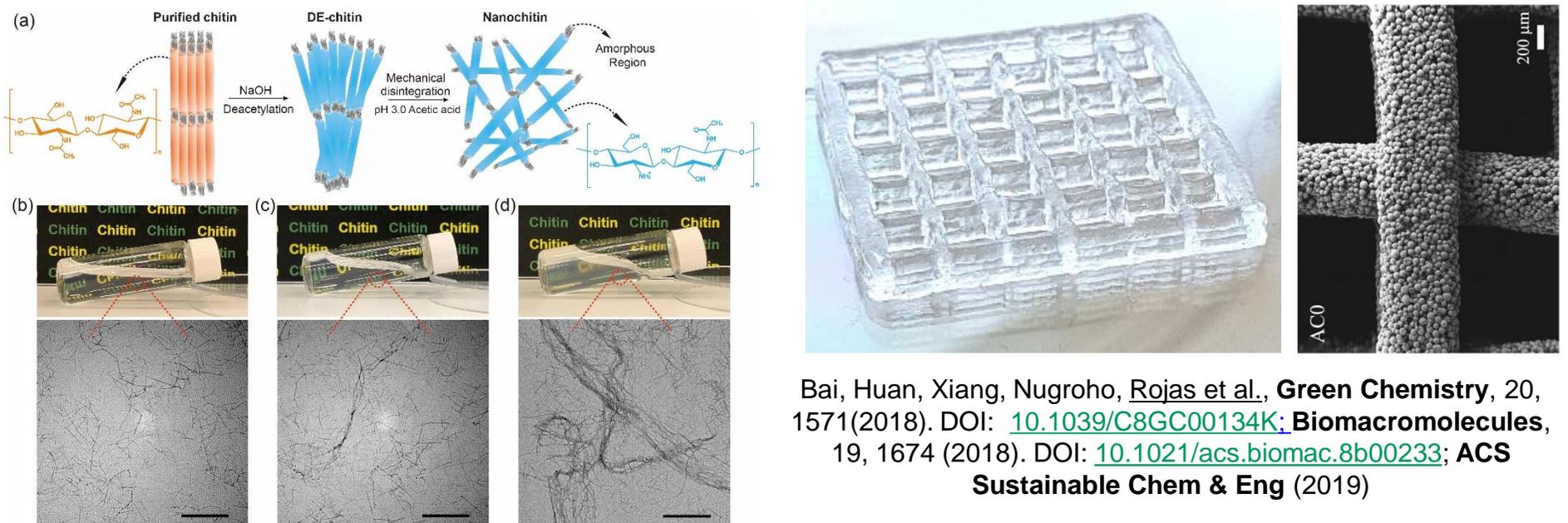
Biobased Colloids and Materials (BiCMat) group



Topic Short and long nanochitin for oil/water interfacial super-stabilization and 3D printing

What? Nanochitins of various aspect ratio are produced and used to achieve super-stable emulsions

How?



Bai, Huan, Xiang, Nugroho, Rojas et al., **Green Chemistry**, 20, 1571(2018). DOI: [10.1039/C8GC00134K](https://doi.org/10.1039/C8GC00134K); **Biomacromolecules**, 19, 1674 (2018). DOI: [10.1021/acs.biomac.8b00233](https://doi.org/10.1021/acs.biomac.8b00233); **ACS Sustainable Chem & Eng** (2019)

Possible application Structural food; 3D printing and advanced materials

BiCMat senior members and postdocs joined in 2018

1. Johanna Majoinen, Surface functionalization, Polymer self-assembly
2. Jukka Hassinen, Nanoparticle clusters (current, manager CERES Flagship)
3. Rafael Grande, Interpolyelectrolyte complexes
4. Bruno Mattos, supracolloids, controlled release
5. Robertus Nugroho, Biocolloidal powders

BiCMat PhD students joined in 2018

1. Bin Zhao – Ph.D., Bioproducts and Biosystems, Chem. Eng, Aalto University
2. Eva Pasquier – Ph.D., Bioproducts and Biosystems, Chem. Eng, Aalto University (with Grenoble INP – Pagora, France, Prof. Julien Bras, co-supervisor):
3. Ya Zhu – Ph.D., Bioproducts and Biosystems, Chem. Eng, Aalto University (with College of Material Science and Engineering, Northeast Forestry University, China)
4. Xiao Zhang – Ph.D., Bioproducts and Biosystems, Chem. Eng, Aalto University
5. Saara Lähtevänoja – Ph.D., Bioproducts and Biosystems, Chem. Eng, Aalto University
6. Katariina Solin – Ph.D., Bioproducts and Biosystems, Chem. Eng, Aalto University
7. Konrad Klockars – Ph.D., Bioproducts and Biosystems, Chem. Eng, Aalto University

BiCMat MS & Licentiate students joined in 2018

1. Mikko Laine (current)– M.S., Bioproducts and Biosystems, Chem. Eng, Aalto University:
2. Olli Lehtinen (current)– Licentiate., Bioproducts and Biosystems, Chem. Eng, Aalto University

Summer and temporal researchers

Stefan Winklehner, Mahdi Rafee, Amal Ishfaq, Michael ...

BiCMat members graduated (PhD)

1. Meri Lundahl (Aalto University)– Ph.D., Chem. Eng, Aalto University: Wet-spinning of cellulose nanofibrils hydrogels, 2018.
2. Ahsan Uddin (Tampere University, Finland)– Ph.D., Chem. Eng, Aalto University: Nanocellulose for control synthesis of nanoparticles and antimicrobial applications, 2018.
3. Sanna Virtanen – Ph.D., Bioproducts and Biosystems, Chem. Eng, Aalto University From wood to industrial polymeric biomaterials, August 2018.
4. Anurodh Tripathi (NCSU, USA) – Ph.D., Chemical and Biomolecular Engineering, NCSU: Porous and light-weight cellulose diacetate structures for environmental remediation, July 2018 (co-advisor: Prof. Saad Khan)
5. Joe Lavoie (Glen Raven, USA) – Ph.D., Chemical and Biomolecular Engineering, NCSU: Approaches for Surface Energy Control of Nonwoven Fibers for Alcohol Repellency and Electret Charge Protection, February 2018 (co-advisor: Prof. Saad Khan).
6. Prajesh Adhikari (Intel, USA) – Ph.D., Chemical and Biomolecular Engineering, NCSU: Developing New Multicomponent Systems: From Coatings, Gels to Nanofiller Composites, January 2018 (co-advisor: Prof. Saad Khan).



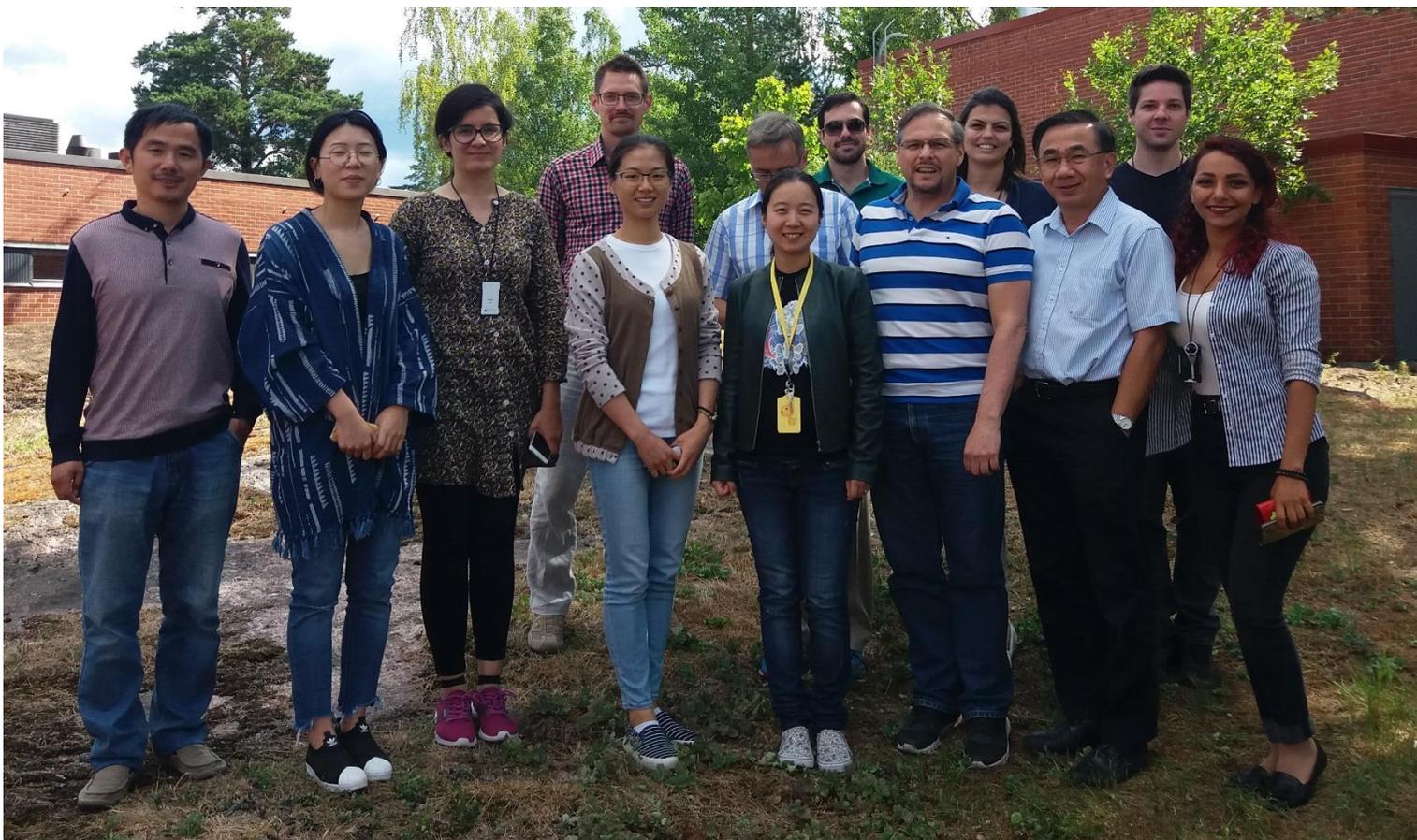
BiCMat members graduated (M.S.)

1. Amal Ishfaq– M.S., Bioproducts and Biosystems, Chem. Eng, Aalto University: Comparison of the surface activity of hemicelluloses extracted from spruce and birch sawdusts, November 2018.
2. Sonja Päärnilä – M.S., Bioproducts and Biosystems, Chem. Eng, Aalto University: Lignin films - production and characterization, June 2018.
3. Katariina Solin – M.S., Bioproducts and Biosystems, Chem. Eng, Aalto University: Bioactive Nanocellulose Films with Spatial Definition, May, 2018.
4. Klockars Konrad – M.S., Bioproducts and Biosystems, Chem. Eng, Aalto University: Evaporation-induced self-assembly of cellulose nanocrystals from aqueous suspensions into chiral nematic solid structures, April, 2018.
5. Riikka Virtanen– M.S., Bioproducts and Biosystems, Chem. Eng, Aalto University: Towards bioengineered alginates – comparison of bacterial and algal alginates regarding gelling properties and spinnability, April 2018.



Visiting Scholars Hosted by the Group in 2016

16. Antonio Maria Borrero Lopez. Ph.D. student, Química Física y Ciencia de los Materiales, Universidad de Huelva, Spain, 3 months
17. Carmen Hervés. Ph.D. student, ute for Advanced Chemistry of Catalonia, Spanish National Research Council, Spain, 3 months
18. Prof. Guihua Yang, Qilu University, China, Nanocomposites, 3 months.
19. Prof. Haiming Li, Dalian Polytechnic University, Nanocellulose in 3D printing, 1 year
20. Dr. Marco Beaumont, University of Natural Resources and Life Sciences (BOKU), Vienna, Austria, Cellulose Nanoparticles, 2 months
21. Jorge Luengo, CMPC, Chile



Awards and personnel highlights 2018

- Distinguished Professor, [College Chem. Engineering](#), Nanjing Forestry University, China.
- Anselme Payen Award, highest honor in the area of Cellulose and Renewable Materials
- Act of the Year 2018, Aalto University
- EU Commission ERC Advanced grant, the most competitive project award in the EU for established scientists
- Academy of Finland FinnCERES Bioeconomy Flagship (2018-)

<p>CERES Flagship – Competence Center for the materials Bioeconomy: A Flagship for our Sustainable Future (Aalto University, VTT Technical Research Centre of Finland Ltd)</p> 	<p>Academy of Finland</p>	<p>9,332,800 (1st term) (total of 24 MEUR for 8 years until 2025)</p>	<p>01.05.2018 - 31.12.2022</p>
<p>BioELCell-Bioproducts Engineered from Lignocelluloses: from plants and upcycling to next generation materials, 788489</p>   <p>European Research Council Established by the European Commission</p>	<p>European Research Commission - ERC Advanced Grant</p>	<p>2,500,000</p>	<p>01.08.2018 - 31.07.2023</p>



Awards and personnel highlights 2018 (Cont'd)

1. Annamari Jukkola starts Mö Foods Oy
2. Luiz Greca: 2nd term CHEM Fellowship Aalto Doctoral Program in Chemical Technology, Aalto University (based on competitive projects)
3. Jiaqi Guo: Alexander von Humboldt fellowship
4. Blaise Tardy best oral presentation
5. Ling Wang travel award
6. Wenchao Xiang Travel award
7. Janika Lehtonen, fellowship to Australia



Committee membership



1. Serra Húnter Programme (SHP) fostered by the Government of Catalonia and the Catalan public universities for Appointment of Assistant Professor in UPC-Terrassa
2. Staff Scientist Position at the Department of Chemistry, Aalto University
3. Aalto University Materials Platform, chair
4. Tappi Research Committee Nanotechnology of Renewable Materials, co-chair

PhD Committees:

1. Umea, 2018
2. ETH, 2018
3. University of Helsinki, Petteri Parkkila, 2018 (1)
4. Universiti Putra Malaysia, Engku Arisyah Binti Tengku Yasim Anuar, 2018

Opponent duties 2018



1. Anna Ottenhall, “Antimicrobial materials from cellulose using environmentally friendly techniques”, KTH Royal Institute of Technology, School of Engineering Sciences in Chemistry, Department of Fibre and Polymer Technology, Stockholm, Sweden, December 7, 2018.
2. Yingxin Liu, “Nanocellulose-based materials: from colloidal assembly to functional films”, University of Stockholm, Sweden, June 7, 2018.
3. Emelie Norström “Hemicelluloses and other Polysaccharides for Wood Adhesive Applications”, KTH Royal Institute of Technology, School of Engineering Sciences in Chemistry, Biotechnology and Health, Department of Fibre and Polymer Technology, Stockholm, Sweden, June 11, 2018.
4. Patrick Laurén, “Biomedical applications of nanofibrillar cellulose”, Division of Pharmaceutical Biosciences, Faculty of Pharmacy, University of Helsinki, Finland, June 29, 2018.
5. Kajsa Markstedt, “3D Printing Wood Tissue”, Department of Chemistry and Chemical Engineering, Chalmers University of Technology, Sweden, June 1, 2018.

Evaluation of Promotion and Tenure

1. Lianbiong Hu to the rank of Full Professor, University of Maryland,.
2. Mehdi Tajvidi to the rank of Associate Professor in Maine University
3. Missing some .



Peer-reviewed journal publications 2018 (46)



1. Tripathi A., Ago M., Khan S., **Rojas O.J.**, Heterogeneous Acetylation of Plant Fibers into Micro- and Nanocelluloses for the Synthesis of Highly-stretchable, Tough and Water-Resistant Co-continuous Filaments via Wet-Spinning, **ACS Applied Materials and Interfaces**, Accepted (2019)
2. Liu L., Bai L., Tripathi A., Yu J., Wang Z., Borghei M., Fan Y., **Rojas O.J.**, High Axial Ratio Nanochitins for Ultra-Strong and Shape-Recoverable Hydrogels and Cryogels via Ice Templating, **ACS Nano**, Accepted (2019)
3. Klockars K.W., Yau N.E., Tardy B.S., Majoinen J., Kämäräinen T., Miettunen K., Boutonnet E., Borghei M., Beidler J., **Rojas O.J.**, Coffee rings from cellulose nanocrystals and visual designs from drying flux inhomogeneities, **Cellulose**, Accepted (2019). DOI: [10.1007/s10570-018-2167-7](https://doi.org/10.1007/s10570-018-2167-7)
4. Toivonen M. S., Onelli O., Jacucci G., Lovikka V., **Rojas O.J.**, Ikkala O., Vignolini, S., Anomalous Diffusion-Assisted Brightness in White Cellulose Nanofibril Membranes, **Advanced Materials**, 1704050 (2018). DOI: [10.1002/adma.201704050](https://doi.org/10.1002/adma.201704050)
5. Tripathi A., Parsons G.N., Khan S.A., **Rojas O.J.** Synthesis of organic aerogels with tailorable morphology and strength by controlled solvent swelling following Hansen solubility, **Scientific Reports**, 8, 2106 (2018). DOI: [10.1038/s41598-018-19720-4](https://doi.org/10.1038/s41598-018-19720-4)
6. Jukkola A., Partanen R., **Rojas O.J.**, Heino A., Effect of heat treatment and pH on the efficiency of micro-diafiltration for the separation of native fat globules from cream in butter production, **Journal of Membrane Science**, 548, 99-107 (2018). DOI: [10.1016/j.memsci.2017.11.012](https://doi.org/10.1016/j.memsci.2017.11.012)
7. Guo J., Filpponen I., Johansson L-S., Heißler S., Li L., Levkin P., **Rojas O.J.**, Micro-patterns on nanocellulose films and paper by photo-induced thiol-yne click coupling: a facile method toward wetting with spatial resolution, **Cellulose**, 25, 367–375 (2018). DOI: [10.1007/s10570-017-1593-2](https://doi.org/10.1007/s10570-017-1593-2)
8. de Assis C.A., Iglesias M.C., Bilodeau M., Johnson D., Phillips R., Peresin M.S., Bilek T., **Rojas O.J.**, Venditti, R., Gonzalez R. Cellulose Micro- and nanofibrils (CMNF) Manufacturing - Risk and Financial Assessment, **Biofuels, Bioproducts & Biorefining**, 12, 251–264 (2018). DOI: [10.1002/bbb.1835](https://doi.org/10.1002/bbb.1835)

Peer-reviewed journal publications 2018 (46), cont'd

9. Li S., Xie W., Wilt M., Willoughby J.A., **Rojas O.J.**, Thermally stable and tough coatings and films using vinyl silylated lignin, **ACS Sustainable Chemistry & Engineering**, 6, 1988–199 (2018). DOI: [10.1021/acssuschemeng.7b03387](https://doi.org/10.1021/acssuschemeng.7b03387)
10. Kontturi E., Laaksonen P., Linder M., Nonappa, Gröschel A.H., **Rojas O.J.**, Ikkala O.J., Novel materials through assembly of nanocelluloses, **Advanced Materials**, DOI: [10.1002/adma.201703779](https://doi.org/10.1002/adma.201703779)
11. Carrillo I., Mendonça R.T., Ago M., **Rojas O.J.**, Comparative study of cellulosic components isolated from different Eucalyptus species, **Cellulose**, 25, 1011–1029 (2018). DOI: [10.1007/s10570-018-1653-2](https://doi.org/10.1007/s10570-018-1653-2)
12. Orelma H., Virtanen T., Spoljaric S., Lehmonen J., Seppälä J., **Rojas O.J.**, Harlin A., Cyclodextrin-functionalized fiber yarns spun from deep eutectic cellulose solutions for non-specific hormone capture in aqueous matrices, **Biomacromolecules**, 19, 652–661 (2018). DOI: [10.1021/acs.biomac.7b01765](https://doi.org/10.1021/acs.biomac.7b01765)
13. de Matos M., Mattos B.D., Tardy L.B., **Rojas O.J.**, Magalhães W.L.E., Use of biogenic silica in porous alginate matrices for sustainable fertilization with tailored nutrient delivery, **ACS Sustainable Chemistry & Engineering**, 6, 2716–2723 (2018). DOI: [10.1021/acssuschemeng.7b04331](https://doi.org/10.1021/acssuschemeng.7b04331)
14. Eisa W.H., Abdelgawad A.M., **Rojas O.J.**, Solid-state synthesis of metal nanoparticles supported on cellulose nanocrystals and their catalytic activity, **ACS Sustainable Chemistry & Engineering**, 6, 3974–3983 (2018). DOI: [10.1021/acssuschemeng.7b04333](https://doi.org/10.1021/acssuschemeng.7b04333)
15. Tardy B.L., Richardson J.J., Guo J., Lehtonen J., Ago M., **Rojas O.J.**, Lignin Nano- and Microparticles as Template for Nanostructured Materials: Formation of Hollow Metal-Phenolic Capsules, **Green Chemistry**, 20, 1335-1344 (2018). DOI: [10.1039/C8GC00064F](https://doi.org/10.1039/C8GC00064F) (2018)
16. Toikkanen O., Outinen M., Malafronte L., **Rojas O.J.**, Formation and structure of insoluble particles in reconstituted model infant formula powders, **International Dairy Journal**, 82, 19-27 (2018). DOI: [10.1016/j.idairyj.2018.03.001](https://doi.org/10.1016/j.idairyj.2018.03.001)
17. Özkan M., Borghei M., Karakoç A., **Rojas O.J.**, Paltakari J., Films based on crosslinked TEMPO-oxidized cellulose and predictive analysis via machine learning, **Scientific Reports**, 8,4748 (2018). DOI: [10.1038/s41598-018-23114-x](https://doi.org/10.1038/s41598-018-23114-x)

Peer-reviewed journal publications 2018 (46), cont'd

18. Bai L., Huan S., Xiang W., **Rojas O.J.**, Pickering emulsions by combining cellulose nanofibrils and nanocrystals: Phase behavior and depletion stabilization, **Green Chemistry**, 20, 1571-1582 (2018). DOI: [10.1039/C8GC00134K](https://doi.org/10.1039/C8GC00134K)
19. Greca L.G., Lehtonen J., Tardy B.L., Guo J., **Rojas O.J.**, Biofabrication of multifunctional nanocellulosic 3D structures: a facile and customizable route, **Materials Horizons**, 5, 408-415 (2018). DOI: [10.1039/C7MH01139C](https://doi.org/10.1039/C7MH01139C)
20. Khakalo A., Filpponen I., **Rojas O.J.**, Protein-mediated interfacial adhesion in composites of cellulose nanofibrils and polylactide: Enhanced toughness towards material development, **Composites Science and Technology**, 160, 145-151 (2018). DOI: [10.1016/j.compscitech.2018.03.013](https://doi.org/10.1016/j.compscitech.2018.03.013)
21. Mattos B., Tardy B.L., Mohammadi P., Kämäräinen T., Linder M., Schreiner W., Magalhães W., **Rojas O.J.**, Controlled biocide release from hierarchically-structured biogenic silica: surface chemistry to tune release rate and responsiveness, **Scientific Reports**, 8:5555 (2018). DOI: [10.1038/s41598-018-23921-2SREP-17-54177](https://doi.org/10.1038/s41598-018-23921-2SREP-17-54177)
22. Borghei M., Miettunen K., Greca L.G., Poskela A., Lehtonen J., Lepikko S., Tardy B.L., Lund P., Subramanian V., J. **Rojas O.J.** Biobased aerogels of different surface charge as electrolyte retaining membranes in a quantum dot-sensitized solar cell, **Cellulose**, 25, 3363–3375 (2018). DOI: [10.1007/s10570-018-1807-2](https://doi.org/10.1007/s10570-018-1807-2)
23. Bai L., Xiang W., Huan S., **Rojas O.J.**, Formulation and stabilization of concentrated edible oil-in-water emulsions based on electrostatic complexes of a food-grade cationic surfactant (ethyl lauroyl arginate) and cellulose nanocrystals, **Biomacromolecules**, 19, 1674-1685 (2018). DOI: [10.1021/acs.biomac.8b00233](https://doi.org/10.1021/acs.biomac.8b00233)
24. Kämäräinen T., Ago M., Seitsonen J., Raula J., Kauppinen E.I., Ruokolainen J., **Rojas O.J.** Harmonic analysis of surface instability patterns on colloidal particles, **Soft Matter**, 14, 3387-3396 (2018). DOI: [10.1039/c8sm00383a](https://doi.org/10.1039/c8sm00383a)
25. Cusola, O., Kivistö S., Vierros S., Batys P., Ago M., Tardy B.L., Greca L.G., Roncero M.B., Sammalkorpi M., Rojas O.J., Particulate coatings via evaporation-induced self-assembly of polydisperse colloidal lignin on solid interfaces, **Langmuir**, 34 (20), 5759–5771(2018). DOI: [10.1021/acs.langmuir.8b00650](https://doi.org/10.1021/acs.langmuir.8b00650)

Peer-reviewed journal publications 2018 (46), cont'd

26. Mattos B.D., Greca L.G., Tardy B.L., Magalhães W.L.E., **Rojas O.J.**, Green Formation of Robust Supraparticles for Cargo Protection and Hazards Control in Natural Environments, **Small**, 1801256 (2018). DOI: [10.1002/sml.201801256](https://doi.org/10.1002/sml.201801256)
27. Klockars K.W., Tardy B.L., Borghei M., Tripathi A., Greca L.G., **Rojas O.J.**, Effect of anisotropy of cellulose nanocrystal suspensions on stratification, domain structure formation and structural colors, **Biomacromolecules**, 19, 2931–2943 (2018). DOI: [10.1021/acs.biomac.8b00497](https://doi.org/10.1021/acs.biomac.8b00497)
28. Hernández J.A., Romero V.H., Escalante A., Toriz G., **Rojas O.J.**, Sulbarán B.C., *Agave tequilana* Bagasse as Source of Cellulose Nanocrystals via Organosolv Treatment, **BioResources** 13, 3603-3614 (2018). DOI: [10.15376/biores.13.2.3603-3614](https://doi.org/10.15376/biores.13.2.3603-3614)
29. Hynninen V., Hietala S., McKee J., Murtomäki L., **Rojas O.J.**, Ikkala O., Nonappa, Inverse thermoreversible mechanical stiffening and birefringence in methylcellulose/cellulose nanocrystal hydrogel, **Biomacromolecules**, 19, 2795–2804 (2018). DOI: [10.1021/acs.biomac.8b00392](https://doi.org/10.1021/acs.biomac.8b00392)
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38. Huan S., Ajdary R., Bai L., Klar V., **Rojas O.J.**, Low solids emulsion gels based on nanocellulose for 3D-printing, **Biomacromolecules**, Accepted (2018). DOI: [10.1021/acs.biomac.8b01224](https://doi.org/10.1021/acs.biomac.8b01224)
39. Xiang W., Filpponen I., Saharinen E., Lappalainen T., Salminen K., **Rojas O.J.**, Foam processing of fibers as a sustainable alternative to wet-laying: Fiber web properties and cause-effect relations, **ACS Sustainable Chemistry & Engineering**, 6, 14423–14431 (2018). DOI: [10.1021/acssuschemeng.8b03102](https://doi.org/10.1021/acssuschemeng.8b03102)
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1. Xiang W., Tardy B.L., Stubenrauch C., Rojas O.J., “Interfacial Properties of Alkyl Glycosides” in “Bio–Based Surfactants and Detergents: Synthesis, Properties, and Applications”, 2nd Ed. (Hayes, Ashby and Solaiman, Eds.) AOCS Press (2019).
2. Huan S., Ago M., Borghei M., Rojas O.J., Nanocelluloses at the Oil–Water Interface: Emulsions Toward Function and Material Development (ch. 16), in "Cellulose Science and Technology: Chemistry, Analysis, and Applications" (T. Rosenau, A. Potthast, Eds.), John Wiley & Sons, Inc. (2019)
3. Salas, C., Hubbe M.A., Rojas O.J., Nanocellulose Applications in Papermaking, in “Production of materials from sustainable biomass resources”, Springer Book Series - Biofuels and Biorefineries (Z. Fang, R.L. Smith, X-f. Tian, Eds.) (2019)
4. Huan S., Ago M., Borghei M., Rojas O.J., “Nanocelluloses at the Oil-Water Interface: Emulsions toward Function and Material Development” in Part C: Material Sciences and Cellulose: Novel cellulose-based materials, Advances in Cellulose Science and Technology: Chemistry, Analysis and Applications (Thomas Rosenau & Antje Potthast, Eds.), John Wiley and Sons. NJ

CONFERENCE and Invited SEMINARS



1. Rojas, O.J., Materials Bioeconomy and Solutions from the Forest, Department of Chemistry, University of Aveiro, December 11, 2018, Aveiro, Portugal.
2. Rojas O.J., Back from the Future with the Forest, Y Science 2018, Slush for Life Sciences, December 5, 2018, Helsinki, Finland.
3. Rojas O.J., Key Enabling Nanotechnologies for the Future Bioeconomy, Department of Chemical Engineering, Nanjing Forestry University, November 14, 2018, Nanjing, China
4. Rojas O.J., Prospects and Utilization of Sustainable Nanomaterials derived from Pulp and Paper Streams, The 5th International Conference on Pulping, Papermaking and Biotechnology, November 12-14, 2018, Nanjing, China
5. Rojas O.J., Nanostructured Materials from Cellulose and Lignin, Department of Chemical Engineering, Dalian Polytechnical University, November 16, 2018, Dalian, China
6. Rojas O.J., Nanocelluloses and Nanolignins in Product Development, Department of Chemical Engineering and Materials Science, Jiangnan University, November 19 and 20, 2018, Wuxi, China
7. Rojas O.J., Biobased polymers: material bank for the development of structure, color and function, Stockholm University, School of Chemistry, June 7, 2018
8. Rojas O.J., Biobased polymers: material bank for the development of structure, color and function, Institute for Advanced Chemistry of Catalonia, Spanish National Research Council, June 26, 2018, Barcelona, Spain.
9. Rojas O.J., Biobased polymers: material bank for the development of structure, color and function, Center for Nano-Integration CENIDE, Universität Duisburg-Essen, August 28, 2018, Essen, Germany
10. Rojas O.J., Biobased polymers: material bank for the development of structure, color and function, Joint Department of Chemistry, Wood Science and Chemical and Biological Engineering, University of British Columbia, September 5, 2018, Vancouver, BC, Canada
11. Rojas O.J., Nanostructured materials from cellulose and lignin, Department of Chemistry, Unicamp, October 25, 2018, Campinas, Brazil

12. Rojas, O.J., Nanostructured materials based on renewable polymers, Brazilian National Nanotechnology Institute, October 26, 2018, Campinas, Brazil
13. Rojas, O.J., Materials Bioeconomy and Solutions from the Forest, Department of Chemical Engineering, University of Waterloo, November 02, 2018, Waterloo, Canada
14. Balakshin M., Capanema E.A., Borghei M., Huang Z., Sulaeva I., Rojas O.J., Feng M., Potthast A., Rosenau T., Recent Achievements in the Valorisation of Technical Lignins, NWBC 2018 - 8th Nordic Wood Biorefinery Conference, Helsinki, Finland, October 23-25, 2018.
15. Rojas, O.J., Lignin Colloids, Properties and Films: Interfacial properties, LiFT workshop - High-Value Products from Lignin, School of Chemical Engineering, Aalto University, August 23-24, Espoo, Finland.
16. Rojas O.J., Biobased polymers: material bank for the development of structure, color and function, 10th Iberoamerican Congress on Pulp and Paper Research (CIADICYP) and 51st. ABTCP of the Brazilian Pulp and Paper Technical Association, São Paulo, Brazil, October 23-25, 2018.
17. Rojas O.J., Key Enabling Technologies (KET) for the future Bioeconomy, Mission 10000 Conference: Nanotechnology: An Enabler for the Bioeconomy, October 17th, 2018, Braga, Portugal
18. Rojas O.J., Nanolignin and nanocellulose: Production and applications in multiphase systems XXIX Interamerican Congress of Chemical Engineering and 68th Canadian Chemical Engineering Conference, CSChE 2018, October 28-31, 2018, Toronto, ON
19. Rojas O.J., Biobased polymers: material bank for the development of structure, color and function, Department of Chemical Engineering, May 31, 2018, Chalmers University, Sweden.
20. Rojas O.J., (Ligno)Cellulose-based nanostructures, characterization, bioapplications and Imaging, Nanomedicines for Biomedical Applications, University of Helsinki, School of Pharmaceutics, May 18, 2018, Helsinki, Finland

21. Balakshin M., Capanema E.A, Rojas O.J., Feng M., The development of efficient methodology for the valorization of technical lignins, 1st PAPTAC International Lignin Conference, Edmonton, Alberta, September 18-20, 2018.
22. Tardy B.L., Lehtonen J., Greca L., Yau N., Mattos B., Beidler J., **Rojas O.J.**, Biobased polymers for the development of structure and functions: from bio-fabrication to arts and design, **256th American Chemical Society, Fall National Meeting**, Boston, MA, Aug 19-23, 2018.
23. Huan S., Ajdary R., Klar V., Bai L., **Rojas O.J.**, 3D-printable nanocellulose/alginate emulsion gels containing poly(lactic acid), **256th American Chemical Society, Fall National Meeting**, Boston, MA, Aug 19-23, 2018.
24. Bai L., Xiang W., Huan S., **Rojas O.J.**, Formulation and stabilization of concentrated edible oil-in-water emulsions based on electrostatic complexes of a food-grade cationic surfactant (ethyl lauroyl arginate) and cellulose nanocrystals, **256th American Chemical Society, Fall National Meeting**, Boston, MA, Aug 19-23, 2018.
25. Facchine E.G., **Rojas O.J.**, Khan S.A., Shear-induced heterogeneity in flocculating micro/nanofibrillated cellulose microstructures American Physical Society in Los Angeles, CA. March 2018
26. Facchine E.G., Sooah J., Spontak R.J., **Rojas O.J.**, Khan S.A., Liquid crystal ordering transition and colloidal interactions of cellulose nanocrystals, American Physical Society in Los Angeles, CA. March 2018
27. Emily G. Facchine, Sooah Jin, Richard J. Spontak, Orlando J. Rojas, and Saad A. Khan, Understanding self-assembly and ionic strength interactions of cellulose nanocrystals using isothermal titration calorimetry and rheology, **255th American Chemical Society, Spring National Meeting**, New Orleans, LA, March 18-22, 2018.
28. Facchine E.G., **Rojas O.J.**, Khan S.A., Microstructural dynamics and rheology of flocculated micro/nanofibrillated cellulose suspensions, **255th American Chemical Society, Spring National Meeting**, New Orleans, LA, March 18-22, 2018.
29. Facchine E., Rojas O.J., Khan S., Microstructural dynamics and rheology of flocculated micro/nanofibrillated cellulose suspensions, **255th American Chemical Society, Spring National Meeting**, New Orleans, LA, March 18-22, 2018.

30. Abdelgawad A.M., Fritz C., **Rojas O.J.**, Acquiring antibacterial and hemostatic properties for polypropylene nonwovens via layer-by-layer surface modification using soy bean protein, **255th American Chemical Society, Spring National Meeting**, New Orleans, LA, March 18-22, 2018.
31. Tripathi A., Ago M., Khan S., **Rojas O.J.**, Continuous filaments from cellulose with impressive wet strength, **255th American Chemical Society, Spring National Meeting**, New Orleans, LA, March 18-22, 2018.
32. Bai L., Huan S., Xiang W., **Rojas O.J.**, Stabilization of cellulose nanocrystal-based Pickering emulsions induced by cellulose nanofibrils: Impact of depletion effect on the phase behavior of emulsion droplets, **255th American Chemical Society, Spring National Meeting**, New Orleans, LA, March 18-22, 2018.
33. Greca L. G, Lehtonen J., Tardy B.L., Guo J., **Rojas O.J.**, Bacterial cellulose 3D structuring towards new applications, **255th American Chemical Society, Spring National Meeting**, New Orleans, LA, March 18-22, 2018.
34. Ago M., Abbati de Assis C., Greca L.G., Gonzalez R., **Rojas O.J.**, Economic analysis of integrated continuous process for colloidal lignin particle via aerosol flow method, **255th American Chemical Society, Spring National Meeting**, New Orleans, LA, March 18-22, 2018.
35. Facchine E., Jin S., Spontak R.J., **Rojas O.J.**, Khan S. Understanding self-assembly and ionic strength interactions of cellulose nanocrystals using isothermal titration calorimetry and rheology, **255th American Chemical Society, Spring National Meeting**, New Orleans, LA, March 18-22, 2018.
36. Xiang W., Preisig N., Stubenrauch C., Tardy B.L., Laine C., Hjelt T., Tammelin T., Ketoja J., **Rojas O.J.**, Effect of cellulosic fibers on foam dynamics, **255th American Chemical Society, Spring National Meeting**, New Orleans, LA, March 18-22, 2018.
37. Tardy B.L., Mattos B.D., Greca G.L., Klockars K., Borghei M., **Rojas O.J.**, Formation of flexible hybrid materials with embedded hierarchically structured components, **255th American Chemical Society, Spring National Meeting**, New Orleans, LA, March 18-22, 2018.



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