

34th EMS Summer School 2017
Membranes in Biorefineries
June 26 – 30, 2017

SPEAKERS

SESSION 1 Biobased products and biorefineries

The aim of this session is to provide an overview on the biobased products produced in biorefineries and the membrane processes used in biorefineries.

Stefan Lundmark, Adjunct professor, Perstorp AB/KTH, Sweden (Biobased platform chemicals)

Lundmark is Innovation Director at the Perstorp Group one world leader in several sectors of the specialty chemicals market. He is also member of the Wallenberg Wood Science Center (WWSC) which supports the development of new material products using the Swedish forests.

Ulrica Edlund, Professor, KTH Royal Institute of Technology, Stockholm, Sweden (Macromolecules from biorefining – recovery and materials design)

Edlund is professor in polymer technology and senior lecturer at Fibre and Polymer Technology, KTH. Her expertise are the synthesis, surface modification, and characterization of polymeric biomaterials intended for biomedical applications. She is further expert in surface modification of polymer biomaterials, through chemical functionalization, grafting, patterning and nanostructuring and characterization of polymeric biomaterials.

Bart Van der Bruggen, Professor, KU Leuven, Belgium (Overview on membrane processes for biorefineries)

Van der Bruggen is professor in sustainable engineering and he is also Executive Editor for Journal of Chemical Technology and Biotechnology, and as Editor for Separation and Purification Technology. His research is focused on the use of separation technologies in particular membrane process for recovery of resources and water and he is currently president of the European Membrane Society.

SESSION 2 Biorefinerys concepts based on wood, agricultural crops and algae

The aim of this session is to introduce different biorefinery concepts based on the feed stock used.

Merima Hasani, Assistant Professor, Chalmers, Gothenburg, Sweden (Wood based biorefineries)

Hasani is assistant professor in Chemistry and Chemical Engineering with focus on Forest Products and Chemical Engineering and works also at the Wallenberg Wood Science Centre. She defended her doctoral thesis "Chemical modification of cellulose: New possibilities of some classical routes" in 2010 and since then her work explores new methods for chemical modification of cellulose in aqueous systems.

Frank Lipnizki, Professor, Lund University, Lund, Sweden (Agriculture biomass biorefineries)

Lipnizki has nearly 20 years of industrial and scientific experience related to membrane processes. His main research interests are the integration and optimisation of membranes and membrane process for the food, biotech and pulp and paper industry with special focus on biorefineries.

Lidietta Giorna, Dr, Institute on Membrane Technology, University of Calabria, Rende, Italy (Algae based biorefineries)

Giorno is since 2009 Director of the Institute on Membrane Technology of the National Research Council of Italy, ITM-CNR. Her wide research expertise in membrane technology includes: integrated membrane systems for bioseparations and bioconversions, downstream processing based on molecular separation. Giorno has edited five books and authored more than 100 peer reviewed scientific papers in international journals and was President of the European Membrane Society Council from 2009 – 2011.

SESSION 3 Downstream processing in biorefineries

The aim of this session is to introduce the different downstream unit operations in biorefineries with focus on membrane technology and relevant pre-treatment processes.

Maria Norberta Neves Correia de Pinho, Associate Professor Technical University of Lisbon, Portugal (Sustainable and energy-efficient separation methods in biorefineries)

De Pinho has more than thirty years of experience in membrane processes covering mass transfer phenomena, membrane production and industrial applications. In due of her career de Pinho has been involved in more than 30 national and international projects related to membrane technology, including projects on membranes in pulp and paper plus biorefineries and has more than 100 peer reviewed publications.

Cristiana Boi, Assistant Professor, University of Bologna, Bologna, Italy (Downstream processing in biorefineries)

Boi is full time assistant professor of Chemical engineering principles at the Faculty of Engineering. Her research activities in the field of membrane separation processes are in particular downstream processes with focus on the fundamental aspects of the different processes and on their possible applications.

Hans Theliander, Professor, Chalmers, Gothenburg, Sweden (Pre-treatment by filtration)

Theliander is professor in Forest Products and Chemical Engineering at Chalmers University of Technology, and associate director at Wallenberg Wood Science Center.

Finn Rundström, xx, Alfa Laval, xx, Denmark (Pre-treatment by centrifugation)

SESSION 4 Membranes in the pulp and paper industry

The aim of the focus on one of the key biorefinery concepts related to the pulp and paper industry and the membrane applications in this concept. The session will be supported by a field trip to the Stora Enso Nymölla Pulp plant with one of the largest membrane installations in this field.

Mari Kallioinen, Associate Professor, Lappeenranta University of Technology, Lappeenranta, Finland. (Membrane applications in the pulp and paper industry)

Kallioinen is associate professor in membrane technology and LUT RE-SOURCE platform leader at Lappeenranta University of Technology (LUT). Her research topics are on the efficient utilization of resources with focus biorefineries, forest-based industry and mining industry, the development of membrane-based water treatment processes, the new technologies to monitor and control membrane fouling and scaling as well as membrane filtration under extreme conditions.

Karolina Pokus, PCI Membranes - Filtration Group, UK (Membranes for applications in the biotech and pulp and paper industry)

Pokus is application and process engineer at PCI Membranes, one of the most established membrane companies in the fields of biotechnology, food and pulp and paper. PCI is the supplier of one of the largest membrane installations in the pulp and paper industry at Stora Enso Nymölla pulp and paper mill, which we will visit this afternoon.

Ann-Sofi Jönsson, Professor, Lund University, Lund, Sweden (Membrane filtration in pulp mills)

Jönsson has more than thirty years of experience in membrane processes in a wide variety of both fundamental and applied research projects. An early engagement in pulp and paper applications has been a valuable gateway to the present research on optimal use of biomass, with focus on downstream processing using membrane processes.

SESSION 5 Water and wastewater treatment

The aim of this session is to highlight the use of membrane technology in the water loop of biorefineries.

Nicolas Heinen, BSc (ChemEng), Alfa Laval, Nakskov, Denmark (MBRs for biorefineries)

Heinen is Technical Director of MBR Technology at Alfa Laval. He has worked for more than 30 years in the development of membrane processes and wastewater treatment. His membrane related career started in the beginning of the 1980ies as Business Development Manager at DDS Filtration (now Alfa Laval Business Centre Membranes). Later he worked with Veolia Kruger and BioBalance on the development of the Biological Nutrient Removal (BNR) process. In 2003, he re-joined the Alfa Laval Business Centre Membranes and developed Alfa Laval MBR system.

Jens Lipnizki, PhD, Lanxess, Leverkusen, Germany (Water preparation and recovery in biorefineries)

Lipnizki is Head of Technical Marketing Membranes at Lanxess. He has worked for more than 15 years on the development of membranes and processes. Since 2011 Lipnizki works at Lanxess with focus on reverse osmosis membrane and applications of reverse osmosis in water preparation and water recovery.

Luboš Novák, xx, Mega, Straz pod Ralskem, Czechia (Electromembrane processes in biorefineries)

Novák is CEO of company MEGA which has worldwide reach and more than 30 years of experience in membrane production and electro-membrane separation.

SESSION 6 Membranes and modules

The aim of this session is to provide inside knowledge on membranes and membrane module configuration with relevance to biorefineries.

Haofei Guo, PhD, Alfa Laval, Nakskov, Denmark (Polymeric membranes for biorefineries)

Guo is R&D project manager and membrane engineer in the Business Centre Membrane of Alfa Laval. Her research fields are membrane manufacturing and development, antifouling modification of porous membrane; surface and interfacial chemistry; development of new and maintenance of existing membranes. She has more than 10 years' experience in membrane production, modification and optimisation.

Peter Bolduan, atech innovations, Gladbeck, Germany (Ceramic membranes in biotech and pulp and paper industry)

Bolduan is managing director at atech innovations, one of the leading global ceramic membrane producers. He has more than 20 years' experience in the development of ceramic membranes and membrane applications for a wide range of industries including food, biotech, water and pulp and paper industry.

Marcus Weyd, PhD, Fraunhofer-Institut für Keramische Technologien und Systeme IKTS, Hermsdorf, Germany (Inorganic membranes in biorefineries)

Weyd is leader of the Membrane Process Technology and Modelling group at Fraunhofer IKTS since the year 2010. The main focus he puts on the process testing and process integration of inorganic membranes in separation processes in liquid and gaseous media and non-destructive membrane characterization. He studied environmental and process engineering in Jena and Freiberg and received his PhD from University Magdeburg.

Jörg Vogel, PhD, Aquaporin A/S, Kongens Lyngby, Denmark (Aquaporin membranes for water recovery from fermentation processes)

Vogel is head of technology development at Aquaporin. His main responsibility is the testing analysis of the biomimetic Aquaporin membranes for different applications. He is also responsible for the pilot production of the forward osmosis (FO) flat sheet membrane pilot production and the FO module development. In addition, he is charge of hollow fibre module optimization and upscaling towards pilot production.

Wojciech Kujawski, Professor, Nicolaus Copernicus University, Torun, Poland (Implementation of membrane separation techniques in the production of butanol by fermentation process)

Kujawski heads the Membranes and Membrane Techniques Research Group and has the Chair in Physical Chemistry and Physicochemistry of Polymers. His key expertise in the membrane processes: pervaporation, membrane distillation, organic solvent nanofiltration, ceramic membranes with focus on biotechnology, bio-fuels, bio-energy.

SESSION 7 Fouling and cleaning

The aim of this session is to investigate fouling and cleaning in biorefineries since fouling and cleaning has a significant impact on economic feasibility of membrane technology.

Chris Dotremont, PhD, Vito, Mol, Belgium (Fouling and cleaning of membranes in biorefineries)

Dotremont is project manager at VITO – the Flemish Institute for Technological Research, where she is heading the membrane engineering team. She has gained profound expertise in membrane technology with a track record of more than 20 years in membrane development. Her current research topics are focused on membrane bioreactors, membrane distillation and organophilic pervaporation for in-situ-product-recovery (ISPR) and fouling and cleaning of membranes.

Frank Lipnizki and **Ann-Sofi Jönsson**, Lund University, Lund, Sweden (Costs for membrane cleaning - key aspects in membrane plant operation)

SESSION 8 Economy

The aim of this session is to give an insight in the economics of industrial membrane plants considering key aspects influencing OPEX and CAPEX such as membrane cleaning and membrane exchange.

Frank Lipnizki and **Ann-Sofi Jönsson**, Lund University, Sweden (Nothing comes for free – membrane plant economy)

João Crespo, Professor, Nova University of Lisbon, Portugal (How can membrane processing contribute towards a circular economy)

Crespo is Professor of Chemical Engineering and Vice-Rector for Research and Innovation at Nova University of Lisbon (NOVA). He is former Vice-President of the Portuguese National Science Foundation and former Academic Dean of the Faculty of Sciences and Technology at NOVA. Crespo is also a founder and member of two spin-off companies. His research interests are membrane separation processes, membrane bioreactors, process monitoring.

SESSION 9 The future of membranes in biorefineries

The aim of the final session is to provide an outlook on the future of membrane technology in biorefineries both from an industrial and academic perspective.

Rikard Krook, Business Area Manager Renewable Resources, Alfa Laval, Sweden (The Alfa Laval approach to biorefineries)

Frank Lipnizki, Professor, Lund University, Sweden (The future of membranes in biorefineries)