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Advanced Membrane Technology VII

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Conference Program

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Program

Advanced Membrane Technology VII

September 11 – 16, 2016

Maryborough Hotel and Spa

Cork, Ireland

Conference Co-Chairs

Isabel C. Escobar
(University of Kentucky, USA)

Jamie Hestekin
(University of Arkansas, USA)



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Previous conferences in this series

Advanced Membrane Technology

October 14-19, 2001

Barga, Italy

Conference Chairs:

Dr. Norman N. Li, NL Chemical Technology, Inc., USA
Prof. Enrico Drioli, University of Calabria, Italy
Prof. William J. Koros, University of Texas, Austin, USA

Advanced Membrane Technology II

May 23-28, 2004

Irsee, Germany

Conference Chair:

Dr. Norman N. Li, NL Chemical Technology, Inc., USA

Advanced Membrane Technology III

June 11-15, 2006

Cetraro (Calabria), Italy

Conference Chairs:

Dr. Norman N. Li, NL Chemical Technology, Inc., USA
Prof. Enrico Drioli, University of Calabria, Italy

Advanced Membrane Technology IV

June 7-12, 2009

Trondheim, Norway

Conference Chair:

Prof. May-Britt Hagg Norwegian University of Science & Technology, Norway

Advanced Membrane Technology V

Oct. 14-19, 2012

Singapore

Conference Chairs:

Dr. Tony Fane, Singapore Membrane Technology Centre
Dr. Rong Wang, Singapore Membrane Technology Centre

Advanced Membrane Technology VI

February 8-13, 2015

Sicily, Italy

Conference Chairs:

Dibakar Bhattacharyya, University of Kentucky, USA
Benny Freeman, University of Texas, USA

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Sunday, September 11, 2016

16:30 - 18:30	Conference Check-in (Sherrard Corridor)
18:30 - 19:30	Opening Reception with live Irish music dancers (Orangery)
19:45 - 21:00	Dinner (Bellini's Restaurant)

NOTES

- Technical Sessions will be held in Sherrard Suite B.
- The Poster Sessions will be held in Sherrard Suite A.
- Session A poster presenters should set up their posters on Sunday after 16:30. Session A posters should be removed following the poster session on Monday.
- Session B poster presenters should set up their posters on Tuesday morning after 08:00. Session B posters should be removed by 12:00 on Wednesday.
- All breakfasts and lunches, as well as dinners on Sunday, Monday, and Tuesday, will be in Bellini's Restaurant.
- The conference banquet on Thursday will be in the Orangery.
- Audiotaping, videotaping and photography of presentations are prohibited.
- Speakers – Please leave at least 5 minutes for questions and discussion.
- Please do not smoke at any conference functions.
- Turn your cellular telephones to vibrate or off during technical sessions.
- After the conference, ECI will send an updated participant list to all participants. Please check your listing now and if it needs updating, you may correct it at any time by logging into your ECI account.
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- Please write your name in the front of this program booklet so it can be returned if misplaced.

Monday, September 12, 2016

07:00 - 08:30 Breakfast

08:30 - 09:00 **Welcome and opening remarks**
Isabel C. Escobar, Jamie Hestekin, Conference Chairs
Norman Li, ECI Liaison

Plenary Lecture

09:00 - 10:00 **New variations of the old ‘phase inversion’ process: SNIPS, CIPS , DIPS and more**
Klaus-Viktor Peinemann, King Abdullah University of Science and Technology (KAUST), Saudi Arabia

10:00 - 10:30 Coffee Break

Advances in Nanocomposite Membranes

Chairs: Nora Savage, National Science Foundation, USA and Bradley Ladewig, Imperial College of London, England

10:30 - 11:00 **Polyamide/TiO₂ nanocomposite membranes applied to the degradation of dyes from textile industry**
Maria Teresa Pessoa de Amorim, Minho University, Portugal

11:00 - 11:30 **Graphene oxide membranes for gas separation**
Marek Lanc, University of Chemistry and Technology Prague, Czech Republic

11:30 - 12:00 **PIM-1/graphene pervaporation membranes for bioalcohol recovery**
Patricia Gorgojo, The University of Manchester, United Kingdom

12:00 - 12:30 **Mixed matrix PVDF membranes with in-situ synthesized PAMAM dendrimer-like particles: A new class of sorbents for Cu(II) recovery from aqueous solutions by ultrafiltration**
Alex T. Kuvarega, University of South Africa, South Africa

12:30 - 13:30 Lunch

Membranes for Gas Separations

Chairs: Ingo Pinnau, King Abdullah University of Science and Technology, Saudi Arabia and Giulio C. Sarti, University of Bologna, Italy

13:30 - 14:00 **Engineering of pervaporation systems: Modelling of dehydration modules, including recycles**
Cilian O'Suilleabhain, Cork Institute of Technology, Ireland

14:00 - 14:30 **Functionalized polymers of intrinsic microporosity for highly energy-intensive gas separations**
Ingo Pinnau, King Abdullah University of Science and Technology, Saudi Arabia

Monday, September 12, 2016 (continued)

- 14:30 - 15:00 **Membranes for CO₂ capture - report on pilot plant tests**
May-Britt Hägg, Norwegian University of Science and Technology, Norway
- 15:00 - 15:30 Coffee Break
- 15:30 - 16:30 **Poster Session A Pitch**
Chairs: Isabel Escobar, University of Kentucky, USA; Jamie Hestekin, University of Arkansas, USA; and Nora Savage, NSF, USA
- 16:30 - 18:30 **Poster Session A**
Chairs: Isabel Escobar, University of Kentucky, USA; Jamie Hestekin, University of Arkansas, USA; and Nora Savage, NSF, USA
- 19:00 - 20:30 Dinner

Tuesday, September 13, 2016

07:00 - 09:00 Breakfast

Plenary Lecture

09:00 - 10:00 **Membranes in wastewater treatment: Integrated crystallization is essential**
Bart Van der Bruggen, KU Leuven, Belgium

10:00 - 10:30 Coffee Break

Membranes for Biological & Industrial Applications

Chairs: Bart Van der Bruggen, KU Leuven, Belgium, and Jamie Hestekin, University of Arkansas, USA

10:30 - 11:00 **Development of novel membrane structures for enhanced purification of plasmid DNA using small pore size ultrafiltration membranes**
Andrew L. Zydney, The Pennsylvania State University, USA

11:00 - 11:30 **Understanding reverse osmosis polyamide active layer macrostructure and performance through indirect microscopic observation of film growth**
Caleb V. Funk, Dow Water & Process Solutions, USA

11:30 - 12:00 **Novel reverse electrodialysis biobattery**
Christa Hestekin, University of Arkansas, USA

12:00 - 12:30 **Alternative treatment methods for the removal and destruction of algal toxins**
Isabel C. Escobar, University of Kentucky, USA

12:30 - 13:30 Lunch

Sustainable Water Treatment

Chairs: Mihail Barboiu, Institut Europeen des Membranes, France and Andrew Zydney, The Pennsylvania State University, USA

13:30 - 14:00 **Salt-excluding artificial water channels exhibiting enhanced dipolar water and proton translocation**
Mihail Barboiu, Institut Europeen des Membranes, France

14:00 - 14:30 **Voltage activated membrane platforms**
Bruce Hinds, University of Washington, USA

14:30 - 15:00 **Impact of energy fluctuation on permeate quality in autonomous and directly coupled renewable energy powered nanofiltration and reverse osmosis systems**
Andrea Schaefer, KIT, Germany

Tuesday, September 13, 2016 (continued)

15:00 - 15:30 **Optimizing hollow fiber membranes and modules for osmotic processes:
Membranes, modules, and models**
Jeff McCutcheon, University of Connecticut, USA

15:30 - 16:00 Coffee Break

Membranes for Energy Applications I

Chairs: May-Britt Hägg, Norwegian University of Science and Technology,
Norway and Jeffrey McCutcheon, University of Connecticut, USA

16:00 - 16:30 **New facilitated transport membranes for CO₂ capture and separation**
Winston Ho, The Ohio State University, USA

16:30 - 17:00 **Surface-enhanced separation performance of porous inorganic membranes
for biofuel conversion applications**
Michael Z. Hu, Oak Ridge National Laboratory, USA

17:00 - 18:00 **Poster Session B Pitch**

Chairs: Isabel Escobar, University of Kentucky, USA; Jamie Hestekin, University
of Arkansas, USA; and Nora Savage, NSF, USA

18:30 - 20:00 Dinner

20:00 - 22:00 **Poster Session B**

Chairs: Isabel Escobar, University of Kentucky, USA; Jamie Hestekin, University
of Arkansas, USA; and Nora Savage, NSF, USA

Wednesday, September 14, 2016

07:00 - 08:30 Breakfast

Transport, Modeling and Gas Separations

Chair: Winston Ho, The Ohio State University, USA, and Stephen M.C. Ritchie, University of Alabama, USA

08:30 - 09:00 **Influence of polymer backbone rigidity on water and salt transport properties of low water content membrane polymers for desalination**
Geoffrey M. Geise, University of Virginia, USA

09:00 - 09:30 **Monitoring multicomponent transport using in-situ FTIR spectroscopy**
Daniel J. Miller, Lawrence Berkeley National Laboratory, USA

09:30 - 10:00 **How to describe and predict plasticization in glassy polymeric membranes for gas separations**
Giulio C. Sarti, University of Bologna, Italy

10:00 - 10:30 **Light responsive membranes for gas separation**
Bradley Ladewig, Imperial College of London, England

10:30 - 11:00 Coffee Break

Membranes for Energy Applications II

Chair: Geoffrey M. Geise, University of Virginia, USA, and Isabel C. Escobar, University of Kentucky, USA

11:00 - 11:30 **“Breakthrough” osmosis in “leaky” supported membranes: A breakthrough in PRO?**
Andriy Yaroshchuk, ICREA & Polytechnic University of Catalonia, Spain

11:30 - 12:00 **Novel CO₂ capture membranes based on polymerized ionic liquids and polymeric porous supports**
Marius Sandru, SINTEF, Norway

12:00 - 12:30 **Salinity gradient energy: Assessment of pressure retarded osmosis and osmotic heat engines for energy generation from low-grade heat sources**
Johan Vanneste, Colorado School of Mines, USA

12:30 - 14:00 Lunch

14:30 Excursion to Blarney Castle and Gardens followed by dinner at The Lemon Tree in Blarney Castle Hotel

Buses will return to the hotel at approximately 20:30.

Thursday, September 15, 2016

07:00 - 09:00 Breakfast

Plenary Lecture

09:00 - 10:00 **Reactive and responsive functionalized membranes**
Dibakar Bhattacharyya, University of Kentucky, USA

10:00 - 10:30 Coffee Break

Scalable Membrane Nanomanufacturing

Chairs: Caleb V. Funk, Dow Water & Process Solutions, USA and Dibakar Bhattacharyya, University of Kentucky, USA

10:30 - 11:00 **Membrane performance vs process performance: What should we enhance?**
Bart Van der Bruggen, KU Leuven, Belgium

11:00 - 11:30 **Development of novel composite hollow fiber membranes and modules applied in pressure retarded osmosis: From laboratory scale to pilot scale**
Laurentia Setiawan, Nanyang Technological University, Singapore

11:30 - 12:00 **Lab and pilot scale pervaporation process for the purification of dimethyl carbonate**
Henk van Veen, Energy research Centre of the Netherlands (ECN), Netherlands

12:00 - 12:30 **High flux ultrafiltration based on charged membranes: Background and data from the field**
Stephen M.C. Ritchie, University of Alabama, USA

12:30 - 13:30 Lunch

Low Fouling Membranes

Chairs: Rong Wang, Singapore Membrane Technology Centre, Nanyang Technological University, Singapore

13:30 - 14:00 **Fouling of nanofiltration membranes by organics, colloids and their combinations in cross-flow filtration: Effects of the presence of various ions on membrane-foulant non-electrostatic interactions**
Oranso T Mahlangu, University of South Africa, South Africa

14:00 - 14:30 **Performance of the CSTR-in-series extractive membrane bioreactor in industrial wastewater treatment**
Shuwen Goh, Singapore Membrane Technology Center (SMTC), Nanyang Environment and Water Research Institute (NEWRI), Nanyang Technological University (NTU), Singapore

14:30 - 15:00 **Ultrafiltration membranes based on PES-PEG block copolymers**
Jochen Meier-Haack, Leibniz Institute of Polymer Research Dresden, Germany

Thursday, September 15, 2016 (continued)

15:00 - 15:30 **Development of polymer blend ultrafiltration membranes with combined size and charge selectivity**
Clélia Emin, Universität Duisburg-Essen, Germany

15:30 - 16:00 Coffee Break

Micropollutant and Emerging Component Removal

Chairs: Andrea Schaefer, Karlsruher Institut für Technologie (KIT), Germany

16:00 - 16:30 **PVDF membrane chromatography for gold recovery**
Chuanfang Yang, Chinese Academy of Sciences, China

16:30 - 17:00 **Hybrid protein membranes: Snatch contaminants from water and strike gold**
Raffaele Mezzenga, ETH Zurich, Switzerland

17:00 - 17:30 **Effect of water composition on perchlorate removal from polluted ground-water using Ion Exchange Membrane Bioreactor**
Alon Zelichover, Ben Gurion University of the Negev, Israel

19:00 - 20:30 Banquet

Friday, September 16, 2016

07:00 - 09:00 Breakfast

Plenary Lecture

09:00 - 10:00 **Aquaporins (AQP)-based biomimetic membranes for water reuse and desalination**

Rong Wang, Singapore Membrane Technology Centre, Nanyang Technological University, Singapore

10:00 - 10:30 Coffee Break

Emerging Membrane Applications

Chair: Kamallesh K. Sirkar, New Jersey Institute of Technology, USA, and Klaus-Viktor Peinemann, King Abdullah University of Science and Technology (KAUST), Saudi Arabia

10:30 - 11:00 **Effect of surfactants on the long-term process stability of omniphobic membrane during the process of membrane-distillation**

Yair Kaufman, Ben Gurion University of the Negev, Israel

11:00 - 11:30 **Membrane distillation - A technology for resource recovery in communal waste water treatment**

Judith Buchmaier, AEE INTEC - Institute for Sustainable Technologies, Austria

11:30 - 12:00 ***In-situ* monitoring of RO membranes using electrical impedance spectroscopy: Threshold fluxes and fouling**

Hans Coster, University of Sydney, Australia

12:00 - 12:30 **Organic solvent nanofiltration with novel polymeric membranes**

Kamallesh K. Sirkar, New Jersey Institute of Technology, USA

12:30 - 12:45 Closing remarks

12:45 - 14:00 Lunch

Departures

Poster Presentation List

Session A

1. **Synthesis and characterization of carbon nanotube membranes for water treatment**
Nozipho Nonsikelelo Gumbi, University of South Africa, South Africa
2. **Phosphonium based poly(ionic liquid)/ ionic liquid membranes for high temperature ion conductance: Influence of ionic liquid structure and loading on membrane stability and performance**
Alexander Lopez, University of Colorado Boulder, USA
3. **Nanofiltration membranes modified by interfacial polymerization and polyelectrolyte deposition for ionic liquid recycling from biomass hydrolysates**
Alexandru M. Avram, University of Arkansas, USA
4. **Poster Withdrawn**
5. **Nanofiltration and hybrid membranes for water reuse**
Andrew Colburn, University of Kentucky, USA
6. **Transient membrane potential after concentration step: A novel method for advanced characterization of ion-exchange membranes**
Andriy Yaroshchuk, ICREA & Polytechnic University of Catalonia, Spain
7. **Performance study for membrane fractionation of second cheese whey from sheep**
Antónia Teresa Macedo, Instituto Politécnico de Beja, LEAF, Portugal
8. **Study of gas transport mechanisms in mesoporous membranes using dynamic means field theory**
Ashutosh Rathi, University of Massachusetts Amherst, USA
9. **Membrane synthesis for produced water filtration**
Audie Thompson, Prairie View A&M University, USA
10. **Self-healing properties of microcapsule-embedded and hydrogel-composite water filtration membranes**
Bezawit A. Getachew, Yale University, USA
11. **Experimental study on the removal of sulfur compounds and siloxanes from biogas**
Chul-U Bak, Hanyang University, South Korea
12. **Functionalization of silver nanoparticles on membranes and its influence on biofouling**
Conor G. Sprick, University of Kentucky, USA
13. **Modeling behavior of charged high flux ultrafiltration membranes for dairy applications**
Corey L. Patton, University of Alabama, USA
14. **Effect of water interactions on Polyvinylamine at different pH for Membrane gas separation**
Daniel Romero, NTNU, Norway
15. **Numerical simulation of reverse electrodialysis with ammonium bicarbonate**
Deok Han Kim, Sogang University, South Korea

16. **Accelerated CO₂ absorption in a membrane contactor using enzyme carbonic anhydrase**
Edel Sheridan, SINTEF, Norway
17. **High temperature dewatering of ethanol by vapour permeation and pervaporation with HybSi® membranes**
Henk M. van Veen, Energy research Centre of the Netherlands, Netherlands
18. **Nanofiltration and reverse osmosis for defluoridation: The role of inorganic carbon**
Andrea Iris Schäfer, Karlsruhe Institute of Technology, Germany
19. **Roll-to-Roll nanoimprint lithography of polyethersulfone ultrafiltration membranes and fouling mitigation effects**
Jacob Hutfles, University of Colorado Boulder, USA
20. **Novel polyelectrolyte hydrogel membrane for ethanol dehydration via pervaporation**
Jinpeng Liu, Ben Gurion University of Negev, China
21. **Vanadium redox flow battery - membrane selection and characterization**
Jiří Vrána, University of Chemistry and Technology, Prague, Czech Republic
22. **Thermally stable anion-exchange materials**
Jochen Meier-Haack, Leibniz Institute of Polymer Research Dresden, Germany
23. **Membrane distillation as a thermal conductivity measurement device**
Johan Vanneste, Colorado School of Mines, USA
24. **Demineralised skim milk concentrates by means of dynamic cross-flow microfiltration**
Johannes Schäfer, University of Hohenheim, Germany
25. **Fractionation of mono- and disaccharides by nano- and diafiltration**
Johannes Schäfer, University of Hohenheim, Germany
26. **Investigation of membrane separations, ozonation and biofiltration for the removal of Microcystin-LR**
Joyner Eke, University of Kentucky, USA
27. **A coarse grained model for ion transport in microscale batteries**
Kaitlyn A. Dwelle, Massachusetts Institute of Technology, USA
28. **Poster Withdrawn**

Session B

29. **Engineering of extracellular matrix scaffolds via hollow fiber cell culture**
Kevin Roberts, University of Arkansas, USA
30. **Hollow fibers for artificial lung applications**
Lauren E. Reed, University of Arkansas, USA
31. **Trimethylamine draw solute in osmotic heat engine for power generation**
Lingling Xia, University of Connecticut, USA
32. **Desalinating seawater and recovering waste water using hybrid forward and reverse osmosis at the pilot level**
Maqsd R. Chowdhury, University of Connecticut, USA

33. **Aging of polymers of intrinsic microporosity studied by sorption and permeation**
Marek Lanč, University of Chemistry and Technology, Prague, Czech Republic
34. **Surface modification of polyethersulfone membranes by catechol and polyethyleimine to removal reactive dyes from textile wastewater**
Maria Teresa Pessoa de Amorim, University of Minho, Portugal
35. **Microporous hollow fiber membranes spun from PIM-1**
Melinda Jue, Georgia Institute of Technology, USA
36. **Composite membrane fabrication with nanoporous metallic films**
Michael J. Detisch, University of Kentucky, USA
37. **Nature-inspired next generation nanosorters for protein purification**
Mirco Sorci, Rensselaer Polytechnic Institute, USA
38. **Characterization of microporous ECTFE membrane after exposure to different liquid mediums and radiation**
Na Yao, New Jersey Institute of Technology, USA
39. **Fouling in direct contact membrane distillation during treatment of produced water from unconventional (shale) gas production**
Omkar R. Lokare, University of Pittsburgh, USA
40. **Zwitterion-containing polymer additives for fouling resistant ultrafiltration membranes: Choosing the right chemistry and architecture**
Papatya Kaner, Tufts University, USA
41. **Thin film composite polyamide membrane on polydopamine layer containing stabilized particles for reverse osmosis**
Pinar Cay Durgun, Arizona State University, USA
42. **High-performance biomimetic membranes made using genetically engineered aquaporins.**
Priyesh Wagh, University of Kentucky, USA
43. **Polydopamine mediated self-cleaning of high-flux pH-responsive isoporous membranes for filtration applications**
Rahul Shevate, King Abdullah University of Science and Technology (KAUST), Saudi Arabia
44. **Case study: Pilot treatment of olive mill and metal processing wastewater by ceramic membrane ultrafiltration**
Renata Tomczak-Wandzel, Aquateam COWI AS, Norway
45. **Development and characterization of polymeric hollow fiber membrane with high CO₂ separation performance**
Sang Yong Nam, Gyeongsang National University, South Korea
46. **Synthesis and characterization of novel cardo-containing copolyimide membranes for gas separation and effect of bulky site in the polymer backbone**
Sang Yong Nam, Gyeongsang National University, South Korea
47. **Synthesis and characterization of PEEK containing imidazole moiety and effect of functional groups**
Sang Yong Nam, Gyeongsang National University, South Korea

48. **Role of active layer in the performance of aromatic and semi-aromatic nanofiltration membranes for water purification**
Shardul S. Wadekar, University of Pittsburgh, USA
49. **Investigation of biofouling resistant poly(vinyl alcohol)/cellulose acetate ultrafiltration membranes**
Silver Enyinnia, Prairie View A&M Univesity, USA
50. **Hybrid biophysical membrane treatment systems for sustainable water reuse in the O&G industry**
Stephanie M. Riley, Colorado School of Mines, USA
51. **Comparative studies of ultrasound and membrane emulsification for the production of stable Perfluorocarbon-in-water nanoemulsions**
Syed Usman Taqui, Universidade NOVA de Lisboa, Portugal
52. **Polysulfone based multi-block copolymer membranes for water purification applications**
Yi Yang, Arizona State University, USA
53. **Revisiting membrane rejection: On the relationship between solute size and pore size in the nanofiltration regime**
Yuqiong Li, Imperial College London, United Kingdom
54. **Prospects for cyclodextrins and their derivatives in membrane production**
Edward Nxumalo, UNISA, South Africa