Program

Separations Technology IX: New Frontiers in Media, Techniques, and Technologies

March 5-10, 2017

Grand Real Santa Eulalia Hotel
Albufeira, Portugal

Conference Chairs
Kamalesh K. Sirkar
New Jersey Institute of Technology, USA

Conference Co-Chairs
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Rensselaer Polytechnic Institute, USA

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Prof. S. Ranil Wickramasinghe, University of Arkansas, USA

Previous conferences in this series:

New Directions in Separations Technology
October 16-21, 1985
Davos, Switzerland
Conference Chair:
Norman Li, UOP, Inc., USA

Separations Technology
April 26-May 1, 1987
Bavaria, West Germany
Conference Chairs:
Norman Li, Allied Signal Research Center, Inc., USA
Heiner Strathmann, Fraunhofer Institute, Germany

Separations Technology
May 15-19, 1989
Davos, Switzerland
Conference Chairs:
Heiner Strathmann, Fraunhofer Institute, Germany
C. Judson King, University of California-Berkeley, USA
Norman Li Allied Signal Research Center, Inc., USA

Separations Technology
Oct. 20-25, 1991
Keauhou Beach, Hawaii, USA
Conference Chairs:
George E. Keller, II, Union Carbide, USA
Darsh T. Wasan, Illinois Institute Of Technology, USA

New Directions in Separation Technology
June 26-July 2, 1993
Noordwijkerhout, Netherlands
Conference Chairs:
E. Lightfoot, Univ. of Wisconsin, USA
P. Danusi, IAEA – Australia

Separation Technology: Advances and Opportunities in Environmental Separations
July 22–27, 1995
Snowbird, Utah
Conference Chairs:
Ronald W. Rousseau, Georgia Institute of Technology, USA
Charles A. Eckert, Georgia Institute of Technology, USA

Previous conferences in this series:

Separation Technology "Separations for Clean Production"
October 26 - 31, 1997
Davos, Switzerland
Conference Chairs:
David W. Savage, Exxon Research & Engineering, USA
Gino V. Baron, Vrije Universiteit, Belgium
Christopher J.D. Fell, University of New South Wales, Australia

Separations Technology: New Perspectives on Very Large-Scale Operations
October 3-8, 2004
Fraser Island, Queensland, Australia
Conference Chairs:
Chris Fell, University of New South Wales, Australia
George E. Keller II, MATRIC, USA

The Role of Structure in Biological, Chemical and Environmental Separations: From the Molecular to the Macro
January 6-11, 2008
Puntarenas, Costa Rica
Conference Chairs:
T.A. Hatton, Massachusetts Institute of Technology, USA

Separations Technology: Sustainable Separation Technology for Energy and Environmental Challenges
December 5-9, 2010
Keauhou Beach, Hawaii, USA
Conference Chair:
Michael F. Doherty, University of California, Santa Barbara, USA

Conference Sponsors

American Chemical Society

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Sunday, March 5, 2017

16:30 – 18:00	**Conference Check-in** (Lower Lobby - near restaurant)
18:00 – 18:20	Introductions
	Conference Chairs (K.K. Sirkar, M. Mazzotti, S. Cramer, J. Crespo)
18:20 – 20:00	Welcome Reception (Le Club)
20:00 – 21:30	Dinner (Le Club)

NOTES

- Technical Sessions will be held in Balaia.
- Poster Sessions will be held in Santa Eulalia I and II.
- Breakfasts and lunches and will be in the Restaurante do Real.
- Dinners on Monday and Tuesday will be in the Restaurante do Real.
- The conference banquet on Thursday will be held in Le Club.
- Audiotaping, videotaping and photography of presentations are prohibited.
- Speakers – Please leave at least 5 minutes for questions and discussion.
- Speakers – Please ensure your talk adheres to your given time allotment. Talks that go over their allotment reduce time for valuable discussion and can disrupt the conference program.
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- 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.
- Please do not smoke at any conference functions.
- Please write your name in the front of this program booklet so it can be returned if misplaced.

Monday, March 6, 2017

07:00 – 08:30	Breakfast buffet
	Session 1: Separation Media Synthesis and Modeling Chairs: Marco Mazzotti, ETH Zurich, Switzerland Krista Walton, Georgia Institute of Technology, USA
08:30 – 09:10	**Modelling of metal-organic frameworks as tunable adsorbents for separations** Randall Snurr, Northwestern University, USA (Plenary)
09:10 – 09:40	**On the use of structured adsorbents in cyclic adsorption processes** James Ritter, University of South Carolina, USA
09:40 – 10:10	**Redox-based electrochemical adsorption technologies for energy-efficient water purification and wastewater treatment** T. Alan Hatton, Massachusetts Institute of Technology, USA
10:10 – 10:40	Coffee break
	Session 2: Adsorption and Chromatography - 1 Chairs: T. Alan Hatton, Massachusetts Institute of Technology, USA Randall Snurr, Northwestern University, USA
10:40 – 11:10	**CO_2 interactions with porous carbons: Is the surface stable at ambient conditions?** Teresa Bandosz, CCNY/CUNY, USA
11:10 – 11:40	**Impact of metal substitution on stability and adsorption properties of MOF-74** Krista Walton, Georgia Institute of Technology, USA
11:40 – 12:10	**3D-printed structured adsorbents for molecular separation** Joeri Denayer, Virje Universiteit Brussels, Belgium
12:10 – 12:30	Break
12:30 – 13:40	Lunch
	Session 3: Adsorption and Chromatography - 2 Chairs: Chang-Ha Lee, Yonsei University, Korea Teresa Bandosz, CCNY/CUNY, USA
13:40 – 14:10	**Electrochemically-mediated adsorptive processes for CO_2 capture** T. Alan Hatton, Massachusetts Institute of Technology, USA
14:10 – 14:40	**Adsorption equilibrium and kinetics of high molecular weight n-paraffins mixtures and kerosene on 5A zeolite** Daniel Aranda López, Universidad Complutense de Madrid, Spain
14:40 – 15:10	**Polymer-grade olefin production by gas-phase SMB** Vanessa Martins, FEUP/LSRE-LCM, Portugal
15:10 – 15:40	Coffee break

Monday, March 6, 2017 (continued)

Session 4: Adsorption and Chromatography - 3
Chairs: James Ritter, University of South Carolina, USA
Joeri Denayer, Vrije Universiteit Brussel, Belgium

15:40 – 16:10 **H_2 pressure swing adsorption for IGCC power plant and techno-economic analysis of integrating PSA to IGCC with carbon capture**
Chang-Ha Lee, Yonsei University, South Korea

16:10 – 16:40 **Cryogenic pressure temperature swing adsorption process for natural gas upgrade**
Alexandre Ferreira, University of Porto, Portugal

16:40 – 17:10 **Two-column relay simulated moving-bed for gas-phase separations**
Rui Ribeiro, LAQV-Requimte, Portugal

17:10 – 19:00 Free time / *ad hoc* Sessions

19:00 – 20:30 Dinner

20:30 – 21:30 **Social Hour/Poster Session - 1**
Chairs: Ranil Wickramasinghe, University of Arkansas, USA
James Ritter, University of South Carolina, USA

Tuesday, March 7, 2017

07:00 – 08:30	Breakfast buffet
	Session 5: Bioseparations: Recent Advances - 1 Chairs: Ana Azevedo, Instituto Superior Técnico, Portugal Marcel Ottens, Delft University of Technology, Netherlands
08:30 – 09:00	**Analytical affinity chromatography-on-a-chip for selective capture and sensitive detection of protein and polynucleotide biomarkers** Ruben Soares, Institute for Bioengineering and Biosciences, Portugal
09:00 – 09:30	**Surface engineering for developing new membrane adsorbers** Ranil Wickramasinghe, University of Arkansas, USA
09:30 – 10:00	**New adsorbers for the removal of genotoxic impurities from active pharmaceutical ingredients** Teresa Esteves, Instituto Superior Técnico, Portugal
10:00 – 10:30	Coffee break
	Session 6: Bioseparations: Recent Advances - 2 Chairs: Ranil Wickramasinghe, University of Arkansas, USA Alois Jungbauer, BOKU, Australia
10:30 – 11:00	**Core-shell versus inert polymer grafted adsorbents for the negative chromatography of virus-like particle** Beng Ti Tey, Monash University, Malaysia
11:00 – 11:30	**Why nanofibers are a good adsorptive surface – fundamental understanding and industrial applications for mAb bioprocessing** Karol Lacki, Puridify, United Kingdom
11:30 – 12:00	**Purification of minicircles by combined enzymatic modification of miniplasmid topology and multimodal chromatography** Duarte Prazeres, Instituto Superior Técnico, Portugal
12:30 – 14:00	Lunch
	Session 7: Bioseparations: Recent Advances - 3 Chairs: Karol Lacki, Puridify, United Kingdom Ruben Soares, Institute for Bioengineering and Biosciences, Portugal
14:00 – 14:30	**Bienzymatic production and reaction-integrated separation of laminaribiose by ad- and desorption on zeolite BEA** Dave Hartig, Technische Universität Braunschweig, Germany
14:30 – 15:00	**Understanding and enhancing selective Fab separations using multimodal chromatography** Steven Cramer, Rensselaer Polytechnic Institute, USA
15:00 – 15:30	**Rapid optimization of chromatography operating conditions using a nano-liter scale column on a microfluidic chip with integrated pneumatic valves and optical sensors** Ines Pinto, Instituto Superior Técnico, INESC-MN, Portugal

Tuesday, March 7, 2017 (continued)

15:30 – 16:00 Coffee break

Session 8: Bioseparations: Recent Advances - 4
Chairs: Steven Cramer, Rensselaer Polytechnic Institute, USA
Dave Hartig, Technische Universität Braunschweig, Germany

16:00 – 16:40 **Integration of continuous precipitation, crystallization and flocculation of recombinant proteins**
Alois Jungbauer, BOKU, Austria (Plenary)

16:40 – 17:10 **Use of expanded bed chromatography in industrial scale enzymes production**
Guilherme Ferreira, DSM Biotechnology Center, Netherlands

17:10 – 17:40 **LYTAG-driven purification strategies as a key to integrate and intensify the downstream processing of monoclonal antibodies**
Ana Azevedo, Instituto Superior Técnico, Portugal

17:40 – 18:10 **Computational bioseparation process development**
Marcel Ottens, Delft University of Technology, Netherlands

18:10 – 19:00 Free Time / *ad hoc* Sessions

19:00 – 20:30 Dinner

20:30 – 21:30 **Social Hour / Poster Session – 2**
Chairs: Mainak Majumder, Monash University, Australia
Krista Walton, Georgia Institute of Technology, USA
Dibakar Bhattacharyya, University of Kentucky, USA

Wednesday, March 8, 2017

07:00 – 08:30 Breakfast Buffet

Session 9: Other Technologies Especially Novel Separation Technologies
Chairs: Kamalesh Sirkar, New Jersey Institute of Technology, USA
T. Alan Hatton, Massachusetts Institute of Technology, USA

08:30 – 09:10 **Synthesis of energy efficient separation processes using distillation and membranes**
Rakesh Agrawal, Purdue University, USA (Plenary)

09:10 – 09:40 **Miniaturization of aqueous two-phase extraction for biological applications**
Raquel Aires-Barros, Instituto Superior Tecnico/iBB, Portugal

09:40 – 10:10 **Optimizing the regeneration process parameters for forward osmosis to produce clean water at low temperature**
Abdukrem Amhamed, Hamed Bin Khalifa University, Qatar

10:10 – 10:40 Coffee break

Session 10: Other Technologies Especially Novel Separation Technologies
Chairs: Rakesh Agrawal, Purdue University, USA
Marco Mazzotti, ETH Zurich, Switzerland

10:40 – 12:00 **Panel Discussion: Alternative Separation Processes (AltSep) for Current Organic-Organic Separation Technologies**
Panelists: James Ritter, Andrew Livingston, Randall Snurr, Joao Crespo, Rakesh Agrawal, Marco Mazzotti

12:30 – 13:30 Lunch

13:40 Coaches depart the hotel for the conference excursion.

There will be a guided tour inside the medieval wall of Faro for a glimpse of the local history. We expect to visit a museum or the cathedral. The harbor stands outside one of the entrances of the medieval walls where the group will board a catamaran which will take us along the Natural Park of the Ria Formosa. The island where we will stop is at the southern-most point of Portugal, where the silence and stillness are most impressive. The catamaran will return the group to Faro where the coaches will be waiting for the return to the hotel. Anticipated return time is 18:00.

Dinner this evening will be “on your own”. We’ll have a list of restaurants in Albufeira available; however, it is fun to go to the downtown area and find an interesting restaurant.

Thursday, March 9, 2017

07:00 – 08:30	Breakfast buffet
	Session 11: Membrane Separations - 1 Chairs: Andrew Livingston, Imperial College London, United Kingdom Kamalesh Sirkar, New Jersey Institute of Technology, USA
08:30 – 09:10	**Thin film membranes for molecular separations** Andrew Livingston, Imperial College, London (Plenary)
09:10 – 09:40	**Organic solvent nanofiltration with novel perfluoropolymer and other polymeric membranes** Kamalesh Sirkar, New Jersey Institute of Technology, USA
09:40 – 10:10	**Overview of research on graphene-based membranes** Mainak Majumder, Monash University, Australia
10:10 – 10:40	Coffee break
	Session 12: Membrane Separations - 2 Chairs: João Crespo, FCT-Universidade Nova de Lisboa, Portugal Ranil Wickramasinghe, University of Arkansas, USA
10:40 – 11:10	**Monitoring of membrane processes with fluorescence molecular probes** João Crespo, FCT-Universidade Nova de Lisboa, Portugal
11:10 – 11:40	**Membrane distillation for treating hydraulic fracturing produced waters** Ranil Wickramasinghe, University of Arkansas, USA
11:40 – 12:10	**Membrane supports designed for Pd membranes** Bernard Bladergroen, University of the Western Cape, South Africa
12:10 – 12:40	**Computational fluid dynamics (CFD) approach for characterizing and improving fluid flow for membrane filtration technologies and successful scale-up** Mohd Shawkat Hussain, University College London, United Kingdom
12:40 – 14:00	Lunch
	Session 13: Membrane Separations - 3 Chairs: Winston Ho, The Ohio State University, USA Mihail Barboiu, Institut Europeen des Membranes, France
14:00 – 14:30	**Oxidatively stable membranes for CO_2 separation and H_2 purification** Winston Ho, The Ohio State University, USA
14:30 – 15:00	**Rubbery organic frameworks-tuning the Gaz-diffusion through dynameric membranes** Mihail Barboiu, Institut Européen des Membranes, France
15:00 – 15:30	**CO_2 capture over H_2 by polymeric membranes for carbon-free H_2 production** Ikuo Taniguchi, Kyushu University, Japan
15:30 – 16:00	Coffee break

Thursday, March 9, 2017 (continued)

Session 14: Membrane Separation - 4
Chairs: Dibakar Bhattacharyya, University of Kentucky, USA
Alois Jungbauer, BOKU, Austria

16:00 – 16:30 **Synthesis of functionalized membranes for metal capture to tunable separations**
Dibakar Bhattacharyya, University of Kentucky, USA

16:30 – 17:00 **Nanomembranes in biotechnology: Separation of small and large biomolecules**
Alois Jungbauer, BOKU, Austria

17:00 – 17:30 **Advanced RO element obtained by new membrane and channel material**
Hiroyuki Yamada, Toray Industries, Inc, Japan

17:30 – 18:00 **ElectroOsmoDialysis**
Andriy Yaroshchuk, ICREA & Polytechnic University of Catalonia, Spain

18:00 – 19:00 Free Time / *ad hoc* sessions

19:00 – 21:00 Conference Banquet

Friday, March 10, 2017

07:00 – 08:30	Breakfast buffet
	Session 15: Crystallizations and Solid-Liquid Separations - 1 Chairs: Ronald Rousseau, Georgia Institute of Technology, USA Marco Mazzotti, Swiss Federal Institute of Technology Zurich, Switzerland
08:30 – 09:10	**Sequencing synthesis and crystallization to improve product yield** Ronald Rousseau, Georgia Institute of Technology, USA (Plenary)
09:10 – 09:40	**Crystal nucleation from solution: design and modelling of detection time experiments** Giovanni Maggioni, ETH Zurich, Switzerland
09:40 – 10:10	**Selective manipulation of crystal shape by combined crystallization, milling, and dissolution stages - An approach for robust process design** Fabio Salvatori, Technical University Zurich, Switzerland
10:10 – 10:40	Coffee break
	Session 16: Crystallizations and Solid-Liquid Separations - 2 Chairs: Kamalesh Sirkar, New Jersey Institute of Technology, USA Steven Cramer, Rensselaer Polytechnic Institute, USA
10:40 – 11:10	**Holistic development of a low-energy ammonia-based process for CO_2 capture with solid formation** Marco Mazzotti, ETH Zurich, Switzerland
11:10 – 11:40	**On the potential of phase-change adsorbents for CO_2 capture by temperature swing adsorption** Marco Mazzotti, ETH Zurich, Switzerland
11:40 – 12:00	Conference wrap-up and discussion with conference chairs
12:30	Lunch and departures

Poster Presentations

1.	**Integrating Nanomembrane Separation with Plasmonic Detection for Real-Time Cell Culture Monitoring** Stephan Hinterberger, acib GmbH, Austria
2.	**Conductive nanothick gold on hydrophilic polymeric nanomembranes** Christian Schuster, acib GmbH, Austria
3.	**Hybrid process for genotoxics removal from active pharmaceutical ingredients combining organic solvent nanofiltration with polybenzimidazole adsorbents** Flávio A. Ferreira, IST, Portugal
4.	**Adsorptive removal of CO_2 from CO_2-CH_4 mixture using cation-exchanged zeolites** Jong-Nam Kim, Korea Institute of Energy Research, South Korea
5.	**Development of carbon-based adsorbent for separation of impurities such as siloxane and ammonia from land-fill gas** Kanghee Cho, Korea Institute of Energy Research, South Korea
6.	**Mechanism of preferential CO_2 permeation of amine-containing polymeric membrane** Mai Yoshizawa, Kyushu University, Japan
7.	**Biorefinery to produce activated carbon from biomass - an approach for a biogas refining process** Isabel Esteves, LAQV-Requimte, Portugal
8.	**Design of structured adsorbents for aplications in gas adsorption processes - Conventional shaping vs 3D-Printed formulation** Isabel Esteves, LAQV-Requimte, Portugal
9.	**Mass transfer simulation for concentration of kiwi juice by osmotic distillation using finite volume method** Carlos Zambra, Universidad de Talca, Chile
10.	**Selectvie Modification of Membrane Pore and External Surfaces** Ranil S. Wickramasinghe, University of Arkansas, USA
11.	**Rapid and high-capacity MgO composites by salt-controllable precipitation for pre-combustion CO_2 capture** Chang-Ha Lee, Yonsei University, South Korea
12.	**Carbon dioxide separation from anaesthetic gases with membrane contactors and biocompatible ionic liquids** Carla Martins, Universidade NOVA de Lisboa, Portugal
13.	**Comparison and evaluation of agglomerated MOFs in gaseous biofuels purification by means of pressure swing adsorption (PSA)** Ismael Águeda, Universidad Complutense de Madrid, Spain
14.	**Adsorption of representative pharmaceutical compounds from hospital wastewater by carbon materials** Ismael Águeda, Universidad Complutense de Madrid, Spain

15.	**Recovery of butanol from model fermentation broths by adsorption on activated carbon** Ismael Águeda, Universidad Complutense de Madrid, Spain