

# Program

## *Water Purification and Reuse*

Seminaris Seehotel  
An der Pirschheide 40  
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June 8 – 13, 2003

*Co-sponsors: AICHE, ACS, DECHEMA*

### Conference Chair

Dr. Norman N. Li  
NL Chemical Technology, Inc.  
U. S. A.

Engineering Conferences International  
Six MetroTech Center  
Brooklyn, NY 11201  
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**The conference Organizing Committee would like to thank the National Science Foundation of the USA for its financial support.**

### **Notes**

All ECI conferences technical sessions, meals, and socials are smoke-free.

Please turn your cell phone to vibrate and have any telephone conversations outside the meeting room.

Poster presenters – We ask that presenters to be present in front of their posters for interactions with the attendees during Session 1 and 2. Presenters are not required to be present at Session 3. The conference participants will be asked to vote for the best top 3 papers in this final session.

**Sunday, June 8, 2003**

4:00 pm – 6:00 pm	Registration/Check-in
5:30 pm – 6:00 pm	Welcome Reception
6:00 pm – 7:30 pm	Dinner Buffet
7:30 pm – 8:30 pm	Social Hour

**Monday, June 9, 2003**

7:30 am – 8:30 am

Breakfast Buffet

8:30 am – 8:45 am

Opening Remarks

Norman Li, Conference chair

Herman Bieber, ECI Representative

8:45 am – 12:20 pm

**Session I: Advanced Biological and Chemical Reaction Technologies**

Session Chairs: Dr. Walter J. Weber, University of Michigan, USA

Dr. Michael R. Hoffman, California Institute of  
Technology, USA

***Advanced Biological Processes for Contaminant Removal***

Dr. Perry L. McCarty, Department of Civil and Environmental  
Engineering, Stanford University, USA

***Organic Contaminant Bioavailability in Groundwater and  
Subsurface Systems***

Dr. Walter J. Weber, Department of Civil and Environmental Engineering,  
University of Michigan, USA

10:15 am – 10:45 am

Morning Coffee

***Sonochemical Reaction Engineering for Water Quality Control***

Dr. Michael R. Hoffmann, California Institute of Technology, W. M. Keck  
Laboratories, USA

***Point Source Metals recovery in a Spouted Bed Electrolytic  
Reactor (SBER)***

Dr. Joseph M. Calo\* and A. P. Shirvanian, Chemical Engineering, Brown  
University, and G. Hradil, Technic Inc., USA

12:20 pm – 1:45 pm

Lunch Buffet

2:00 pm – 5:00 pm

*Ad hoc* discussions, free time for recreation, optional visit to Potsdam

5:00 pm – 7:15 pm

**Session II: Advanced Inorganic Membrane Technology**

Session Co-Chairs: Dr. Yi Hua (Ed) Ma, Worcester Polytechnic  
Institute, USA

Dr. Michel Farcy, Pall Corporation, France

***Aqueous Ion Transport in Mesoporous Inorganic Membranes:  
Modeling and Experiments***

Dr. Henk Verweij, Department of Materials Science and Engineering, The  
Ohio State University, USA

**Monday, June 9, 2003 (continued)**

***Waste Water Recycle with Inorganic Membranes in  
Dye/Pigment and Specialty Organic Processing***

Dr. Michel Farcy, Pall Corporation, Paris, France

***Factors Affecting Salt Rejection in Nanoporous Ceramic  
Membranes***

Dr. Marc A. Anderson\*, Joanna Skuzlacek, and M. Isabel Tejedor, Water  
Science and Engineering Laboratory, University of Wisconsin, USA

7:20 pm – 9:00 pm

Dinner Buffet

9:00 pm – 10:00 pm

Social Hour

**Tuesday, June 10, 2003**

7:30 am – 8:30 am

Breakfast Buffet

8:30 am – 12:00 noon

**Session III: Advanced Polymeric Membrane Technology (I)**

Session Co-Chairs: Dr. Norman N. Li, NL Chemical Technology, Inc.,  
USA  
Dr. Enrico Drioli, University of Calabria, Italy

***Perspective for Membrane Research and Application in Water Purification***

Dr. Enrico Drioli\* and Efreem Curcio, Institute on Membrane Technology, ITM-CNR, University of Calabria, Italy

***Development of an Advanced Membrane for Water Treatment***

Dr. Richard Q. Song\*, Dr. Jane C. Li, Dr. Mark A. Kuehne, Maxwell Tsai, and Dr. Norman N. Li, NL Chemical Technology, Inc., USA

10:00 am – 10:30 am

Morning Coffee

***Polypeptide and Biomolecule Functionalized Membranes for Water Treatment***

Dr. D.B. Bhattacharyya, Department of Chemical and Materials Engineering, University of Kentucky, USA

***Removal and Recovery of Metals and Other Materials from Aqueous Solutions by Supported Liquid Membranes with Strip Dispersion***

Dr. W.S. Winston Ho, Department of Chemical Engineering, Department of Materials Science and Engineering, The Ohio State University, USA

12:15 pm – 1:30 pm

Lunch Buffet

1:30 pm – 3:30 pm

*ad hoc* sessions/free time for recreation

3:30 pm – 5:00 pm

**Poster Session I with coffee**

Co-Chairs: Dr. D. Bhattacharyya, University of Kentucky, USA  
Dr. Enrico Drioli, University of Calabria, Italy  
Dr. Eric M. V. Hoek, University of California, USA  
Dr. Richard Q. Song, NL Chemical Technology, USA

5:00 pm – 7:15 pm

**Session IV: Advanced Extraction and Stripping Technologies**

Session Co-Chairs: Dr. W.S. Winston Ho, Ohio State University, USA  
Dr. Masahiro Goto, Kyushu University, Japan

***Extraction of Rare Earth Metals by Emulsion Liquid Membranes Containing a Novel Cyclic Carrier Calixarene***

Dr. Masahiro Goto, Department of Applied Chemistry, Kyushu University, Japan

***Stable Emulsion Liquid Membranes for Water Reclamation***

Dr. John Wiencek\*, Jin Li, and Barry Hu, Department of Chemical and Biochemical Engineering, The University of Iowa, USA

**Tuesday, June 10, 2003 (continued)**

***Cyanide Removal from Wastewater Using Gas Filled Membrane Pores***

Dr. Zhisong Shen, Dr. Binbing Han, and Dr. Ranil Wickramasinghe\*,  
Department of Chemical and Bioresource Engineering, Colorado State  
University, USA

7:20 pm – 9:00 pm

Dinner Buffet

9:00 pm – 10:00 pm

Social Hour

**Wednesday, June 11, 2003**

7:30 am – 8:30 am

Breakfast Buffet

8:30 am – 12:00 noon

**Session V: Advanced Adsorption Technology**

Session Co-Chairs: Dr. Ralph Yang, University of Michigan, USA  
Dr. Motoyuki Suzuki, University of Tokyo and  
United Nations University, Tokyo, Japan

***Carbon-Ceramic Composite Membrane***

Dr. M. Suzuki, University of Tokyo and University of United Nations,  
Tokyo, Japan

***Dynamics of Multi-component Separation in Batch  
Chromatography and Continuous Chromatography***

Dr. N.-H. Linda Wang\*, Y. Xie, S. Mun, and C. Chin, School of Chemical  
Engineering, Purdue University, USA

10:00 am – 10:30 am

Morning Coffee

***Simulating the Removal of Synthetic Organic Chemicals in  
Fixed-Bed Granular Activated Carbons Adsorbers***

Michelle E. Jarvie\*, D. W. Hand, Dr. John C. Crittenden, and D. R.  
Hokanson, Department of Civil and Environmental Engineering, Michigan  
Technological University, USA

***Natural Organic Matter Preloading of Activated Carbon in Water  
Treatment Applications: Phenomena, Mechanisms, and Effects  
on Target Compound Removal***

Dr. Walter J. Weber, Department of Civil and Environmental Engineering,  
University of Michigan, USA

12:00 noon – 1:30 pm

Lunch Buffet

1:30 pm – 5:00 pm

*ad hoc* sessions/free time for recreation

5:00 pm – 7:15 pm

**Session VI: Removal of Trace Contaminants**

Session Co-Chairs: Dr. Andre Y. Tremblay, University of Ottawa,  
Canada  
Dr. D.B. Bhattacharyya, University of Kentucky,  
USA

***Specific Chemical Reactions between Selected Nanoparticles  
and Trace Contaminants***

Dr. C. P. Huang, Department of Civil and Environmental Engineering,  
University of Delaware, USA

***Ozonation of Persistent DOC in WWTP Effluent with the Aim of  
Groundwater Recharge***

Dr. Jochen Schumacher\* and Martin Jekel, Department of Water Quality  
Control, Technical University Berlin, Germany



**Wednesday, June 11, 2003 (continued)**

***Elimination of Trace Organics in Long Term Operation of Conventional and Membrane Activated Sludge Processes***

Dr. Regina Gnirss\* and Sebastian Zuehlke, Berliner Wasserbetriebe,  
Boris Lesjean, Vivendi Water - Anjou Recherche, and Uwe Duennbier,  
Berliner Wasserbetriebe, Germany

7:20 pm – 9:00 pm

Dinner Buffet

9:00 pm – 10:00 pm

**Poster Session II** and Social Hour

Co-Chairs: Dr. D. Bhattacharyya, University of Kentucky, USA  
Dr. Enrico Drioli, University of Calabria, Italy  
Dr. Eric M. V. Hoek, University of California, USA  
Dr. Richard Q. Song, NL Chemical Technology, USA

**Thursday, June 12, 2003**

7:30 am – 8:30 am

Breakfast Buffet

8:30 am – 12:45 pm

**Session VII: Integrated Process Designs and Implementation**

Session Chair: Dr. Greg Leslie, CH2M, Australia

Dr. Amy Childress, University of Nevada, USA

***30 Years of Treatment Evolution for Municipal Water Recycling: From Windhoek, Namibia to NEWater, Singapore***

Dr. Ian Law, CH2M HILL, Sydney, Australia

***Water Reuse and Zero Liquid Discharge – A Sustainable Water Resource Solution***

Dr. Boris Lesjean, Research Engineer, Kompetenz Zentrum Wasser Berlin, Germany and Bruce Durham, Vivendi Water, Warkworth, UK

10:00 am – 10:30 am

Morning Coffee

***Multi-source Water Recycling at London's Millennium Dome***

Dr. Alan Smith, Research and Development Department, Thames Water, Reading *Berkshire, UK*

***Identifying Key Process Issues through Pilot Testing: Experiences from the World's Largest Municipal Water Recycling Plant in Kuwait***

Dr. Stephan van Hoof, Norit Membrane Technology, Enschede, The Netherlands

***Failure of Microporous Membranes in Drinking Water and Water Reuse Applications***

Dr. Amy E. Childress, Department of Civil Engineering, University of Nevada, Reno, NV, USA, Shivaji S. Deshmukh, Orange County Water District, Fountain Valley, CA, USA, Dr. Mehul Patel and Dr. Gregory L. Leslie\*, CH2M Hill Australia, Australia

12:50 pm – 2:00 pm

Lunch Buffet

2:00 pm – 3:45 pm

*ad hoc* sessions/free time for recreation

3:45 pm – 4:45 pm

**Poster Session III (with coffee)**

Co-Chairs: Dr. D. Bhattacharyya, University of Kentucky, USA

Dr. Enrico Drioli, University of Calabria, Italy

Dr. Eric M. V. Hoek, University of California, USA

Dr. Richard Q. Song, NL Chemical Technology, USA

4:45 pm – 7:30 pm

**Session VIII: Advanced Polymeric Membrane Technology (II)**

Co-Chairs: Dr. Heiner Strathmann, University of Stuttgart, Germany

Dr. James E. Kilduff, Rensselaer Polytechnic Institute, USA

***CMP Water Recovery by Crossflow Filtration***

Matthias Grabosch, Sartorius AG, Germany

**Thursday, June 12, 2003 (continued)**

***A RO-CEDI Hybrid System for High Purity Water Production***

Dr. Seung-Hyeon Moon, Environmental Science and Engineering,  
Kwangju Institute of Science and Technology, Kwangju, Korea

***Impact of Colloidal Fouling on RO and NF Membrane  
Performance in Water Treatment and Reclamation Applications***

Dr. Eric M.V. Hoek, University of California, Department of Chemical and  
Environmental Engineering, USA

***Ultrafiltration Membrane Fouling by Natural Organic Matter***

James E. Kilduff\* and Georges Belfort, Rensselaer Polytechnic Institute,  
USA

8:00 pm – 10:00 pm

Conference Banquet

**Friday, June 13, 2003**

7:30 am – 8:30 am

Breakfast Buffet

8:30 am – 12:00 pm

**Session IX: Process Design for Water Treatment and Reuse**

Session Co-Chairs: Dr. Henrik Wenzel, Technical University of Denmark, Denmark  
Dr. Eric Hoek, University of California, USA

***Break-through of Mass Integration in Textile Industry through Development of Generic Water Recycle Schemes***

Dr. Henrik Wenzel\*, Department of Manufacturing Engineering and Management, Technical University of Denmark, Denmark, Zsig Schneider and Chris Buckley, Pollution Research Group, School of Chemistry, University of Natal, South Africa, Hans Henrik Knudsen, Department of Manufacturing Engineering and Management, Technical University of Denmark, Denmark, and Susan Barclay, Pollution Research Group, School of Chemistry, University of Natal, South Africa

***The R&D Project "Natural and Artificial Systems of Recharge and Infiltration" Oriented Towards the Specific Requirements in Berlin***

Bernd Heinzmann, Berliner Wasserbetriebe, Germany

10:00 am – 10:30 am

Morning Coffee

***The Use of Advanced Oxidation Processes in the Destruction of DDT***

Dr. Andre Y. Tremblay, University of Ottawa, Canada

***Enhanced Direct Contact Membrane Distillation Process for Desalination***

Dr. Amy E. Childress, University of Nevada, USA

12:15 pm – 1:30 pm

Lunch Buffet and departure