

# Chemical Process Control – CPC 7

January 8 – 13, 2006 ♦ Fairmont Chateau Lake Louise ♦ Alberta, Canada

## FINAL AGENDA

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\* Represents presenters  
[ ] Represents Paper ID

### Sunday, January 8

1:00 p.m. to	5:00 p.m.	Conference Registration
<b>5:00 p.m. to</b>	<b>6:30 p.m.</b>	<b>Welcome Reception</b>
<b>6:30 p.m. to</b>	<b>6:45 p.m.</b>	<b>Introductory Remarks</b> Conference Chairs: <i>Mike Henson (University of Massachusetts) and Tom Badgwell (Aspen Technology)</i>
<b>6:45 p.m. to</b>	<b>10:00 p.m.</b>	<b>General Session – Process Control Theory</b> Session Chair: <i>Sirish Shah (University of Alberta)</i>
6:45 p.m. to	7:30 p.m.	Control in an Information-Rich World: Future Directions in Control, Dynamics and Systems – <i>Richard Murray (California Institute of Technology)</i> [51]
7:30 p.m. to	8:15 p.m.	Polynomial Control Systems: Analysis and Design via Dissipation Inequalities – <i>Christian Ebenbauer and Frank Allgöwer*</i> (University of Stuttgart) [68]
8:15 p.m. to	8:30 p.m.	Refreshment Break
8:30 p.m. to	9:15 p.m.	Recent Developments in the Control of Constrained Hybrid Systems – <i>Manfred Morari*</i> and <i>Miroslav Barić (Swiss Federal Institute of Technology)</i> [69]
9:15 p.m. to	10:00 p.m.	Approximate Dynamic Programming Based Approach to Process Control and Scheduling – <i>Jay Lee*</i> (Georgia Institute of Technology) and <i>Jong Min Lee (University of Virginia)</i> [59]

## Monday, January 9

7:30 a.m. to 7:30 a.m. to	5:00 p.m. 8:30 a.m.	Conference Registration Continental Breakfast (complimentary)
<b>8:30 a.m. to</b>	<b>12:00 p.m.</b>	<b>General Session – Process Control Applications</b> Session Chair: <i>Martin Pottmann (DuPont)</i>
8:30 a.m. to	9:10 a.m.	Model Predictive Control – Building a Bridge Between Theory and Practice – <i>Brian Froisy (Aspen Technology)</i> [48]
9:10 a.m. to	9:50 a.m.	Air Separation Control Technology – <i>David Vinson (Air Products and Chemicals)</i> [67]
9:50 a.m. to	10:10 a.m.	Refreshment Break
10:10 a.m. to	10:50 a.m.	Measurement and Control of Polymerization Reactors – <i>John Richards* and John Congalidis* (DuPont)</i> [50]
10:50 a.m. to	11:30 a.m.	Bioprocess Control: Advances and Challenges – <i>Joseph Alford (Eli Lilly and Co.)</i> [39]
11:30 a.m. to	12:00 p.m.	Panel Discussion
<b>12:00 p.m. to</b>	<b>5:45 p.m.</b>	<b>Free Afternoon</b>
<b>5:45 p.m. to</b>	<b>9:00 p.m.</b>	<b>General Session – Multiscale Systems</b> Session Chair: <i>Fraser Forbes (University of Alberta)</i>
5:45 p.m. to	6:30 p.m.	A Systems-Based Approach to Multiscale Computation: Equation-Free Detection of Coarse-Grained Bifurcations – <i>Constantinos Siettos (National Technical University of Athens), R. Rico-Martinez (Instituto Tecnológico de Celaya, Mexico) and Yannis Kevrekidis* (Princeton University)</i> [63]
6:30 p.m. to	7:15 p.m.	An Extended Kalman Filter for <i>In-Situ</i> Sensing of Yttria-Stabilized Zirconia in Chemical Vapor Deposition – <i>Rentian Xiong, Paul Wissmann and Martha Gallivan* (Georgia Institute of Technology)</i> [44]
7:15 p.m. to	7:30 p.m.	Refreshment Break
7:30 p.m. to	8:15 p.m.	A Multiscale Systems Approach to Microelectronic Processes – <i>Richard Braatz*, Richard Alkire and Edmund Seebauer (University of Illinois at Urbana-Champaign)</i> [55]
8:15 p.m. to	9:00 p.m.	Control and Optimization of Multiscale Process Systems – <i>Panagiotis Christofides* (University of California – Los Angeles) and Antonios Armaou (Pennsylvania State University)</i> [37]
9:00 p.m. to	10:30 p.m.	Hospitality

## Tuesday, January 10

7:30 a.m. to 7:30 a.m. to	5:00 p.m. 8:30 a.m.	Conference Registration Continental Breakfast (complimentary)
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<b>8:30 a.m. to</b>	<b>12:00 p.m.</b>	<b>General Session – Information and Enterprise Systems</b> Session Chair: <i>Gintaras Reklaitis (Purdue University)</i>
8:30 a.m. to	9:10 a.m.	Enterprise Resource Planning (ERP) Implementation – <i>Steve Jenison*</i> and <i>Rich Gargas (Eli Lilly and Co.)</i> [41]
9:10 a.m. to	9:50 a.m.	Ontological Informatics Infrastructure for Chemical Product Design and Process Development – <i>Venkat Venkatasubramanian (Purdue University)</i> [60]
9:50 a.m. to	10:10 a.m.	Refreshment Break
10:10 a.m. to	10:50 a.m.	Current Opportunities, Future Directions: IBM's Perspective on PLM/ALM in the Chemicals Industry – <i>Val Rahmani and Lute Quintrell* (IBM)</i> [53]
10:50 a.m. to	11:30 a.m.	Emerging Cyberinfrastructure: Opportunities for the Chemical Process Control Community – <i>Sangtae Kim (Purdue University)</i> [57]
11:30 a.m. to	12:00 p.m.	Panel Discussion
<b>12:00 p.m. to</b>	<b>6:30 p.m.</b>	<b>Free Afternoon</b>
<b>6:30 p.m. to</b>	<b>9:00 p.m.</b>	<b>General Session – Systems Biology</b> Session Chair: <i>Juergen Hahn (Texas A&amp;M University)</i>
6:30 p.m. to	7:15 p.m.	Signal Transduction and Regulation in Bacteria – <i>Ernst Dieter Gilles (Max Planck Institute for Dynamics of Complex Technical Systems)</i> [28]
7:15 p.m. to	7:30 p.m.	Refreshment Break
7:30 p.m. to	8:15 p.m.	Circadian Rhythm: A Natural, Robust, Multi-scale Control System – <i>Frank Doyle*, Rudi Gunawan, Neda Bagheri, Henry Mirsky, (University of California – Santa Barbara)</i> and <i>Tsz Leung To (Massachusetts Institute of Technology)</i> [62]
8:15 p.m. to	9:00 p.m.	Analysis and Design of Complex Metabolic Networks – <i>Vassily Hatzimanikatis* and Liqing Wang (Northwestern University)</i> [66]
9:00 p.m. to	10:30 p.m.	Hospitality

## Wednesday, January 11

7:30 a.m. to 8:30 a.m.	Continental Breakfast (complimentary)
<b>8:30 a.m. to 12:00 p.m.</b>	<b>General Session – Modeling and State Estimation</b> Session Chair: <i>Wolfgang Marquardt (RWTH Aachen University)</i>
8:30 a.m. to 9:10 a.m.	An Overview of Subspace Identification – <i>Joe Qin (University of Texas at Austin)</i> [61]
9:10 a.m. to 9:50 a.m.	Nonlinear Empirical Modeling Techniques – <i>Ronald Pearson (ProSanos Corporation)</i> [49]
9:50 a.m. to 10:10 a.m.	Refreshment Break
10:10 a.m. to 10:50 a.m.	Sequential Monte Carlo Methods: New Tools for Optimal Filtering, Identification and Control of Non-linear Systems – <i>Arnaud Doucet* (University of British Columbia), Sumeetpal Singh (Cambridge University) and Ba-Ngu Vo (Melbourne University)</i> [42]
10:50 a.m. to 11:30 a.m.	Particle Filtering and Moving Horizon Estimation – <i>James Rawlings* (University of Wisconsin – Madison) and Bhavik Bakshi (Ohio State University)</i> [64]
11:30 a.m. to 12:00 p.m.	Panel Discussion
<b>12:00 p.m. to 1:00 p.m.</b>	<b>Free time</b>
<b>1:00 p.m. to 3:00 p.m.</b>	<b>Vendor Display</b> Vendor Chair: <i>Robert Parker (University of Pittsburgh)</i>
<b>3:00 p.m. to 6:30 p.m.</b>	<b>Free time</b>
4:00 p.m. to 5:30 p.m.	CACHE Task Force Meeting <i>Tom Edgar (University of Texas at Austin)</i>
<b>6:30 p.m. to 9:00 p.m.</b>	<b>General Session – Microchemical and Fuel Systems</b> Session Chair: <i>Wayne Bequette (Rensselaer Polytechnic Institute)</i>
6:30 p.m. to 7:15 p.m.	Hierarchical Multiscale Model-Based Design of Experiments, Catalysts, and Reactors for Fuel Processing – <i>Dionisios Vlachos*, Ashish Mhadeshwar and Niket Kaisare (University of Delaware)</i> [45]
7:15 p.m. to 7:30 p.m.	Refreshment Break
7:30 p.m. to 8:15 p.m.	Dynamics and Control of Integrated Microchemical Systems with Application to Micro-Scale Fuel Processing – <i>Mayuresh Kothare (Lehigh University)</i> [47]
8:15 p.m. to 9:00 p.m.	Control of Stationary and Transportation Fuel Cell Systems: Progress and Opportunities – <i>Subbarao Varigonda* (United Technologies Research Center) and Mithun Kamat (UTC Power)</i> [43]
9:00 p.m. to 10:30 p.m.	Hospitality

## Thursday, January 12

- 7:30 a.m. to 8:30 a.m. Continental Breakfast (complimentary)
- 8:30 a.m. to 12:00 p.m.** **General Session – Dynamic Simulation and Optimization**  
Session Chair: *Dominique Bonvin (Swiss Federal Institute of Technology)*
- 8:30 a.m. to 9:10 a.m. Sensitivity Analysis of Differential-Algebraic Equations and Partial Differential Equations – *Linda Petzold\**, *Yang Cao, (University of California – Santa Barbara)* and *Shengtai Li, (Los Alamos National Laboratory)* and *Radu Serban (Lawrence Livermore National Laboratory)* [46]
- 9:10 a.m. to 9:50 a.m. Can Simulation Technology Enable a Paradigm Shift in Process Control? – *Robert Cox\**, *Julie Smith\** and *Yiannis Dimitratos (DuPont)* [40]
- 9:50 a.m. to 10:10 a.m. Refreshment Break
- 10:10 a.m. to 10:50 a.m. Simultaneous Dynamic Optimization Strategies: Recent Advances and Challenges – *Shivakumar Kameswaran* and *Larry Biegler\** (Carnegie Mellon University) [52]
- 10:50 a.m. to 11:30 a.m. Optimization of Hybrid Systems – *Paul Barton\**, *Cha Kun Lee* and *Mehmet Yunt (Massachusetts Institute of Technology)* [54]
- 11:30 a.m. to 12:00 p.m. Panel Discussion
- 12:00 p.m. to 2:00 p.m.** **Poster Display with Lunch**  
Poster Chairs: *Prodromos Daoutidis (University of Minnesota)* and *Edward Gatzke (University of South Carolina)*
- Vendor Display with Lunch**  
Vendor Chair: *Robert Parker (University of Pittsburgh)*
- 2:00 p.m. to 5:30 p.m.** **Free time**
- 5:30 p.m. to 6:30 p.m.** **Reception (offsite at Whiskyjack Lodge)**
- 6:30 p.m. to 9:00 p.m.** **Banquet (offsite at Whiskyjack Lodge)**

## Friday, January 13

- 7:00 a.m. to 8:00 a.m. Continental Breakfast (complimentary)
- 8:00 a.m. to 11:00 p.m.** **General Session – Process Control Education**  
Session Chair: *Kenneth Muske (Villanova University)*
- 8:00 a.m. to 8:40 a.m. A Global View of Graduate Process Control Education – *Thomas Edgar\** (University of Texas at Austin), *Babatunde Ogunnaike* (University of Delaware and *Kenneth Muske (Villanova University)*) [65]
- 8:40 a.m. to 9:10 a.m. Panel Discussion
- 9:10 a.m. to 9:30 a.m. Refreshment Break
- 9:30 a.m. to 10:10 a.m. Renovating the Undergraduate Process Control Course – *Thomas Edgar\** (University of Texas at Austin), *Babatunde Ogunnaike* (University of Delaware), *James Downs\** (Eastman Chemical Co.), *Kenneth Muske* (Villanova University) and *Wayne Bequette\** (Rensselaer Polytechnic Institute) [58]
- 10:10 a.m. to 11:00 a.m. Panel Discussion
- 11:00 a.m. to 11:15 a.m.** **Closing**  
Conference Chairs: *Mike Henson* (University of Massachusetts) and *Tom Badgwell* (Aspen Technology)