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WELCOME MESSAGE

On behalf of the International Program Committee (IPC) and the National Organizing Committee (NOC), we would like to extend our warmest welcome to all the attendees of the 7th International Symposium on Advanced Control of Chemical Processes (ADCHEM). Held under the auspices of International Federation of Automatic Control (IFAC), this symposium brings together academics, engineers and researchers around the world in the areas of process modeling, monitoring, and control to the Hong Kong Special Administration Region (HKSAR) of China, the Pearl of the Orient.

There is a saying in Chinese “有朋自遠方來，不亦樂乎!” This can be roughly translated “friends from afar, what a wonderful and happy thing”. Indeed, this ADCHEM will be a wonderful event for the organizers, as we had a record number of paper submission. For you as the symposium attendee, we believe this will also be a wonderful experience for the reasons of:

- **Timing:** This ADCHEM was originally scheduled 17-20 June 2003. The organizers decided to postpone the symposium to 11-14 January 2004, due to the outbreak of the SARS in the spring of 2003. This postponement may have caused some inconvenience to you. For this, we sincerely apologize. Bad things can turn into good. The postponement moves the ADCHEM to a time when the weather of Hong Kong is very comfortable. Also, with this new date, the symposium sits just between the New Year and the Chinese New Year (22 January). Hong Kong is well known for its blending of the western and Chinese cultures. Each year around this time, there will be numerous interesting signs and greetings set up for the Chinese New Year on the walls of the skyscrapers along the magnificent Victoria Harbor area. The organizers would like to take this opportunity to say “Kung Hei Fat Choy and Sun Tai Kin Hong”, wishing you a prosperous, healthy and successful year.

- **Location:** Hong Kong is such a fascinating place. There are so many things in stores for visitors who come from all corners of the world. For those who have visited Hong Kong before, you love to come back and renew their experiences. For those who have not been here before, you will surely have an unforgettable experience. Hong Kong is coined as the shopper's paradise and heaven of foods. It is also the gateway to Mainland China. Hong Kong has many splendid tourist attractions, and it boasts itself as a metropolis well suited for the 21st century. We are pleased to report that Hong Kong received a record tourist total despite of the SARS outbreak early in year 2003. Hong Kong has again captured the imagination of the visitors. So, come and enjoy Hong Kong.

- **Quality.** Last not the least, with the recorded paper submission and hard work of the entire IPC team, particularly the area chairs, only these high quality papers have been accepted.

Again, warmest welcome. Wish you a wonderful stay in Hong Kong and Happy Chinese New Year.

Furong Gao, Chair, NOC  
Frank Allgower, Chair, IPC
ORGANIZATION

International Program Committee

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Frank Allgower (Germany)

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B. Huang (Canada), J. Lee (US) and J. Qin (US)

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B. Ogunnaike (US)

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J. Chu (China)         Masahiro Ohshima (Japan)
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Sten Bay Jorgensen (Denmark)  Fuli Wang (China)
Rudibert King (Germany) Guenter Wozny (Germany)
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Costas Kravaris (Greece) En-sup Yoon (Korea)
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National Organizing Committee

Honorary Chairs
Youxian Sun, Po Lock Yue

Chair
Furong Gao

Co-Chair
Shuqing Wang

Committee Members

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<tr>
<td>Xiren Cao</td>
<td>Ping Gao</td>
<td>C. K. Li</td>
<td>Peter K. S. Tam</td>
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<td>C. M. Chan</td>
<td>James H. F. Ho</td>
<td>Yu Qian</td>
<td>K. L. Teo</td>
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<td>P. T. Chan</td>
<td>Biao Huang</td>
<td>Joe Qin</td>
<td>Fuli Wang</td>
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<td>Bingzhen Chen</td>
<td>Dexian Huang</td>
<td>Li Qiu</td>
<td>Y. K. Wong</td>
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<td>Guohua Chen</td>
<td>David C. W. Hui</td>
<td>A B Rad</td>
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<td>Xijun Hu</td>
<td>Cheng Shao</td>
<td>Jie Zhang</td>
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Sponsored by

IFAC - The International Federation of Automatic Control

Supporting Organizations

University Grants Committee
K. C. Wong Education Foundation
The Chiang Chen Industrial Charity Foundation
The Chen Hsong Group
The Hong Kong Tourism Board
The Hong Kong University of Science and Technology
The Hong Kong Polytechnic University
Northeastern University, China
Zhejiang University

The organizers greatly appreciate the support from the above agencies, companies and institutions.

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<tr>
<th>Date</th>
<th>SUNDAY</th>
<th>MONDAY</th>
<th>TUESDAY</th>
<th>WEDNESDAY</th>
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<td>11:00</td>
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<td>17 January</td>
<td>Departure to Harbour Cruise</td>
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<td>Departure to Conference Banquet</td>
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<td></td>
<td>Reception at 17:00 sharp</td>
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<td>18 January</td>
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</table>
Symposium Venue:
LTB: Lam Woo Lecture Theatre (B)
LTD: Lee Wing Tat Lecture Theatre (D)
LTF: Leung Yat Sing Lecture Theatre (F)
LTG: Chow Tak Sin Lecture Theatre (G)

Room 1401: Preparation Room

Poster Session:
Academic Concourse
# PROGRAM SCHEDULE

## 11 January 2004 (Sunday)

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## 12 January 2004 (Monday)

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<tr>
<td>09:30</td>
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<td></td>
<td>Frontiers in Industrial Process Automation – A Personal Perspective</td>
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<tr>
<td></td>
<td>Peter Terwiesch, ABB Process Industries GmbH, GERMANY</td>
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<td>10:30</td>
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<td>11:00</td>
<td><strong>Oral Lectures #1</strong></td>
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<tr>
<td>11:00</td>
<td>Session 1.1 Control Applications 1</td>
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<tr>
<td>11:00</td>
<td>Session 1.2 System Identification</td>
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<tr>
<td>11:00</td>
<td>Session 1.3 Control Monitoring and Fault Detection</td>
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<td>13:00</td>
<td>Lunch</td>
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<td>14:00</td>
<td><strong>Semi-Plenary Lectures SP #1</strong></td>
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<tr>
<td>14:00</td>
<td>Session SP 1.1 Modelling and Identification</td>
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<tr>
<td>14:00</td>
<td>Session SP 1.2 Process and Control Monitoring</td>
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<td>15:40</td>
<td><strong>Oral Lectures #2</strong></td>
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<tr>
<td>15:40</td>
<td>Session 2.1 Model Predictive Control</td>
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<td>Session 2.2 Modelling and Identification</td>
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<td>Session 2.3 Statistical Process Monitoring and Application</td>
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### 13 January 2004 (Tuesday)

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<td>Session SP 2.2: Model Based Control</td>
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<td>Session 3.2: Modelling and Control of Biochemical and Biomedical Systems</td>
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<td>Session 4.1: New Formulations and Issues in MPC</td>
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<td>Session 4.3: Real Time Optimization and Scheduling</td>
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<td>15:30 – 16:00</td>
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<td>16:00 – 17:00</td>
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<tr>
<td></td>
<td></td>
<td>A Learning Theory Approach to System Identification</td>
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<td>M. Vidyasagar, Tata Consultancy Services, INDIA</td>
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<td>17:00 – 18:00</td>
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### 14 January 2004 (Wednesday)

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<td>Session SP 3.1: Batch and Semi-batch Control</td>
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<td>Session SP 3.2: Process Control Applications</td>
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<td>Session 5.1: Robustness and Nonlinearity Analysis</td>
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<td>Session 5.2: Subspace Approaches to Control and Monitoring</td>
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<td>5.3</td>
<td>Session 5.3: Microelectronic Manufacturing Process Control</td>
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<td>12:40 – 13:50</td>
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<td>6.1</td>
<td>Session 6.1: Control Applications 2</td>
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<td>Session 6.2: Batch Process Modelling and Control</td>
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<td>6.3</td>
<td>Session 6.3: Advances in Process Control</td>
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<td>A Systems Approach to Modelling and Analyzing Biological Regulation</td>
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<td>Francis J. Doyle III, University of California, Santa Barbara, USA</td>
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<td>16:30 – 17:00</td>
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<td>17:00 – 18:00</td>
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**DETAILED PROGRAM**

12 January 2004 (Monday)

**Plenary Lecture #1**
09:30 – 10:30

**LTB**
Chair: F. Allgower

*Frontiers in Industrial Process Automation – A Personal Perspective*
Peter Terwiesch, ABB Process Industries GmbH, GERMANY

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**Oral Session #1**
11:00 – 13:00

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<tr>
<th>LTD</th>
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</table>
| **Session 1.1**
Control Applications 1 | **Session 1.2**
System Identification | **Session 1.3**
Control Monitoring and Fault Detection |

### LTD (Session 1.1)
**Co-chairs:** S. Skogestad, F. Doyle

11:00 – 11:20
*Modeling and Optimization on Energy Costs in Internal Thermally Coupled Distillation Columns of Non-Ideal Mixtures*
X. -G. Liu, J. -X. Qian, Zhejiang University

11:20 – 11:40
*Multi-objective Robust Control of an Evaporation Process*
W. -J. Yan, Zhejiang University
Y. Cao, Cranfield University

11:40 – 12:00
*Nonlinear Control of a Fluid Catalytic Cracking Unit*
Q. Yang, S. -R. Li, X. -M. Tian, University of Petroleum (East China)

### LTG (Session 1.3)
**Co-chairs:** A. Cinar, C. Scali

11:00 – 11:20
*Development of a Technique for Performance Evaluation of Industrial Controllers*
C. Scali, M. Rossi, University of Pisa
M. Amadei, Polimeri Europa

11:40 – 12:00
*Performance Envelopes of Process Intensified Systems*
S. R. Abd Shukor, M. T. Tham, University of Newcastle upon Tyne

---

**Co-chairs (Session 1.2):**
Y. Arkun, W. Marquardt

11:00 – 11:20
*Stochastic Grey-Box Modeling as a Tool for Improving the Quality of First Engineering Principles Models*
N. R. Kristensen, H. Madsen, S. B. Jørgensen, Technical University of Denmark

11:20 – 11:40
*Identification of Multirate Sampled-Data Systems*
J. -D. Wang, T. -W. Chen, B. Huang, University of Alberta

11:40 – 12:00
*System Identification from Multi-rate Data*
R. B. Gopaluni, H. Raghavan, S. L. Shah, University of Alberta

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<tr>
<th>Time</th>
<th>Session Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>12:00 – 12:20</td>
<td>Estimator Design with PLS Model for Consistent Control of Refinery Main Fractionators</td>
<td>D. Pastore, A. Brambilla, G. Pannocchia, University of Pisa</td>
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<td>12:00 – 12:20</td>
<td>Robust PID Tuning using Closed-Loop Identification</td>
<td>Y. -C. Zhu, Eindhoven University of Technology</td>
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<td>12:00 – 12:20</td>
<td>Fault Diagnosis Based on Limit Measurements of Process Variables</td>
<td>H. A. Preisig, Norwegian University of Science and Technology (NTNU) Y. X. Xi, K. W. Lim, National University Singapore</td>
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<td>12:20 – 12:40</td>
<td>Estimation of Reaction Rates by Nonlinear System Inversion</td>
<td>W. Marquardt, A. Mhamdi, RWTH Aachen</td>
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<td>Study on the Soft-Sensor and Control Scheme for an Industrial Azeotropic Distillation Column</td>
<td>S. Zhang, C. -M. Bo, J. Li, C. -Y. Sun, Y. -R. Wang, Nanjing University of Technology</td>
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<td>12:40 – 13:00</td>
<td>An Incremental Approach for the Identification of Reaction Kinetics</td>
<td>W. Marquardt, M. Brendel, A. Mhamdi, RWTH Aachen, D. Bonvin, EPFL</td>
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<tr>
<td>12:40 – 13:00</td>
<td>Fault Diagnosis and Fault Identification for Fault-Tolerant Control of Chemical Processes</td>
<td>K. -K. Noh, E. S. Yoon, Seoul National University</td>
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**Semi-Plenary Lectures SP #1 14:00 – 15:10**

**LTF Session SP 1.1**

*Modelling and Identification*

Chair: J. Qin

14:00 – 14:35

**New Developments in Industrial MPC Identification**

Y. -C. Zhu, Eindhoven University of Technology

14:35 – 15:10

**Modelling and Control of Reactive Distillation Systems**

M. O. Tadé, B. H. Bisowarno, Y. -C. Tian, Curtin University of Technology

**LTG Session SP 1.2**

*Process and Control Monitoring*

Chair: B. Huang

14:00 – 14:35

**Digital Imaging for Process Monitoring and Control with Industrial Applications**

H. -L. Yu, J. F. MacGregor, McMaster University

14:35 – 15:10

**Monitoring Performance in Flexible Process Manufacturing**

E.B. Martin, A.J. Morris, University of Newcastle
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<td><strong>Session 2.3</strong></td>
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<td><strong>Model Predictive Control</strong></td>
<td><strong>Statistical Process Monitoring and Application</strong></td>
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<td>Co-chairs: M. Kothare, A. Vande Wouwer</td>
<td>Co-chairs: E. S. Yoon, M. Kano</td>
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**15:40 – 16:00**

**Constraint Handling in Reduced Order MPC: Application to Paper Machines**
Y. Arkun, Koc University
A. Rigopoulos, Weyerhaeuser Corp.

**15:40 – 16:00**

**A Complete Dynamic Model for Twin Screw Extruders**
Y. Le Gorrec, S. Choulak, C. Jallut, LAGEP
P. Cassagnau, A. Michel, LMPB

**15:40 – 16:00**

**PCA with Efficient Statistical Testing Method for Process Monitoring**
F. -P. Mu, V. Venkatasubramanian, Purdue University

**16:00 – 16:20**

**Simulation-Based Dual Mode Controller for Nonlinear Processes**
J. M. Lee, J. H. Lee, Georgia Institute of Technology

**16:00 – 16:20**

**A Data-Driven Model for Valve Stiction**
S. L. Shah, M. A. A. S. Choudhury, University of Alberta
N. F. Thomhill, University College London

**16:00 – 16:20**

**Computation of the Performance of Shewhart Control Charts**
E. B. Martin, P. Mulder, J. Morris, University of Newcastle

**16:20 – 16:40**

**Nonlinear Model Predictive Control of Multicomponent Distillation Columns using Wave Models**
S. Schwarzkopf, S. Grüner, I. Uslu, Universität Stuttgart
A. Kienle, E. D. Gilles, Max-Planck-Institut für Dynamik Komplexer technischer Systeme Magdeburg

**16:20 – 16:40**

**A Software Sensor for a Wastewater Treatment Plant**
T. Lopez, Instituto Mexicano del Petróleo
A. Pulis, M. Mulas, R. Baratti, Universita’ di Cagliari

**16:20 – 16:40**

**Combined Multivariate Statistical Process Control**
M. Kano, S. Tanaka, S. Hasebe, I. Hashimoto, Kyoto University
H. Ohno, Kobe University
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<td>16:40 – 17:00</td>
<td><strong>Nonlinear Model Predictive Control of Cement Grinding Circuits</strong></td>
<td>R. Lepore, A. Vande Wouwer, M. Remy, Faculté Polytechnique de Mons</td>
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<td><strong>Experimental Verification of Gap Metric as a Tool for Model Selection in Multi-Linear Model-Based Control</strong></td>
<td>A. Palazoğlu, University of California. Davis O. Galán, ABB Australia Limited Paper</td>
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<td>J. A. Romagnoli, University of Sydney Y. Arkun, Koç University</td>
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<td>17:00 – 17:20</td>
<td><strong>Optimal Operation and Control of a Reactive Simulated Moving Bed Process</strong></td>
<td>A. Toumi, S. Engell, University of Dortmund</td>
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<td><strong>Bayesian Estimation of Unconstrained Nonlinear Dynamic Systems</strong></td>
<td>W. -S. Chen, B. R. Bakshi, P. K. Goel, Ohio State University</td>
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<td>S. Ungarala, Cleveland State University</td>
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<td><strong>Combinations of Measurements as Controlled Variables: Application to a Petlyuk Distillation Column</strong></td>
<td>V. Alstad, S. Skogestad, Norwegian University of Science and Technology (NTNU)</td>
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<td><strong>Multivariate Analysis of Process Data using Robust Statistical Analysis and Variable Selection</strong></td>
<td>L. H. Chiang, R. J. Pell, M. B. Seasholtz, Dow Chemical Company</td>
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<td>17:00 – 17:20</td>
<td><strong>Batch Monitoring through Common Subspace Models</strong></td>
<td>J. Morris, S. Lane, E. B. Martin, University of Newcastle</td>
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<td><strong>Application of PLS Based Regression for Monitoring Bitumen Recovery in a Separation Cell</strong></td>
<td>H. Raghavan, S. L. Shah, University of Alberta</td>
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<td>R. Kadali, B. Doucette, Suncor Extraction</td>
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<td>17:20 – 17:40</td>
<td><strong>Online Performance Monitoring and Quality Prediction for Batch Processes</strong></td>
<td>A. Cinar, C. Ündey, Illinois Institute of Technology</td>
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### 13 January 2004 (Tuesday)

#### Semi-Plenary Lectures SP #2  09:00 – 10:10

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<tr>
<td>Combined On-Line and Run-To-Run Optimization of Batch Processes with Terminal Constrains</td>
<td>A Framework for Design of Scheduled Output Feedback Model Predictive Control</td>
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<td>C. Welz, B. Srinivasan, D. Bonvin, École Polytechnique Fédérale de Lausanne</td>
<td>Z. -Y. Wan, M. V. Kothare, Lehigh University</td>
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<td><strong>09:35 – 10:10</strong></td>
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<tr>
<td>Constrained Self-Optimizing Control via Differentiation</td>
<td>Adaptive Backstepping Nonlinear Control of Bioprocesses</td>
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<td>Y. Cao, Cranfield University</td>
<td>D. Dochain, Université Catholique de Louvain M. Perrier, Ecole Polytechnique de Montréal</td>
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#### Oral Session #3  10:40 – 12:40

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<td><strong>Nonlinear and Robust Control</strong></td>
<td><strong>Modelling and Control of Biochemical and Biomedical Systems</strong></td>
<td><strong>Process Monitoring</strong></td>
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<td><strong>10:40 – 11:00</strong></td>
<td><strong>10:40 – 11:00</strong></td>
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<tr>
<td>Design of Sub-Optimal Robust Gain-Scheduled PI Controllers</td>
<td>Combined Metabolic and Cell Population Modelling for Yeast Bioreactor Control</td>
<td>Process Monitoring Based on Nonlinear Wavelet Packet PCA</td>
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<td>H. M. Budman, J. -Y. Gao, University of Waterloo</td>
<td>M. A. Henson, University of Massachusetts D. Müller, M. Reuss, Universität Stuttgart</td>
<td>Y. Qian, X. -X. Li, J. -F. Wang, Y. -B. Jiang, South China University of Technology</td>
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<td>11:00 – 11:20</td>
<td>Adaptive Extremum Seeking Control of Continuous Stirred Tank Bioreactors</td>
<td>M. Guay, <em>Queen’s University</em> D. Dochain, <em>Université Catholique de Louvain</em> M. Perrier, <em>École Polytechnique de Montréal</em></td>
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<tr>
<td>11:40 – 12:00</td>
<td>Biomass Reconstruction in a Wastewater Treatment Biofilter</td>
<td>A. Vande Wouwer, C. Renotte, <em>Faculté Polytechnique de Mons</em> N. Deconinck, P. Bogaerts, <em>Université Libre de Bruxelles</em></td>
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<tr>
<td>12:00 – 12:20</td>
<td>Biomass Reconstruction in a Wastewater Treatment Biofilter</td>
<td>A. Vande Wouwer, C. Renotte, <em>Faculté Polytechnique de Mons</em> N. Deconinck, P. Bogaerts, <em>Université Libre de Bruxelles</em></td>
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<td>12:40 – 12:00</td>
<td>Glucose Control in Type I Diabetic Patients: A Volterra Model-Based Approach</td>
<td>R. S. Parker, J. D. Rubb, <em>University of Pittsburgh</em></td>
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<td>12:00 – 12:20</td>
<td>A Robust PCA Modeling Method for Process Monitoring</td>
<td>D. Wang, J. A. Romagnoli, <em>University of Sydney</em></td>
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<td>12:20 – 12:40</td>
<td>A Framework for On-Line Trend Extraction and Fault Diagnosis</td>
<td>V. Venkatasubramanian, M. R. Maurya, <em>Purdue University</em> R Rengaswamy, <em>Clarkson University</em></td>
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### Oral Session #4  13:50 - 15:30

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<td><strong>Session 4.2</strong>&lt;br&gt;Monitoring and Batch Processes</td>
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<td><strong>13:50 – 14:10</strong>&lt;br&gt;Developments in Multi-Rate Predictive Control&lt;br&gt;J. A. Rossiter, Sheffield University&lt;br&gt;T. -W. Chen, S.L. Shah, University of Alberta</td>
<td><strong>13:50 – 14:10</strong>&lt;br&gt;Investigation of Calibration-Free Resolution Techniques and Independent Component Analysis&lt;br&gt;E.B. Martin, S. Triadaphillou, I. Wells, J.A. Morris, University of Newcastle</td>
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<td><strong>14:10 – 14:30</strong>&lt;br&gt;Nonlinear Predictive Control in the LHC Accelerator&lt;br&gt;C. de Prada, S. Cristea, University of Valladolid&lt;br&gt;E. Blanco, J. Casas, CERN</td>
<td><strong>14:10 – 14:30</strong>&lt;br&gt;Stage-Based Multivariate Statistical Analysis for Injection Molding&lt;br&gt;F.-R. Gao, N. -Y. Lu, Y. Yang, the Hong Kong University of Science &amp; Technology&lt;br&gt;F. -L. Wang, Northeastern University</td>
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<td><strong>14:30 – 15:10</strong>&lt;br&gt;Disturbance Attenuation with Actuator Constraints by Moving Horizon H-Infinity Control&lt;br&gt;Chen, Jilin University&lt;br&gt;C. W. Scherer, Delft University of Technology</td>
<td><strong>14:30 – 14:50</strong>&lt;br&gt;Nonlinear Control of a Batch Reactor in the Presence of Uncertainties&lt;br&gt;Y. Samyudia, H. Sibarani, McMaster University&lt;br&gt;P. L. Lee, Curtin University of Technology</td>
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| 15:10 – 15:30 | **Computational Delay in Nonlinear Model Predictive Control**  
|           | R. Findeisen, F. Allgöwer,  
|           | University of Stuttgart  |
| 15:10 – 15:30 | **Feedforward Control of Batch Crystallisers - an Approach based on Orbital Flatness**  
|           | U. Vollmer, J. Raisch,  
|           | Max-Planck-Institut Magdeburg  |
| 15:10 – 15:30 | **Variance-Constrained Filtering for Uncertain Stochastic Systems with Missing Measurements**  
|           | Z. D. Wang, Brunel University  
|           | W. C. Ho, City University of Hong Kong  |

**Plenary Lecture #2  16:00 – 17:00**

LTB

Chair: W. Marquardt

**A Learning Theory Approach to System Identification**  
M. Vidyasagar, Tata Consultancy Services  
R. L. Karandikar, Indian Statistical Institute
### 14 January 2004 (Wednesday)

#### Semi-Plenary Lectures SP #3  14:00 – 15:10

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<td><strong>Batch and Semi – Batch Control</strong></td>
<td><strong>Process Control Applications</strong></td>
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<td>Chair: B. Foss</td>
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- **09:00 – 09:35**
  - **Advances in the Modeling and Control of Batch Crystallizers**

- **09:35 – 10:10**
  - **Joint Process and Control Designs of a Semibatch Emulsion Polymerization Reactor**
  - F. Zaldo, M. Hernández, *Centro de Investigación en Polímeros*
  - J. Álvarez, *Universidad Nacional Autónoma de México*

#### Oral Session #5  10:40 – 12:40

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<td><strong>Robustness and Nonlinearity Analysis</strong></td>
<td><strong>Subspace Approaches to Control and Monitoring</strong></td>
<td><strong>Microelectronic Manufacturing Process Control Simulation and Control</strong></td>
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<td>Co-Chair: J. Hahn, N. Hernjak</td>
<td>Co-Chairs: J. Qin, B. Huang</td>
<td>Co-Chairs: R. Adomaitis, R. Braatz</td>
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- **10:40 – 11:00**
  - **Robust Tuning of Feedback Linearizing Controllers via Bifurcation Analysis**
  - J. Hahn, M. Mönnigmann, W. Marquardt, *RWTH Aachen*

- **10:40 – 11:00**
  - **Modified Subspace-Identification Method for Building A Long-Range Prediction Model for Inferential Control**
  - J.H. Lee, Y. -D. Pan, *Georgia Institute of Technology*

- **10:40 – 11:00**
  - **Nonlinear Feedback Control of a Coupled Kinetic Monte Carlo-Finite Difference Code**
  - R. D. Braatz, E. Rusli, T. O. Drews, D. L. Ma, R. C. Alkire, *University of Illinois at Urbana-Champaign*
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<td>Closed Loop Properties and Block Relative Gain</td>
<td>J. F. Forbes, V. Kariwala, E. S. Meadows, <em>University of Alberta</em></td>
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<td>Model Identification and Error Covariance Matrix Estimation from Noisy Data</td>
<td>S. L. Shah, <em>University of Alberta</em></td>
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<td>S. Narasimhan, <em>Indian Institute of Technology</em></td>
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<td>11:00 – 11:20</td>
<td>Optimal Control of Transient Enhanced Diffusion</td>
<td>R. D. Braatz, R. Gunawan, M. Y. L. Jung, E. G. Seebauer, <em>University of Illinois at Urbana-Champaign</em></td>
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<td>11:20 – 11:40</td>
<td>A Tool to Analyze Robust Stability for Constrained MPC</td>
<td>L. O. Santos, J. A. A. M. Castro, <em>Universidade de Coimbra</em></td>
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<td>L. T. Biegler, <em>Carnegie Mellon University</em></td>
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<td>11:20 – 11:40</td>
<td>Nonlinear Subspace Model Identification</td>
<td>A. Cinar, J. DeCicco, <em>Illinois Institute of Technology</em></td>
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<td>11:40 – 12:00</td>
<td>Relationship between Control-Relevant Nonlinearity and Performance Objective</td>
<td>N. Hernjak, <em>University of Delaware</em></td>
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<td>F. J. Doyle III, <em>University of California, Santa Barbara</em></td>
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<td>F. Allgöwer, T. Schweickhardt, <em>Universität Stuttgart</em></td>
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<td>11:40 – 12:00</td>
<td>Semi-Batch Trajectory Control in Reduced Dimensional Spaces</td>
<td>J. Flores-Cerrillo, J. F. MacGregor, <em>McMaster University</em></td>
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<td>12:00 – 12:20</td>
<td>Effect of Process Nonlinearity on Linear Quadratic Regulator Performance</td>
<td>M. Guay, R. Dier, P. J. McLellan, <em>Queen's University</em></td>
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<td>12:00 – 12:20</td>
<td>A Subspace Approach to MIMO Control Performance Monitoring and Diagnosis</td>
<td>S. J. Qin, <em>University of Texas at Austin</em></td>
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<td>C. A. McNabb, <em>Boise Paper Solutions</em></td>
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<td>Lower Limit on Controller Gain for Acceptable Disturbance Rejection</td>
<td>S. Skogestad, <em>Norwegian University of Science and Technology (NTNU)</em></td>
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<td>Multivariate Controller Performance Assessment without Interactor Matrix –</td>
<td>B. Huang, R. Kadali, <em>University of Alberta</em></td>
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**Co-chairs:**
D. Dochain, J. Rieber
C. Georgakis, S. B. Jørgensen
S. Pistikopoulos, B. Srinivasan

### 13:50 –14:10
**Model-Based Trajectory Control of Pressure Swing Adsorption Plants**
M. Bitzer, K. Graichen, M. Zeitz, Universität Stuttgart

13:50 – 14:10
**Feedback Control of Industrial Solution Polymerization of Acrylic Acid using NIR Measurements**
G. Févotte, N. Othman, Université Lyon 1
J. B. Egraz, J. M. Sau, COATEX

**Robust Iterative Learning Control Design based on Gradient Method**
S. Liu, T. -J. Wu, Zhejiang University

### 14:10 –14:30
**Control of Gasholder Level by Trend Prediction based on Time-Series Analysis and Process Heuristics**
C. Han, Y. -H. Chu, J. H. Kim, Pohang University of Science and Technology
S. J. Moon, I. S. Kang, Pohang Iron and Steel Company
S. J. Qin, University of Texas at Austin

14:10 – 14:30
**Data-Driven Modeling of Batch Processes**
D. Bonné, S. B. Jørgensen, Technical University of Denmark

**Compensator for Internet-based Advanced Control**
S. -H. Yang, X. Chen, Loughborough University

### 14:30 – 14:50
**Setting of Injection Velocity Profile via an Iterative Learning Control Approach**
F. -R. Gao, Y. Yang, The Hong Kong University of Science and Technology

14:30 – 14:50
**Two-dimensional Population Balance Modeling of Semi-Batch Organic Solution Crystallization**
G. Févotte, F. Puel, Université Lyon 1

**Model-Based Auto-Tuning System Using Relay Feedback**
H. -P. Huang, K. -Y. Luo, National Taiwan University
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<td>Calorimetric Estimation of Viscosity and Acid Number in Alkyd Reactors</td>
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<td>I. S. de Buruaga, Centro de Investigación en Polímeros T. Lopez, S. Pérez, J. Alvarez, Universidad Autónoma Metropolitana-Iztapalapa</td>
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<td>The Explicit Model-Based Tracking Control Law via Parametric Programming</td>
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<td>E. N. Pistikopoulos, V. Sakizlis, J. D. Perkins, Imperial College London</td>
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<td>Youla-Kučera Parametrisation in Self-Tuning LQ Control of a Chemical Reactor</td>
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<td>J. Mikleš, L. Čirka, M. Fikar, Slovak University of Technology in Bratislava</td>
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<td>State Estimation in Batch Crystallization using Reduced Population Models</td>
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<td>S. Motz, S. Mannal, E. D. Gilles, Universität Stuttgart</td>
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<td>Discrete Control of Nearly Integrable Two-Dimensional Continuous Systems</td>
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<td>S. Blouin, M. Guay, K. Rudie, Queen’s University</td>
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**Plenary Lecture #3 15:30 – 16:30**

**LTB**

Chair: F. -R. Gao

A Systems Approach to Modelling and Analyzing Biological Regulation

F. J. Doyle III, University of California, Santa Barbara
13 January 2004 (Tuesday)

Poster Session 17:00 – 18:00

Chair: F. -R. Gao

**Area 1  Process and Control Monitoring**

**P1-1** Variance Estimation in Multisensor Fusion Algorithm  
C. -Q. Zhong, X.-L. Dong, L.-Y. Zhang, Y. Cao, *Dalian University of Technology*

**P1-2** Respirometry Estimations Based Monitoring of Biological Wastewater Treatment Processes  
D. -C. Yuan, L.-P. Fan, H. -B. Yu, *Shenyang Institute of Automation*

**P1-3** Wavelet Packet Images Matching Applied to Noise Faults Diagnosis  
C. Lu, G. -Z. Wang, *Tsinghua University*  
Q. -G. Qiu, *Dalian University of Technology*

**P1-4** Performance Monitoring based on Characteristic Subspace  
M. Guo, S. -Q. Wang, *Zhejiang University*

**P1-5** Sensing of the Dry Point of Benzene using PCA and DRBFN  
Y. -Q. Chang, F. -L. Wang, *Northeastern University*  
F. -R. Gao, *The Hong Kong University of Science and Technology*

**P1-6** A Fault Diagnosis Method for Fermentation Process  
L.-L. Ma, F. -L. Wang, Y. -B. Jiang, *Northeastern University*  
F. -R. GAO, *The Hong Kong University of Science and Technology*

**P1-7** Multi-PCA Models for Process Monitoring and Fault Diagnosis  
L.-L. Ma, Y. -B. Jiang, F. -L. Wang, *Northeastern University*  
F. -R. Gao, *Hong Kong University of Science and Technology*

**P1-8** A Fault Accommodation Control For Nonlinear Processes  
Y. -W. Zhang, F. -L. Wang, G. Yu, *Northeastern University*  
F. -R. Gao, *The Hong Kong University of Science & Technology*

**P1-9** A Novel Detection of Vessel Liquid Level based on Echo Identification  
Z. -H. Zhang, J.-M. Yuan, *University of Science and Technology Beijing*  
W. -Y. Huang, *Southeast University*

**P1-10** Multi-Site Performance Monitoring in Batch Pharmaceutical Production  
C. W. L. Wong, A. J. Morris and E. B. Martin, *University of Newcastle*  
R. E. A. Escott, *GlaxoSmithKline Chemical Development*

**P1-11** Process Monitoring of an Electro-Pneumatic Valve Actuator Using Kernel Principal Component Analysis  
S. -O. Song, G. Lee, E. S. Yoon, *Seoul National University*
P1-12  Real-Time Application of Scheduling Quasi-Minmax Model Predictive Control to a Bench-Scale Neutralization
Y. -H. Lu, *Georgia Institute of Technology*
Y. Arkun, *KOC University*
A. Palazoglu, *University of California at Davis*

P1-13  Fault-Tolerant Control of Process Systems: Integrating Supervisory and Feedback Control over Networks
N. H. El-Farra, A. Gani, P. D. Christofides, *University of California, Los Angeles*

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P2-2  A Receding Optimization Control Policy for Production Systems with Quadratic Inventory Costs
C. -Y. Song, H. Wang, P. Li, *Zhejiang University*

P2-3  Hard Real-Time CORBA (HRTC) for Process Control Systems
S. Galán, M. Rodríguez, R. Sanz, *Universidad Politécnica de Madrid*

P2-4  A Disaggregation Technique for the Optimal Planning of Offshore Platforms
M. C. A. Carvalho, *University of Sao Paulo*
J. M. Pinto, *Polytechnic University*

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P3-2  Analyzing the Start-Up of Reactive Distillation Columns
F. Reepmeyer, J. -U. Repke, G. Wozny, *Technical University Berlin*

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W. Van Brempt, P. Van Overschee, T. Backx, *IPCOS*
Ø. Moen, *Borealis*
C. Kiparissides, C. Chatzidoukas, *Aristotle University of Thessaloniki*

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C. de Prada, S. Cristea, *University of Valladolid*
D. Megías, J. Serrano, *Universitat Autònoma de Barcelona*
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S.-G. Huang, National Taiwan University of Science and Technology  
C. -C. Yu, National Taiwan University

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Y.-H. Chen, National Taiwan University of Science and Technology  
C. -C. Yu, National Taiwan University

P3-9  Optimal Control of Fluid Catalytic Cracking Unit  

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F. -R. Gao, The Hong Kong University of Science and Technology

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F. -R. Gao, The Hong Kong University of Science and Technology

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B. H. Bisowarno, Y. -C. Tian, M. O. Tadé, Curtin University of Technology

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S. -Y. Xu, J. Lam, University of Hong Kong  
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W. D. Seider, University of Pennsylvania

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D. Dochain, Université Catholique de Louvain

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M. Kano, S. Hasebe, I. Hashimoto, Kyoto University

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A. B. Rad, H. F. Ho, Y. K. Wong, W. L. Lo, the Hong Kong Polytechnic University

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E. O. Voit, Medical University of South Carolina

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P6-2  Fermentation Batch Process Monitoring by Step-By-Step Adaptive MPCA
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P6-3  Improved Operation of a Batch Polymerization Reactor through Batch-To-Batch Iterative Optimization
Z. -H. Xiong, J. Zhang, University of Newcastle

P6-4  Kappa Number Prediction by Hybrid Model for Batch Pulp Cooking Process
Y. Li, J. Zhang, X. -F. Zhu, D. -P. Huang, South China University of Technology

P6-5  A Modular Batch Laboratory Process
R. Olsson, K. -E. Årzen, Lund Institute of Technology
OFFICIAL & SOCIAL PROGRAM

Welcoming Reception - Harbour Cruise

Date: 11 January, 2004 (Sunday)

Assembly point: Entrance Piazza, HKUST at 17:00 sharp

Harbour Cruise – Bauhinia, will take you to see many famous landmarks that illustrate vibrancy and natural beauty of Hong Kong. You can enjoy a magnificent sunset view of Victoria Harbour and relax with the food and drinks served on board. The journey will take approximately 2 hours, from 17:45 to 19:45 along with live band music.

Transportation has been arranged to pick up participants from the Entrance Piazza of HKUST to the embarkation pier and from the disembarkation pier to the Tsim Sha Tsui area (hotel area).

Opening Ceremony

Date: 12 January, 2004 (Monday)
Time: 09:00 - 09:30
Venue: Lecture Theatre B, HKUST
Banquet

Enjoy a banquet of seafood and different dishes of delicacies with Chinese cultural and variety shows at a "floating" restaurant.

Date: 13 January, 2004 (Tuesday)
Time: 18:00 - 21:30
Assembly point: Entrance Piazza, HKUST at 18:00
Venue: Jumbo Floating Restaurant, Aberdeen, Hong Kong

Closing Ceremony

Date: 13 January, 2004 (Wednesday)
Time: 16:30 – 17:00
Venue: Lecture Theatre B, HKUST

Closing Reception

Date: 13 January, 2004 (Wednesday)
Time: 17:00 – 18:00
Venue: Academic Concourse, HKUST
OPTIONAL TOUR PROGRAM

1. Hong Kong Island Tour

Price: HK$220 per person

Time: 09:00 - 13:00 (daily departure)

Departure point: listed hotel

Itinerary: the first stop of this tour takes you to the Peak, which rises 544m above sea-level, offers a spectacular view of hustle and bustle of this extraordinary city. From the Peak, we proceed downhill along the coastal road to Repulse Bay. This seaside resort is one of Hong Kong most popular beaches. Just around the corner is the Stanley Market where silk designer clothing, hand-painted porcelain and souvenir items overflow from the shops onto the narrow lanes. Shopping at Stanley Market is always fun and there are many bargains to be found. The final stop on the tour is Aberdeen where traditional Chinese values and ancient customs are easily observed. Once a small fishing village, Aberdeen is now a thriving town best known for the many junks, houseboats and floating restaurants.

2. The Land Between Tour with Chinese lunch

Price: HK$395 per person

Time: 08:30 - 15:00 (daily departure)

Departure points:

8:30 at Main Entrance of City Hall “Low Block” facing Victoria Harbour
9:00 at Lobby of “The Salisbury” - YMCA, Tsim Sha Tsui

Itinerary: visit the New Territories which abounds in rural beauty. Stops will be made at Yuen Yuen Institute, Tai Mo Shan, Luk Keng, Sam Mun Tsai Fishing Village. The New Territories is an enormously diverse suburban area full of contrasts to the cosmopolitan city center. The Land Between stands both as a gentle reminder of the past of Hong Kong as well as a symbol of its hopes and plans for the future.
3. **Tsing Ma Lantau Monastery Tour**

**Price:** HK$560 per person

**Time:** 09:00 - 17:00 (daily departure except Sundays & Holidays)

**Departure point:** listed hotel

**Itinerary:** spend a relaxing day in one of the largest outlying islands in Hong Kong - Lantau Island. You can visit through Tsing Ma Bridge to Cheung Sha Beach, Tai-O Fishing Village and Po Lin Monastery with the world’s largest outdoor bronze Buddha. Chinese vegetarian lunch is included.

4. **Macau Tour with Lunch**

**Price:** HK$620 per person

**Time:** 08:45 - 19:30 (daily departure)

**Departure point:** listed hotel

**Itinerary:** a 75 minutes Turbojet (or Turbocat/Catamaran) ride brings you to the previous Portuguese enclave - Macau. Visit Kum Yam Temple, up to Penha Hill for a magnificent view of the city, Barrier Gate at the border between Macau and China and the Ruins of St. Paul's Cathedral. A western lunch will be served and followed by free time to visit Casino Lisboa.

- Rates quoted are Net in Hong Kong Dollars, based on SEAT-IN-COACH; subject to change.
- Full refund will be made if booking is cancelled 7 days prior to tour departure date.

**Reservation & Enquiries**

For details and reservation concerning the optional sightseeing tours and hotel, please contact:

Ms. Veronica Cheng / Ms. Rachel Lee

**PC TOURS AND TRAVEL**

Address: B128 Royal Garden Hotel, 69 Mody Road, Tsim Sha Tsui East, Kowloon, Hong Kong
Tel.: +852 2369 9052
Fax: +852 2723 9044
Email: pc@pctourshk.com
Registration Form (Please type or print clearly)

- Prof.  - Dr.  - Mr.  - Ms.

Affiliation (Including Division/Dept.): ____________________________________________

Mailing Address: _______________________________________________________________

Postal Code: __________ City: __________ Country: __________

Phone: __________________ Fax: __________________ E-mail: __________________

Accompanying Person: First Name: __________________ Last Name: __________________

Registration Fee (please check the appropriate box and fill in the number & payment amount)

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<th>Late Registration (after October 10, 2003)</th>
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<th>Payment Amount</th>
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* Note that HK dollars can also be accepted with the rate of $US1=HK5.8

To help us to plan the reception, please indicate if you will join the boat reception on 11 January 2004?

- Yes [ ]
- No [ ]

- Fee for Full-fee Participant includes: symposium proceedings, reception, lunches & refreshments for January 12-14 and banquet
- Fee for Student includes: symposium proceedings, reception and lunches & refreshments for January 12-14
- Fee for Accompanying Person includes: reception and banquet
- Cancellation: Written cancellations received before November 15, 2003 will be subjected to an administrative charge of US$50.
- No refund will be issued after this date. Refund will be made after the conference period, after deducting the administrative charge.

Payment may be made by: (please check the appropriate box)

- USD Bank check/draft
- Please enclose herewith a bank check/draft made payable to “The Hong Kong University of Science and Technology”
  - Bank Name: Hang Seng Bank Limited, UST Branch
  - Account No.: 024-361-008071-600 (must be stated)
  - Bank Account Name: The Hong Kong University of Science and Technology
  - Bank Address: Hang Seng Bank Limited, Room G6030, The HKUST, Clearwater Bay, Kowloon, HONG KONG
  - SWIFT Code: HASE HKHH
  - Please fax a remittance notification with the following details to the secretariat at (+852) 2358 0654 upon completion of bank transfer:
    - Remittance date
    - Amount and currency
    - Remitting party
    - Nature of payment
    - Name of Conference: ADCHEM2003

- Bank Transfer (net of all charges, plus bank charge)
- Credit Card (bank charge to be settled by cardholder)
- VISA (plus net of 2% bank charge)
- MasterCard (plus net of 2% bank charge)
- American Express (plus net of 3.9% bank charge)

Date: ______________________  Signature: ______________________

(as appears on credit card)
**IMPORTANT INFORMATION**

**Registration Desk**
Registration desk is located at the Academic Concourse of the Hong Kong Science and Technology. Service hours of the registration desk are as below:

- 1 January 2004 (Sunday)  14:00 - 16:40
- 2 January 2004 (Monday)  08:00 - 09:00

**Symposium Bag**
Symposium bag contains a coupon for Preprints (Volume I & II), Symposium CD, Abstract and Program booklets as well as a tourist package from the Hong Kong Tourism Board.

**Information Desk**
Information desk will be available in the registration area.

**Tour and Hotel Reservation Desk**
Tour desk is located in the registration area and open from 15:45 - 17:00 on 11 January 2004 (Sunday) and 08:30 - 13:00 on 12 - 14 January 2004.

**Exchange Rate**
The value of the Hong Kong dollar has been pegged at HK$7.8 to the US dollar, and consequent rates of exchange to other currencies. However, the market rate exchange to the US dollar may fluctuate marginally.

**Weather**
In winter (late December to February), it is generally sunny, bright and cool with temperatures ranges from 14°C-20°C (57°F-68°F) with the temperature averaging 17°C (62°F) and humidity near 72%. Warm sweaters and overcoats work best in this season.

**Additional Pre-prints**
Participants can buy an additional copy of Preprints at the Registration Desk located in the registration area.

**Language**
The official language of this symposium is English.
Hints for transportation from airport to HKUST:
For passengers with bulky luggage, taking a taxi to HKUST direct is recommended.