

CAPD e-Newsletter, April 2008

<http://capd.cheme.cmu.edu>

Dear CAPD member,

Welcome to the CAPD e-Newsletter!

We hope this newsletter will have information that is of interest to you.

Best regards, Ignacio Grossmann

- We would like to welcome Praxair, a new member of CAPD. Praxair will also participate in the special group on Enterprise-wide Optimization. The contact person for Praxair will be Jose Pinto.

- Annual Review Meeting

The Annual Review Meeting of CAPD took place on March 10-11, 2008. We had a record attendance of 39 participants from industry (ABB, Air Products, Aspen Technology, Bayer, BP, Cargill, Dow Chemical, Eastman Chemical Company, ExxonMobil, Kraft Foods, NETL, NOVA Chemicals, Paragon Decision Technology, PETROBRAS, PPG, Praxair, Pfizer, Simsci-Esscor/Invensys, Total). On the first day we had research overviews of the faculty, six excellent industrial presentations and a poster session. The dinner this year took place at Monterey Bay Fish Grotto Restaurant. On the second day, we had the presentations by last year students as well a special session on Modeling Systems (see below). You can access an electronic version of the agenda, list of participants and slides presented at the 2008 CAPD Annual Review Meeting in: <http://www.cheme.cmu.edu/internal/capd2008.zip>

Please take note that the next Annual Review Meeting will take place on **March 9-10, 2009**.

- Enterprise-wide Optimization session. We had a special session EWO at the Annual Review Meeting that was well received. The presentations were the following:

- Sebastian Engell, University of Dortmund
Evolutionary Algorithms in Batch Production Scheduling
- Thomas Marlin, McMaster University
A Robust MPC Approach to Optimizing Production, Inventory and Transportation
- Sridhar Tayur, SmartOps
Enterprise Inventory Optimization

- CAPD Short course

We will be offering a new revamped short course on Optimization Modeling and Integrated Process Operations on June 12-18, 2008.

Modules on Optimization Modeling to be taught from Thursday through Saturday (June 12-15) will focus on modeling and algorithms with applications to process optimization, process synthesis and molecular design:

- a) Nonlinear programming (Biegler, Thursday, June 12)

- b) Mixed integer and disjunctive programming (Grossmann, Friday, June 13)
- c) Global optimization and optimization under uncertainty (Sahinidis, Saturday, June 14)

Modules on Integrated Process Operations to be taught from Monday through Wednesday (June 16-18-9) will focus on three major decision levels in plant and enterprise-wide optimization:

- d) Mixed-integer models for planning and scheduling (Grossmann, Monday, June 16)
- e) Process dynamics and control (Ydstie, Tuesday, June 17)
- f) Differential/algebraic models for real time optimization (Biegler, Wednesday, June 18)

The material in each module is independent and self-contained and can be taken in any combination. A detailed description of the topics covered in the course is given in: http://capd.cheme.cmu.edu/shortcourse_details.htm

- Enterprise-wide Optimization

The project "Computational Models and Algorithms for Enterprise-wide Optimization of Process Industries," which is being funded by the Pennsylvania Infrastructure Technology Alliance (PITA), has continued with the participation of ABB, Air Products, BP, Dow Chemical, ExxonMobil, NOVA Chemicals and Total. The last meeting took place right after the CAPD Meeting on March 11-12. The project involves a total of 7 Ph.D. students, and 5 faculty (CMU: Biegler, Grossmann, Hooker; Lehigh: Linderoth; UPitt: Schaeffer). A webpage describing this project, including seminar slides and meeting slides can be found in: <http://egon.cheme.cmu.edu/ewocp/>
Companies interested in participating in this research program should contact grossmann@cmu.edu

- Bayer Lecture in Process Systems Engineering. Sebastian Engell from the University of Dortmund delivered this lecture on Tuesday, March 6, 2008. The title of his lecture was, Uncertainty and Feedback in Process Operations
<http://www.cheme.cmu.edu/newsevents/news/archive/07-08/Bayer2008.pdf>

- Special Issue on Enterprise-wide Optimization (EWO) in *Computers & Chemical Engineering*. Kevin Furman and Ignacio Grossmann have finished editing this special issue. A total of 20 papers were gathered for this special issue, with 4 of them coming from industrial authors (Air Products, Dow Chemical, ExxonMobil, Honeywell). The first ten papers deal with supply chain issues, four papers deal with solution approaches to scheduling problems, and five with operational issues.

- Workshop on Hybrid Systems Modeling, Simulation and Optimization. Organized by Profs. Metin Turkay, Bulent Karasozen and Larry Biegler, the workshop will be held on May 14-16, 2008 at Koc University, Istanbul, Turkey and will focus on the modeling, simulation, control and optimization of hybrid systems. The main goal will be to identify emerging industrial issues and research opportunities in the area of Hybrid Systems, with topics including discrete variational inequalities, discrete events, control, optimization and applications in chemical engineering, systems biology, mechanical engineering. Featured speakers include Ignacio Grossmann and Bruce Krogh from Carnegie Mellon.

<http://portal.ku.edu.tr/~systemslab/hs/>

- Pan American Advanced Study Institute on Emerging Trends In PSE. Ignacio Grossmann is organizing with Frank Doyle, Jaime Cerda and Argimiro Secchi the Pan American Advanced Studies Institute (PASI) on emerging trends in Process Systems Engineering on August 12-21, 2008, at Hotel Costa Galana, Mar del Plata, Argentina. The proposed workshop is aimed at advanced graduate and post-doctoral students, and will emphasize the latest developments and research challenges in the emerging areas of sustainability, energy, biological systems, multiscale systems, and enterprise-wide optimization. This workshop is being funded by NSF and the Department of Energy. We are grateful for the additional support that we received from GAMS Corporation, Bayer, Cargill, Pfizer, PPG and Procter & Gamble. 52 PhD students have been recently selected: 25 from USA, 2 from Canada, 3 from Mexico, 1 from Colombia, 8 from Argentina, 10 from Brazil, and 3 from Chile. The website for this meeting is:

<http://cepac.cheme.cmu.edu/pasi2008>

- Faculty News

Larry Biegler presented a seminar entitled “Real-time Optimization for the Industrial Enterprise” at the University of Illinois – Urbana-Champaign.

Ignacio Grossmann taught a short course on MINLP optimization and process synthesis at the University of Antofagasta, Chile, in January, 2008. He also gave the talk “Trends in Chemical Engineering Curriculum: a U.S. Perspective”, in the Department of Chemical Engineering and Bioprocesses, Catholic University, Santiago de Chile. Ignacio participated in the Symposium on Trends in Chemical Engineering at the Department of Chemical Engineering, Universidad Autonoma Metropolitana-Iztapalapa, Mexico City, where he gave the plenary talk “Research Challenges in Process Systems Engineering and its Potential Impact in the Process Industry.” He also gave the seminar ““New Developments in Discrete-Continuous Optimization of Process Systems,” in the Department of Chemical and Biological Engineering, RPI in March, and in the Department of Chemical Engineering and Biological Engineering, Tufts University in April, 2008. Ignacio also participated in the advisory board meetings of the Department of Chemical Engineering at Penn State, of the Institute of Chemical and Engineering Sciences in Singapore, and of Engineering Sciences at Dow Chemical.

Nick Sahinidis gave a plenary talk on “Global optimization with branch-and-reduce,” at the 5th International Conference on Computational Management Science, Imperial College, London, UK, March 2008. Nick chaired a session and presented a paper at the INFORMS Optimization Society Conference, Atlanta, Georgia, March 2008. In March, Nick was elected as the chair-elect of the INFORMS Optimization Society and will become chair of the Society in 2009. In April 2008, Nick gave a talk “Optimization in the New Biology” as part of the “Distinguished Lecture Series in Systems Biology” at Georgia Institute of Technology, where he was invited by the Center for the Study of Systems Biology and the School of Industrial and Systems Engineering. He subsequently gave the same talk in three other seminars: in the Department of Computational Biology at the University of Pittsburgh School of Medicine, in Carnegie Mellon’s Tepper School

of Business, and in the Department of Chemical and Biological Engineering at the University of Wisconsin, Madison.

Erik Ydstie went to Norway for the annual review meeting on Integrated Operations in oils and gas field management in February. He gave a Departmental seminar with the title "Inventory and Flow Control in Complex Networks: The Conflux of Chemistry, Computation and Communication" in Department of Chemical Engineering at Queens University in Kingston Ontario on March 7. On March 25 he gave a departmental seminar at the University of Maryland. He continued his service as CEO of ILS Inc. The company now has three full time and 2 half time employees working modeling, control and optimization of power plants. Erik participated in the advisory board meetings of the American Chemical Society, Petroleum Research fund and the Worcester Polytechnic Institute, Department of Chemical Engineering.

- Student News

Congratulations to Victor Zavala for accepting a faculty position in the Department of Chemical Engineering at the University of Texas-Austin. Victor will defend in August and plans to do a postdoc in Germany.

Eduardo (Wayo) Dozal successfully defended his Thesis on Supervised Adaptive Control on Thursday April 10. Wayo will join Shell Global Solutions in the summer of 2008.

- Visitor News

Gonzalo Guillen, who did his PhD in Barcelona with Prof. Luis Puigjaner and spent 18 months in Ignacio's group with as a Fulbright scholar, returned to Spain where he joined the Department of Chemical Engineering at the Universitat Roviri e Virgili in Tarragona. Daniela Drummond, who worked in Ignacio's group for one year, returned to University of Campinas in Brazil to complete her PhD degree.

Dr. Peter Heidebrecht from the Max Planck Institute spent the past three months in Larry's group as a DAAD visitor and has returned to Germany. He is investigating dynamic optimization strategies for temperature programmed desorption for better elucidation of kinetic mechanisms and model discrimination.

-Webpages. The following sites might be of interest to you:

Virtual library on Process Systems Engineering:

<http://cepac.cheme.cmu.edu/pasilectures.htm>

You can access webpages of all PSE faculty in the Americas in:

<http://cepac.cheme.cmu.edu/country.htm>

- PSE/ESCAPE-18.

<http://www.escape18.org/>

- Upcoming meetings

SIAM Conference on Optimization (OP08), May 10-13, 2008
Boston, Massachusetts
<http://www.siam.org/meetings/calendar.php?id=191>

Workshop on Hybrid Systems Modeling, Simulation and Optimization
May 14-16, 2008, Koc University, Istanbul, Turkey
<http://portal.ku.edu.tr/~systemslab/hs/>

ESCAPE'18, June 1-4, 2008
Lyon, France
<http://www.escape18.org/>

2008 FOCAP0 Meeting, July 13 - 16, 2008
Marlborough, Massachusetts, USA
<http://www.focapo.org/>

18th Triennial Conference of IFORS, July 14, 2008 - July 18, 2008
Sandton, South Africa

Pan American Advanced Study Institute on Emerging Trends in Process Systems
Engineering, Mar del Plata, August 11-21, 2008.
<http://cepac.cheme.cmu.edu/pasi2008>

INFORMS Annual Meeting 2008, October 12-15, 2008
Washington, DC
<http://meetings.informs.org/DC08/>

2008 AIChE Annual Meeting, November 16-21, 2008
Philadelphia, PA
<http://www.aiche.org/Conferences/AnnualMeeting/index.aspx>

2009 Spring National Meeting. April 26-30, 2009
Tampa Convention Center
Tampa, FL

FOCAPD 2009, June 7-12, 2009
Beaver Run Resort in Breckenridge, Colorado
<http://www.focapd.org/>

2009 PSE'09 , Aug. 16-20, 2009
Salvador, Brazil
<http://www.cepema.usp.br/pse2009>

World Congress Chemical Engineering, Aug. 23-29, 2009
Montreal, Canada
<http://www.chemengcongress2009.com/>

