

THE CHEME NEWS

*Internal Newsletter of the Department of Chemical Engineering
Carnegie Mellon University*

January 2014

Message from the Department Head

Happy New Year and all the best for 2014! Winter has settled in, and I hope you all had a restful break before returning to the Spring semester. This is my first opportunity as department head to chat with you about recent happenings in the department. The last few months have been especially very interesting for me, as I become accustomed to many facets in the operation of the department that many of us need not worry about often because they run so smoothly and well. Based on this experience I was very pleased to learn that the department is in great shape and some exciting directions are being planned. The great state of the department is due in large measure to Andy Gellman, who stepped down on Nov. 1 after more than ten years as department head. Andy's accomplishments include the \$26M Doherty Hall renovation, an extremely important achievement, particularly for maintaining and expanding strong experimental research. In addition, Andy organized and served as founding Director of a consortium with the Department of Energy's National Energy Technology Laboratory (NETL) that includes Carnegie Mellon, Penn State, University of Pittsburgh, Virginia Tech and West Virginia University. This effort now supports around 100 faculty members and 150 PhD students and postdocs. Within the department, Andy was instrumental in hiring half of our current faculty and expanding our masters program by a factor of four, while maintaining and extending our PhD program. He has left a smooth-running department with healthy financials as well as a friendly, scholarly environment with strong potential for further growth. We all wish him well as the co-director of CMU's new Scott Energy Institute.

Moreover, special thanks go to our departmental staff, who worked very hard and very well over this transition. I especially appreciate their experience in covering all of the bases as the year came to a close. In particular, there will be a new rollout of the departmental website this semester, which will give us a fresh, new look and lead to more timely outreach and transfer of information. Also, I am pleased to welcome Allyson Briney as our new Graduate Recruiting and Admissions Manager, who brings her ECE recruiting experience to our graduate admissions effort.

Finally, this newsletter reflects the dynamic research and educational activities of our faculty, researchers, visitors and students over the past few months. I am pleased to welcome 18 new visiting researchers to our department. New research projects are starting for 40 first year MS and 26 PhD students. Five students defended their PhD theses, 15 passed their PhD proposals, and 15 passed their PhD qualifying exams. Our first class in our expanded masters program graduated with 43 students. And we especially look forward to congratulating a large senior class in May.

Have a great semester! I look forward to our working together.

Larry

Department News

Larry Biegler is new ChemE Department Head

Larry Biegler has been appointed as Head of the Chemical Engineering Department effective November 1, 2013. He replaces Andy Gellman, who has been Department Head since January, 2003. Larry holds a B.S. (1977) from the Illinois Institute of Technology and M.S. (1979) and Ph.D. (1981) degrees from the University of Wisconsin, all in Chemical Engineering. Larry is in his 32nd year as a member of the Ch.E. faculty, starting as an assistant professor in 1981 and advancing through academic ranks to his current appointment as the Bayer Professor of Chemical Engineering. He was also Director of the Center for Advanced Process Decision-making from 1999-2005. In 2011, Larry was elected as a University Professor, the highest academic rank at Carnegie Mellon. Larry was also elected to the National Academy of Engineering in 2013. He is a Fellow of the American Institute of Chemical Engineers, and is the recipient of numerous awards including the Lewis Award, McAfee Award (Pittsburgh Section) and the Computers in Chemical Engineering Award, all given by AIChE; the Curtis McGraw Research Award and CACHE Computing Award, given by ASEE; the INFORMS Computing Prize, and an honorary doctorate in engineering sciences (Dr.-Ing. e.h.) from the Technical University of Berlin. All of the faculty are looking forward to Larry's headship. Current activities include the reorganization of departmental staff, updates on the expanded MS program and strategic plans on faculty hiring. Despite this appointment, he will certainly continue to be active in CAPD as he has done in the past.

Welcome to Allyson Briney!

Would you please welcome **Allyson Briney** to the Chemical Engineering Department? Allyson has been hired to be the Graduate Recruiting and Admissions Manager, and her office is in Doherty Hall 3114. Allyson had worked in Electrical & Computing Engineering at CMU as the coordinator of the admissions for graduate students and visitors since 2009. Allyson has worked at Northwestern University as well as at Kraft Foods. Allyson's enjoys wedding planning since she got engaged right before Christmas! Stop into 3114 to say hi to Allyson.

Lubrizol Lab Gets New Look!

New cabinetry and replacement cabinetry will be installed this spring in the undergraduate laboratory spaces, increasing storage space by almost 33% and provided more work surfaces. In addition, a purging of outdated, unused, and inoperable equipment will take place over the course of the semester. Almost half of the cabinets will be installed in the Lubrizol Lab, thereby completing the renovation of that space first started a decade ago. The new work areas in Lubrizol lab will be dedicated to the AIChE student chapter for use on Chemical Car Competition.

Faculty News

Larry Biegler presented a plenary talk entitled “Integrated Chemical Process Optimization: NLP Strategies Based on Multi-scale Engineering Models,” at IFIP'13 in September, 2013, Klagenfurt, Austria. In October, 2013, Larry was the plenary speaker at the PRES'13 conference in Rhodes, Greece, where he gave the talk entitled “Optimization-based Process Synthesis for Sustainable Power Generation.” This was followed by Larry's induction into the NAE on October 8. Larry's group presented 9 papers at the Annual AIChE conference in San Francisco. Following this, he gave the Distinguished Lecture on “Nonlinear Programming Frameworks for Dynamic Real-time Optimization,” at the Department of Chemical Engineering and Materials Science at the University of Southern California. Finally, Larry presented a plenary lecture on “A Survey on Sensitivity-based Nonlinear Model Predictive Control,” at the Dynamics and Control of Process Systems (DYCOPS) conference, in Mumbai, India in December, 2013.

Andy Gellman's article, “Reactions On Copper Surfaces Could Provide New Insight Into Origin Of Life Questions: Surface discriminates between a molecule's chiral forms, making applications in catalysis possible” was published in C&EN the December 16, 2013, issue. See: <http://cen.acs.org/index.html>

Chrysanthos Gounaris joined CMU last August and has since been kept busy with setting up his lab, recruiting students, and getting introduced to fellow CMU researchers outside the Chemical Engineering Department. Besides the talk that he presented at the September EWO meeting on “Vehicle Routing under Demand Uncertainty,” Chrysanthos delivered the October 3 Graduate Seminar of the University of Pittsburgh's Department of Industrial Engineering, a talk at the INFORMS Annual Meeting in Minneapolis, and two talks in the AIChE Annual Meeting in San Francisco. Furthermore, the Special Issue on “Vehicle Routing and Scheduling: Recent Trend and Advances” that he co-edited for Optimization Letters was recently published as the September 2013 issue. Finally, his paper “Estimation of diffusion anisotropy in microporous crystalline materials and optimization of crystal orientation in membranes” was recently published in the Journal of Chemical Physics.

Ignacio Grossmann. In August he gave the seminar “Optimal Multi-scale Demand-Side Management for Continuous Power-intensive Processes,” at INGAR, Santa Fe, and in PLAPIQUI, Bahia Blanca, the seminar “Optimization Models of Water Networks and their Application to Biofuel Processes and Shale Gas Production.” On September 19 he delivered the Inaugural Les Shemilt Lecture, McMaster University, Hamilton, “Optimal Synthesis and Planning of Sustainable Chemical Processes.” He also gave in September the seminar “Progress and Challenges in Discrete and Continuous Optimization for Process Systems Engineering,” in the Department of Chemical and Biomolecular Engineering, National University of Singapore. Ignacio also attended a workshop on petroleum supply chain at Petrobras in Rio de Janeiro on September 30-October 1. On October 30-31 he delivered the Richard Mah Lecture at Northwestern University, “Optimal Synthesis and Planning of Sustainable Process Systems: Water, Biofuels and Shale Gas.” In November he attended the AIChE Meeting in San Francisco in which his group presented 18 papers. In December he gave the talk “Recent and Future Trends in Research and Education in Chemical Engineering,” at the 125th Anniversary Chemical Engineering Event at IMIQ-Academia Mexicana de Ingenieria, Mexico City. In December he

also gave seminars at RWTH Aachen and at the Technical University of Eindhoven. Shortly after, he attended the US-India Chemical Engineering Conference and Workshop on Energy, Environment and Sustainability in Mumbai, India, where he gave a presentation. In September he attended the advisory board meetings of the Engineering Systems and Design at the Singapore University of Technology and Design, and in October at the Department of Chemical and Biochemical Engineering at Rutgers. Finally, Ignacio was appointed Associate Editor of the Perspectives Series of AIChE J.

Dennis Prieve will be moderating discussion at a half-day symposium on "Charge Carriers in Nonpolar Media," as part of the Gordon Research Conference on Colloidal, Macromolecular and Polyelectrolyte Solutions, to be held in Ventura, CA on Feb. 16-21, 2014. Chris Wirth (PhD 2012, now at Katholieke Universiteit Leuven, Belgium) is co-chairing the first Gordon Research Seminar to be held in conjunction with this same conference. The GRS is a full day of oral presentations and posters organized by and for graduate and post-doctoral students and held immediately before the main conference.

Nick Sahinidis. In September, Nick gave an invited talk at the MINLP Workshop in Paris, France. The title of his talk was "Large-scale simulation-optimization with ALAMO and BARON." In October, Nick and his group gave a total of six papers at the Annual INFORMS meeting in Minneapolis, Minnesota. The talks were on global optimization with BARON, simulation-optimization, and surrogate modeling with ALAMO. At the same conference, Nick was one of three invited speakers who spoke in an event honoring the career of Professor Leon Lasdon. In November, Nick attended the AIChE Meeting in San Francisco in which his group presented 11 papers, including one invited paper by Nick on systematic techniques for constructing surrogate models of black boxes. In December, Nick attended the 2013 Winter Simulation Conference in Washington, DC, where his group presented recent work on simulation-based optimization.

Jeff Sirola. Jeff continues to divide his time between CMU and Purdue and for the Fall Semester was mostly at CMU. He helped Ignacio co-teach the Senior capstone process design course and mentored all of the student design groups where the project again involves alternative processes and routes for the production of aromatics from Pennsylvania shale gas. He again taught the chemical process technology and industry structure course he first developed last year, and also a new process synthesis course (expanded from the CAPD short course), both of which were popular with the professional Masters students. He also delivered a keynote on the Impact of Disruptive Change in Feedstock Price and Availability on Chemical Process Development at the Council for Chemical Research Shale Gas Workshop, participated in the Smart Manufacturing Coordination Network Roadmap Workshop on Sustainable Manufacturing, the Carbon Capture Simulation Initiative, an NSF CAREER panel, departmental advisory board meetings at the University of Delaware and at Georgia Tech, the ABET accreditation visit to Purdue, and completed his term assigning program evaluators as ABET AIChE Society Liaison and service as ABET Secretary.

Erik Ydstie is one of the 5 Trustees and organizers of the FIPSE (Future Innovations in Process Systems Engineering). FIPSE II which will take place in Crete in June 21-23 2014. In addition to organizing the overall conference, Erik also organizes a session on networked systems with Alf

Isakson of ABB and Ricardo Scattolini of Elettronica e Informazione Polytecnico di Milano as Plenary Speakers. The objective of the conference is to discuss open and emerging problems rather than focusing on achieved results. In October Erik presented his short course on adaptive control and machine learning in the Department of Electrical Engineering at NTNU Norway. He also presented seminars at Tufts University and University of Texas Austin. He presented a paper on adaptive model predictive control of the HVAC system at Phipps Conservatory at the AIChE meeting and he co-chaired one session on networked control systems.

Welcome Visiting Scholars

Prof. Tae Jeong Ha, from Science and Technology Policy Institute in Korea is working with Prof. Myung Jhon's group on policy-making in fusion technologies such as non- and information technologies with a goal of economic development.

Prof. Gang Xu, from Tsinghua University in China is working with Prof. Dennis Prieve's group on colloid and interface science.

Prof. Baoyun Qiu, from Yangzhou University in China is working with Prof.'s Biegler and Grossmann's group in the area of integrated water optimization.

Jens Bremer, from Berlin Institute of Technology in Germany is working with Prof. Larry Biegler's group on process optimization.

Clara Heuberger, from RWTH Aachen University, Germany is working with Prof. Ignacio Grossmann's group on developing advanced optimization models to examine the impact of energy storage opportunities and different pricing schemes.

Chen Zhang, from Zhejiang University in China, is working with Prof. Larry Biegler's group on operational optimization for large-scale complex process systems.

Prof. Xing Ding from Guangzhou Institute of Geochemistry, CAS in China is working with Prof. Neil Donahue's group on Organic Aerosols and their properties.

Prof. Yang Chen, from Tsinghua University in China, is working with Prof. Ignacio Grossmann's group on CO₂ capture and energy integration for power plants.

Tor Aksel Heirung, from Norwegian University of Science and Technology in Norway is working on his Ph.D. thesis with Prof. Erik Ydstie's group.

Prof. Xi Chen from Zhejiang University in China, is working with Prof. Larry Biegler's group on process optimization.

Prof. Lingyu Zhu from Zhejiang University of Technology in China, is working with Prof. Larry Biegler's group on process optimization.

Pedro Amorim from the University of Porto in Portugal is working in research and education under the direction of Prof. Ignacio Grossmann through the CMU-Portugal Project.

Junxue An, from Royal Institute of Technology, Sweden is working with Prof. Bob Tilton's group on Adsorption and frictional properties of core-shell nanoparticles.

Prof. Mani Bhushan, from Indian Institute of Technology (I.I.T.) Bombay is working with Prof. Larry Biegler's group on the topic of Efficient decentralized constrained state estimation.

Jose Eduardo Alves Graciano, from University of Sao Paulo, Brazil, is working with Prof. Larry Biegler's group on Assessing the reliability of different real-time optimization methodologies.

Prof. Hyung Min Kim, from Kyonggi University in Korea is working with Prof. Myung Jhon's group on computational fluid dynamics and nano/micro scale transport processes modeling via lattice Boltzmann method, which are relevant to the mission of the Data Storage Systems Center (DSSC)

Mustafa Kilinc is working with Prof. Nick Sahinidis' research group on developing and implementing algorithms for global optimization.

Miguel Angel Zamarripa Perez, from Universitat Politècnica de Catalunya, Spain is working with Prof. Ignacio Grossmann's group in the area of enterprise-wide optimization in collaboration with some of the companies of the CAPD (Center for Advanced Process Decision-making).

Undergraduate News

Congratulations to the following students who were on the CIT Dean's List for Fall 2013:

Seniors

Katia Bazzi
Rachel Bordin
Jaqueline Budz
Adam Cantini
William Chai
Yang Choo
Julia Devito
Caitlyn DiPietro
Rachel Dokich
Ian Dolan
Joseph Guihan
Saakshi Gupta
Jinie Haytko
Morgan Jaunzemis

Mahaesh Jayaraman
Immanuel Krogmann
Alexander Noeth
Christa Orvik
Sara Saheb Kashaf
Stephen Scannell
James Solomon
Laura Valcarce
Shrihari Venkatesh
Rebecca Wells
Robert Winkelman
Justin Young
Zifang Zhao
Cecilia Zischkau

Juniors

Eamon Cullinane
Amy Desalazar

Alexandra Frankel
Sara Kelly

Sam Klein
Harley Montano
Sarah Narburgh
James Petka

Lauren Powers
William Records
John Taormina
Darwin Yang

Sophomores

Corrine Bacigal
Jonathan Berman
Maggie Chen
Taigyoo Joo
Do Hyung Kim
Eleanor Kwik
Darwin Kwok

Muyuan Li
Brigid McGovern
Alexandra Newby
Santosh Prabha
Adam Simpson
Brian So
Christia Zheng

Exchange Students

Welcome to Sunkyu Lee, our new exchange student from Yonsei University in Seoul, Korea.

Graduate News

Good luck to our first-year graduate students who have joined the following professors in their research efforts.

PhD Students:

Travis Armiger
Rebecca Ball
Toni Bechtel
Alex Bertuccio
Burcu Beykal
Blake Bleier
Mehak Chawla
Markus Drouven
John Eason
Qingqi Fan
Randall Gamble
Devin Griffith
Lisa Kasiewicz
Jiaying Ke
Nikolaos Lappas
Jianfeng Liu
John Michael
Juan Morinelly
Brittany Nordmark
Nicholas Skarzynski
Irem Sen
AnirudhSubramanyam
Emily Wallitsch
Justin Weinberg

Prof. Dahl
Prof. Whitehead
Prof. Khair
Prof. Tilton
Prof. Mauter
Prof. Anna and Walker
Prof. Kitchin
Prof. Grossmann
Prof. Biegler
Prof. Kitchin
Prof. Schneider
Prof. Biegler
Prof. Whitehead
Prof. Ydstie
Prof. Gounaris
Prof. Gellman
Prof. Sides and Kitchin
Prof. Ydstie
Prof. Tilton and Przybycien
Prof. Pandis
Prof. Gellman
Prof. Gounaris
Prof. Tilton
Prof. Przybycien

Zachary Wilson
Xiaoxiao Yu

Prof. Sahinidis
Prof. Gellman

MS Students:

Cheshta Balwani
Cheng Cheng
Weijia Cui
Tarun Dalwani
Prashansa Desai
Yuan Fang
Nitish Govindarajan
Nishtha Gupta
Yash Khandor
Zekun Li
Ran Li
Boyu Li
Chenkai Li
Xiaoyu Liang
Chang Liu
Nai-Yuan Liu
Eric Liu
Xin Liu
Irene Lotero Herranz
Meiheng Lu
Jiaqi Luo
Raj Maniar
Xinyu Nie
Ebrahim Owaiz
Hsin Pang
Arjun Ramesh
Niyatee Ravipati
Boya Shi
Jiawei Sun
Ajay Thakkar
Lin Wang
Ruxin Wei
Wenqin You
Jialiu Zhang
Zechen Zhang
Yunyao Zhang
Nan Zhang
Tong Zhang
Hua Zheng
Xingshi Zhou

Prof. Biegler
Prof. Gellman/Shukla
Prof. Sahinidis
Prof. Gellman and Miller
Prof. Anna and Walker
Prof. Prieve
Prof. Kitchin
Prof. Gellman and Miller
Prof. Gounaris
Prof. Schneider
Prof. Tilton
Prof. Gellman
Prof. Mauter
Prof. Schneider
Prof. Whitehead
Prof. Sides
Prof. Biegler and Jhon
Prof. Ydstie
Prof. Grossmann
Prof. Kitchin
Prof. Mauter
Prof. Przybycien
Prof. Sahinidis
Prof. Tilton
Prof. Ydstie
Prof. Gellman and Miller
Prof. Przybycien
Prof. Ydstie
Prof. Biegler and Jhon
Prof. Kauffman
Prof. Gounaris
Prof. Ydstie
Prof. Kitchin
Prof. Anna
Prof. Tilton and Przybycien
Prof. Gellman
Prof. Mauter and Siirola
Prof. Sahinidis
Prof. Sahinidis
Prof. Mauter

Congratulations and good luck to our students that graduated in December 2013:

Ajit Gopalakrishnan - PhD

Advisor: L. Biegler. Title: *“Optimization in Energy Networks: Applications in Gas Pipelines and Power Grids”*

Andrea Paciga - PhD

Advisor: S. Pandis. Title: *“Volatility of Organic Aerosol”*

Erica Trump - PhD

Advisor: N. Donahue. Title: *“Atmospheric Particulate Matter: Dynamic Modeling from Laboratory to Regional Scales”*

Yongju Yun - PhD

Advisor: A. Gellman. Title: *“Enantioselective Separation of Amino Acids on Naturally Chiral Cu Surfaces”*

Yan Zhang – PhD

Advisor: N. Sahinidis. Title: *“Modeling Uncertainty and Risk in Carbon Capture and Storage”*

MS

Wei Bai – MS

Advisor: M. Domach. Title: *“High Yield Plasmid Production in Escherichia coli at Bench scale”*

Feng Cao – MS

Advisor: R. Tilton. Title: *“Biofilm-binding Effect of Gold Nanoparticles”*

Shih-Hsin Chang – MS

Advisors: R. Tilton, T. Przybycien. Title: *“Interfacial Tension between PEGylated Protein Solutions and Organic Polymer Solutions”*

Judy Chen – MS

Advisor: N. Sahinidis. Title: *“Derivative-free Optimization and Programming”*

Tianluo Chen – MS

Advisor: N. Sahinidis. Title: *“A GPU-based Parallel Implementation of BLASTN”*

An-Chi Cheng – MS

Advisor: T. Przybycien. Title: *“Economic and Environmental Sustainability in Single-Use versus Multi-Use Equipment Decision-Making for Bioprocesses”*

Jingjiang (Robin) Cheng – MS

Advisor: N. Sahinidis. Title: *“ALAMO in Fortran”*

Xun Cheng - MS

Advisor: B. E. Ydstie. Title: *“Modeling and Recipe Based Control of Polymerization Reactor”*

Yan Cheng – MS

Advisors: B. Morreale and J. Miller. Title: *“Study on Hydrogen Selective Membrane Reactor Application on Methane Dehydroaromatization Reaction”*

Rajan Chidambaram Siva – MS

Advisors: A. Gellman and C. Matranga. Title: *“Atomically Precise Au₂₅⁻ Clusters for Electro-Catalytic CO₂ Conversion”*

Surya Venkatesh Dhulipala – MS

Advisor: N. Donahue. Title: *“Flow Tube Generation of Secondary Organic Aerosols”*

Dapeng Ding – MS

Advisor: A. Gellman and J. Miller. Title: *“Study of Alloy Catalyst for Olefin Hydrogenation”*

Qiyang Duan – MS

Advisor: T. Przybycien. Title: *“Propagation of Variance in Ion Exchange Chromatography for Protein Separations: Impact of Mobile Phase Variance”*

Qianwen Gao - MS

Advisor: L. Biegler. Title: *“Equation-oriented Flowsheet Optimization of CO₂ Processing Unit”*

Zixiang Gao - MS

Advisor: L. Biegler. Title: *“Simulation and Optimization of Flue Gas Desulfurization Process”*

Penghong Guo – MS

Advisor: K. Whitehead. Title: *“Lipidoid Tail Structure Strongly Influences siRNA Delivery Efficacy In Vitro”*

Nisha Holla – MS

Advisors: S. Anna and L. Walker. Title: *“Characterization of Transport Processes in a Microtensiometer Device”*

Yung-Chieh Hsieh – MS

Advisor: A. Khair. Title: *“Combination of Microrheology and Macrorheology: An External Force on a Particle in a Sheared Colloidal Dispersion”*

Heqing Huang – MS

Advisor: P. Sides. Title: *“Determining the Effect of Charge Density on Antimicrobial Activity”*

Zefan Jiang – MS

Advisor: S. Anna. Title: *“The Hydraulic Resistance of a Microfluidic Trap via Computational Fluid Dynamics”*

Zhihao Jin – MS

Advisor: N. Sahinidis. Title: *“Automated Learning of Algebraic Models for Optimization UserInterface Design”*

Deyang Li – MS

Advisor: D. Prieve. Title: *“Dielectrophoretic Force on a Neutral Sphere Near an Electrode, Caused by an A/C Current”*

Xiangan Li – MS

Advisor: J. Siirola. Title: *“Membrane Models for Pre-Combustion Carbon Dioxide and Hydrogen Separation: Using Non-Linear Programming Techniques to Synthesize an Optimal Subsystem”*

Xutao Li - MS

Advisor: N. Donahue. Title: *“Observing Ozone in Smog Chambers via Chemiluminescence”*

Yubing Lu – MS

Advisor: A. Gellman. Title: *“Preparation and Characterization of Ni Surface Structure Spread Single Crystals”*

Manaswita Deepak Malatpure - MS

Advisor: J. Miller. Title: *“Supported Palladium Catalysts for Total Methane Oxidation”*

Prateek Mehta – MS

Advisor: J. Kitchin. Title: *“Identifying Potential BO₂ Oxide Polymorphs for Epitaxial Growth Candidates”*

Yang Song – MS

Advisor: A. Gellman and C. Matranga. Title: *“Synthesis, Characterization and Photocatalytic Activities of Plasmon Mediated Catalysts”*

Yichun Sun – MS

Advisor: B.E. Ydstie. Title: *“Adaptive Control and Implementation in Simulink”*

Chiang-Yu Wang – MS

Advisor: R. Tilton. Title: *“Associative Thickener Effects on Poly(ethylene oxide) Star Polymer Stabilized Emulsions”*

Lei Wang – MS

Advisor: D. Prieve. Title: *“A Brownian Dynamics Simulation of a Colloidal Particle in an Alternating Electric Field Very Near an Electrode”*

Yajun Wang – MS

Advisor: L. Biegler. Title: *“Advances in Pressure Swing Adsorption Optimization”*

Ye Wang – MS

Advisor: N. Sahinidis. Title: *“Optimization of Lithium-ion Battery with Derivative-free Optimization Algorithms”*

Zilong Wang – MS

Advisor: N. Sahinidis. Title: *“PSA-based Prostate Cancer Screening Policy Optimization with Derivative-free Optimization Algorithms”*

Xin Xing – MS

Advisor: A. Gellman and N. Shukla. Title: *“Synthesis of Chiral Nanoparticles”*

Huangqiang Zhao – MS

Advisor: N. Sahinidis. Title: *“Application of Derivative-Free-Optimization Algorithms in Crystallization Process Optimization”*

Zixi Zhao – MS

Advisor: B. E. Ydstie. Title: *“Modeling and Passive Control of a Homo-Polymerization Batch Reactor”*

MS-CPS

Clare Keeney – MS-CPS

Soo Hyun Park - MS-CPS

Zhenhuan Zhong – MS

Advisor: R. Tilton and A. Jacobson. Title: *“pH Effects on the Polyelectrolyte Brush-Grafted Nanoparticles and Its Adsorption onto the Mica Surface”*

Master of Chemical Engineering

Weiqi Cai

Yi Xiong

Congratulations to the following students who recently presented their research proposals:

Melissa Dao

Advisors: L. Walker and M. Domach. Title: *“Impact of Dispersed Nanoparticles in Block Copolymer Soft Solids”*

Sarah Feicht

Advisor: A. Khair. Title: *“Mathematical Modeling of Electronic and Ionic Transport in Organic Electronic Devices”*

Alex Hallenbeck

Advisor: J. Kitchin. Title: *“A Microfluidic Approach to Solvent Characterization for CO₂ Capture Applications: Kinetics of CO₂ Absorption by Amino Acid Salts”*

Eleni Karnezi

Advisor: S. Pandis. Title: *“Simulation of Atmospheric Organic Aerosol using its Volatility-Oxygen Content Distribution”*

Javier Lanauze

Advisors: A. Khair and L. Walker. Title: *“Electrohydrodynamics of Complex Interfaces”*

Bethany Nicholson

Advisor: L. Biegler. Title: *“On-line Estimation and Control of Dynamic, Large Scale Processes with Applications in Power Systems”*

Matthew Payne

Advisor: A. Gellman. Title: *“High-Throughput Assessment of Early Oxidation Behaviors: Al_xFeyNi_{1-x-y} Alloys with Constant Cr Content in Air and Air + H₂O”*

Yash Puranik

Advisor: N. Sahinidis. Title: *“Constraint Propagation and Relaxation Techniques for Global MINLP Optimization”*

Blake Rawlings

Advisor: B. E. Ydstie. Title: *“Verification and Synthesis of Logical Control Systems in the Chemical Processing Industry”*

John Riley

Advisor: R. Tilton. Title: *“Adsorption and Aqueous Boundary Lubrication Properties of Responsive Polymer Brush-grafted Nanoparticles”*

Jun Shi

Advisor: L. Biegler. Title: *“Model-based Control of Optimal Grade Transitions in Polyethylene Solution Polymerization”*

Antonios Tasoglou

Advisor: S. Pandis. Title: *“Formation and Chemical Aging of Atmospheric Carbonaceous Aerosol”*

Francisco Trespalacios

Advisor: I. Grossmann. Title: *“Algorithmic Approach for Improved Mixed-Integer Reformulations of Generalized Disjunctive Programs”*

Zhongnan Xu

Advisor: J. Kitchin. Title: *“Predicting the Activity and Stability of Transition Metal Oxides for the Oxygen Evolution Reaction Using Density Functional Theory”*

Benjamin Yezer

Advisor: A. Khair, D. Prieve, P. Sides. Title: *“Electrostatic Stability in Doped Nonpolar Fluids”*

Congratulations to our second year Ph.D. students who passed their qualifier exams:

Robert Apap
Nick Austin
Jacob Boes
Nicholas Chisholm
Charles Janini
Stephanie Kirby
Steve Klara
Christopher Knapp

Sreekanth Rajagopalan
Ramankur Sharma
Robert Stout
Wei Wan
Ningxin Wang
Mingzhao Yu
Qi Zhang

ChEMSA 2014 officers

President	Gongxun Liu
Social Chairs	Xin Liu; Yash Khandor; Mingzhe Cong (Associate)
Finance Chair	Yunyao Zhang; Hyunkyn Lee (Associate)
Academic Chair	Meiheng Lv; Chestha Balwani
Communication Chair	Owaiz Ebrahim
Technical Chair	Jiaqi Luo

CHEGSA 2014 officers

President:	Nick Chisholm
Vice President:	Jake Boes
Symposium Chairs:	Qi Zhang, Nick Austin, Sarah Feicht
Social Chairs:	Alex Bertuccio, John Michael, Zach Wilson, Emily Wallitsch, Toni Bechtel, and Blake Bleier
Webmaster:	Rob Apap
GSA reps:	John Riley, Bethany Nicholson (Ben Yezer - Alternate)
Fundraising Chair:	Chris Knapp

Alumni News



JitKang Lim, former PhD student of Prof. Bob Tilton and Prof. Sara Majetich (CMU Physics), is one of the recipients for the Takeda Entrepreneurship Award of this year.

The Takeda Young Entrepreneurship Award praises young entrepreneurs or entrepreneurial individuals who challenge technological or social needs in the

real world. This award was conferred to JK based on his idea of using low field gradient to magnetophoretically separate microalgal cells from fishfarm water. Microalgae blooms in commercial fish production ponds at the northern part of Malaysia have posed serious threat to the development of freshwater aquaculture industry in Malaysia. In addition, the conventional practice of mitigating this problem, which involved dilute-and-discard strategy, has also caused serious environmental pollution in the surrounding river. By working together with fish farmers around his campus and an industry partner, JK and collaborators have developed an effective route to deal with this problem. JitKang is currently a Senior Lecturer at School of Chemical Engineering, Universiti Sains Malaysia. More detail about JK's recent works can be found online at <http://www.andrew.cmu.edu/user/jitkangl/Index.htm>

Spring 2014 Chemical Engineering Seminar Series

Spring 2014

January 23:

Model Catalyst Studies: From Supports to supported Nanoparticles

Professor Hajo Freund

Department of Chemical Physics

Fritz-Haber-Institut der Max-Planck Institute

January 28

Aerosol feedbacks on chemistry and climate at urban and regional scales

Professor Gregory R. Carmichael

Karl Kammermeyer Professor of Chemical and Biochemical Engineering

Chemical and Biochemical Engineering

The University of Iowa

February 18

Professor Krzysztof Matyjaszewski

Department of Chemistry

Carnegie Mellon University

February 25

Self-Assembly and Crystallization in Conjugated Polymers

Professor Rachel Segalman

Professor of Chemical and Biomolecular Engineering, UC Berkeley

And Acting Division Director of Materials Sciences

Lawrence Berkeley National Laboratories

Casassa Lecture

March 25

Can we use Thermodynamics to predict adhesion?

Professor John C. Berg

Rehnberg Professor of Chemical engineering

University of Washington

April 1

Transport Phenomena of Chemotactic Bacteria: Diffusion and Dispersion in Porous Media

Professor Roseanne M. Ford

Professor and Chair

Department of Chemical Engineering

University of Virginia

April 8

About Natural Gas and Hydraulic Fracturing

Gregory M. Martin

Distinguished Engineering Associate

ExxonMobil Research and Engineering

April 15

Reaction Pathways in Processing Photons and Students

Professor Tim Anderson

Chemical Engineering Department

University of Massachusetts, Amherst

April 29

Professor Gintaras (Rex) Reklaitis

Burton and Kathryn Gedge Distinguished Professor of Chemical Engineering

Co-director, Pharmaceutical Technology & Education Center

Deputy Director, NSF ERC on Structured Organic Composites

Purdue University