School of
Chemical Engineering

Professional Activity Report
2009-10
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As I was preparing to write this message, the Wall Street Journal (September 13, 2010) published the corporate recruiters’ survey and I was delighted to see that Purdue University ranked fourth in the nation in preparing its students for the work force, with Purdue Engineering ranking second in the US! The newspaper surveyed 842 top recruiting executives to find the schools that best prepare students to land satisfying, well-paying jobs that also have growth potential. Responses from 479 recruiters were received. As a group, the survey participants hired more than 43,000 new graduates in the past year. I am pleased to see that our efforts are noticed and recognized but, more importantly, I am delighted that our students are successful!

2008-09 was a record year for the number of BS and PhD degrees our School awarded, ranking second in BS production with 106 degrees and fourth in PhD production with 24 degrees (Chemical & Engineering News, August 23, 2010). In 2009-10, we awarded 143 BS and 18 PhDs, thus we expect to maintain our place at the top. Educating an increasing number of students comes with its challenges. We doubled our available space in 2005 with the Forney Hall addition; since then we have been continuously renovating the original part of the building, in phases, to bring it to the same high standards of functionality. I am pleased to inform that in 2009-10 we completed the renovation of the 1st floor and one-half of the ground floor. We are tirelessly working to complete renovation of the entire building, expected about one year from now, and we thank all our alumni, friends and corporate partners for their generous support.

In December 2009 we finalized the 2010-14 School Strategic Plan. A committee comprised of alumni, faculty, staff and students identified seven areas on which our School will focus for the next five years to reach our mission of being widely recognized among the premier ranks of chemical engineering programs in the world. For a summary of our plan, please read the following page, while the full version is available at https://engineering.purdue.edu/ChE.

In April of this year, we sailed into uncharted territories, or should I say drove in electrical carts, as we organized the first-ever electrical Grand Prix! This was a large interdisciplinary effort and the first electric vehicle Grand Prix-style go-kart race for college students in the nation. Fifteen go-karts participated, supported by student teams from computer information technology, electrical and computer technology, women in technology, mechanical engineering technology, industrial engineering and of course our School. In a DOE grant led by our Prof. Jim Caruthers, Purdue is working with the University of Notre Dame, Indiana University-Purdue University Indianapolis, Ivy Tech Community College, Purdue University Calumet and Indiana University Northwest to develop the degree and training programs to support the emerging electric vehicle industry. The educational institutions in the I-AEVer consortium will create about 28 courses over the next three years for programs including an associate degree and electric vehicle technology certificates as part of bachelor’s, master’s and doctoral degrees in various engineering and technology disciplines. The evGrandPrix was developed to provide hands-on experience in electro-mechanical technology, complementing the formal coursework.

In May 2010, we celebrated two of our distinguished alumni, Deborah Grubbe (BSChE ’77) and Timothy McGinley (BSChE ’63), who received Honorary Doctorate degrees from Purdue University. It is with great pleasure that I see the full circle completing; every new student who joins our School receives the education and tools to go out in the world and make his/her mark; and we are proud to welcome back and recognize the most illustrious among them with an HDR degree.

As you read our annual report of activities, I know you will appreciate the countless hours and dedicated efforts that go behind graduating every student, writing every paper, and preparing each presentation. We thank our generous alumni, friends, corporate partners and funding agencies for their support that makes all this possible.

Sincerely,

Arvind Varma
R. Ganes Slayter Distinguished Professor
Head, School of Chemical Engineering
School of Chemical Engineering
Strategic Plan 2010-2014

Vision:
Be widely recognized among the premier ranks of chemical engineering programs in the world.

Mission:
Provide students with a rigorous and relevant education, conduct field-defining research, and enhance the School’s global impact.

Values:
Leadership; excellence and innovation; relevance and impact; commitment and responsibility; teamwork and partnership; diversity and respect; safety and sustainability.

Research: To pursue breakthrough research that extends the boundaries of chemical engineering into areas which promote sustainability and which will have the greatest positive impact on our global society.

Education:
Graduate Programs - Recruit and retain high caliber graduate students from top-tier chemical engineering programs, provide challenging and relevant research programs, and a quality graduate level education.

Undergraduate Programs - Recruit and retain the most capable, motivated and diverse class of undergraduates, and help them to obtain a solid and relevant education throughout their Purdue experience.

Global Impact: Educate undergraduate and graduate students who will be successful in a global environment. Cultivate and expand research relationships with prominent international research organizations.

Development: Secure and improve the School’s financial foundation as a means to continually improve its programs and physical facilities, while balancing short and long term goals.

Engagement: Encourage faculty, staff and students to develop a sense of personal responsibility and accountability for service at both the local and national levels. Promote entrepreneurial activity, leading to intellectual property, including invention disclosures and patents. Become a leader in sustainability on the Purdue campus.

Professional Development and Recognition: Encourage all faculty, staff and students to participate in activities that will enhance their career, develop their skills, and help them become more creative and productive. Actively promote recognition by internal and external award nominations.

Culture and Environment: Create an environment where faculty, staff and students are treated with respect and where superior teamwork is achieved. Enhance and expand safety activities and safety education.
**Fields of Study**

**Catalysis and Reaction Engineering** – Baertsch, Delgass, Ramkrishna, Ribeiro, Thomson, Varma

**Fluid Mechanics and Interfacial Phenomena** - Basaran, Beaudoin, Corti, Franses, Harris, Houze; Kim, Litster

**Mass Transfer and Separations** – Agrawal, Franses, Wang, Wankat

**Molecular and Nanoscale Modeling** – Chakrabarti, Corti, Harris, Thomson, Won

**Polymers and Materials** - Caruthers, Litster, Pipes, Varma, Won, Wu

**Product and Process Systems Engineering** - Agrawal, Kim, Litster, Pekny, Reklaitis, Venkatasubramanian

**Chemical Synthesis** - Baertsch, Caruthers, Delgass, Morgan, Ribeiro, Thomson, Varma

**Energy** - Agrawal, Baertsch, Caruthers, Chakrabarti, Delgass, Ho, Morgan, Pekny, Ramkrishna, Ribeiro, Varma, Wu

**Medical Engineering** - Caruthers, Chakrabarti, Franses, Liu, Pekny, Ramkrishna, Won, Yuan

**Pharmaceutical Engineering** - Basaran, Beaudoin, Harris, Kim, Litster, Ramkrishna, Reklaitis, Venkatasubramanian
Faculty

Rakesh Agrawal
Sc. D., Massachusetts Institute of Technology, 1980
Winthrop E. Stone Distinguished Professor
Member, National Academy of Engineering

Research Areas
Energy transformation and use issues for solar, coal, biomass and hydrogen economy;
Novel separation processes using distillation, membranes and adsorption; Process development, cryogenics and gas liquefaction processes

Selected Professional Activities
Member, Editorial Advisory Board, I&EC Research
Member, Chem. Eng. Department Advisory Committee, WPI
Member, Technical Advisory Boards of Dow Chemicals, Genometica, Kyrogen Ltd., Weyerhaeuser
Member, NRC Board on Energy and Environmental Systems (BEES)
Member, NRC Committee on Plug-in Hybrid Electric Vehicles

Selected Invited Lectures
“Thin Film Solar Cells from Nanocrystal Inks of Quaternary Semiconductors”, GE Global Research, NY, September (2009).

Selected Publications


Selected Conference Presentations
“Thin Film Solar Cells from Nanocrystal Inks of Quaternary Semiconductors,” Solar Workshop at CNM Users Meeting, Argonne National Laboratory, Chicago, IL, October, (2009).


Intellectual Property


Chelsey D. Baertsch
Ph. D., University of California at Berkeley, 2001
Assistant Professor
2009 Shreve Prize for Outstanding Teaching in Chemical Engineering

Research Areas
Heterogeneous catalysis, micro catalytic sensors, MEMS, metal oxide nanostructures

Selected Professional Activities
Research Areas
Heterogeneous catalysis, micro catalytic sensors, MEMS, metal oxide nanostructures

Selected Invited Lectures

Selected Publications


Selected Conference Presentations
Osman Basaran
Ph. D., University of Minnesota, 1984

Burton and Kathryn Gedge Professor

Research Areas
Fluid Mechanics, Rheology, Drop Dynamics, Interfacial Phenomena, Finite Element
Computational Analysis, Ink-Jet Printing, MEMS, Electroseparations

Selected Professional Activities

Selected Invited Lectures
“EHD jetting and emission of charged drops from Taylor cones,” Chemical Engineering Department and the Levich Institute, City College of CUNY, New York, NY, May (2010).

Selected Publications

Selected Conference Presentations


Stephen P. Beaudoin  
Ph. D., North Carolina State University, 1995

Professor

Purdue University Faculty Scholar (2006-2011)  
Purdue University Provost Fellow (2008-2010)

Research Areas  
Particle and Thin Film Adhesion, Electronic Materials, Chemical Mechanical Polishing, Biosensors

Selected Professional Activities
President, Particle Division, Adhesion Society, 2008-present

Selected Invited Lectures

Selected Publications


Selected Conference Presentations


Selected Professional Activities
Board of Directors, Discovery Park Cyber Center
Director, Center of Impact Science

Selected Publications


Selected Conference Presentations


Raj Chakrabarti  
PhD, Princeton University, 2002  
Assistant Professor  

Research Areas  
Quantum Control and Information Theory, Theoretical and Computational Biophysics, Application to Energy Sciences

Selected Professional Activities  
Reviewer:  
- NSF CBET Biocatalysis Review Panel, January, 2010

Selected Invited Lectures  
“Molecular control engineering,” Dept. of Chemistry, Purdue University, West Lafayette, IN, April (2010).  
“Control and optimization of molecular systems,” Dept. of Physics, Purdue University, West Lafayette, IN, February (2010).  
“Quantum control landscapes and the design of adaptive feedback control algorithms,” Wolfgang Pauli Mathematical Institute, University of Vienna, (2009).  
“Sequence optimization and evolutionary dynamics of enzyme active sites,” Dept. of Biophysics, Yale University, (2009).

Selected Publications  

Professor Chakrabarti (4th from left) with the Chemical Engineering Sustainability Initiative Group
David S. Corti  
Ph. D., Princeton University, 1997  

Professor  
Director of Undergraduate Studies, Chemical Engineering  

Research Areas  
Molecular Thermodynamics, Metastable Liquids, Nucleation Phenomena, Colloidal Dispersions, Computer Simulation Techniques  

Selected Professional Activities  
Member of the Area 1a Programming Committee, AIChE (September 2007 to August 2010)  

Area 1a Program Organizer for Fall 2009 AIChE National Meeting, Nashville, TN  


Selected Invited Lectures  

Selected Publications  


Selected Conference Presentations  

B. Sturtevant and D. S. Corti, “Computational Studies of Lubrication Forces in Model Colloidal Dispersions,” Midwest Thermodynamics and Statistical Mechanics Conference, University of Notre Dame, South Bend, IN, June (2010).  


Professor Corti (left) with a group of undergraduate students
W. Nicholas Delgass
Ph. D., Stanford, 1969

Maxine Spencer Nichols Professor

Inaugural North American Catalysis Society Award for Distinguished Service in the Advancement of Catalysis (2010)

Research Areas
Heterogeneous catalysis, catalyst design by Discovery Informatics, olefin polymerization, water gas shift reaction, propylene epoxidation over Au nanoparticles, spectroscopy of surfaces, biofuels

Selected Professional Activities
Editorial Board, Journal of Catalysis
Member of the External Advisory Board for the Institute for Environmental Catalysis, Northwestern University

Selected Invited Lectures


Selected Publications


Selected Conference Presentation


Elias I. Franses  
Ph. D., Minnesota, 1979

Professor

Research Areas
Adsorption and Tension Equilibria and Dynamics of Surfactants and Proteins at Interfaces, Adsorption and Transport of Lung Surfactants and their Roles in Alveolar Respiratory Diseases. Sorbents and Sorbent-Solvent Sorbate Interactions of Chiral Molecules for Bioseparations of Enantiomers, Lipid/Protein Interactions in Solutions and at Surfaces.

Selected Publications


Selected Conference Presentations


Poster Session- Fall 2009 GSO Symposium
Robert E. Hannemann  
M.D., Indiana University, 1959  

Visiting Professor  

Research Areas  

Selected Professional Activities  
Executive Committee and Liaison for the Center for Assistive Technology, Regenstrief Center on Healthcare Engineering, Purdue University  
Chair, Healthcare Engineering Signature Area, Purdue University  
Board of Directors, National Center for Missing and Exploited Children  

Selected Publications  

Engineering fountain in front of Forney Hall
Michael T. Harris
Ph. D., University of Tennessee – Knoxville, 1992

Professor
Associate Dean for Undergraduate Education

Research Areas
Nanoparticle Technology, Synthesis of Nanowires and Nanotubes, Micropatterning, Protein Crystallization, Interfacial and Transport Phenomena

Selected Professional Activities
Engineering Advisory Council, Mississippi State University
Associate Editor, Journal of Nanomaterials
Associate Editor, Chemical Engineering Letters
Committee on Minority Affairs, American Chemical Society
Program Chair, AIChE Minority Division
Trustee of AIChE Foundation (2009 to present)

Selected Invited Lectures
M. T. Harris, “Surface Mineralization, Alignment, and Programmed-Self Assembly of the TMV Biotemplate,”
Department of Chemical and Biomolecular Engineering,
University of Illinois Chicago, Chicago, IL, March (2010).

M. T. Harris, “Surface Mineralization, Alignment and Programmed Self-Assembly of the TMV Biotemplate,”
Department of Chemical and Biomolecular Engineering,
University of Tennessee, Knoxville, TN, December (2009).

Selected Publications


Selected Conference Presentations


Intellectual Property
Metal Coated Virus-Based Nanoelectrodes and Method of Assembling of Same, (Patent Application No. 20100093562, April 15, 2010).
Nancy W. Y. Ho  
Ph. D., Purdue University, Molecular Biology

Research Professor  
Senior Research Scientist and Group Leader of Molecular Genetics Group  
Laboratory of Renewable Resources Engineering (LORRE)

Research Areas  
Genetic engineering of the Saccharomyces yeast to convert sugars from cellulosic biomass to ethanol

Selected Invited Lectures  

Selected Publications  


Selected Conference Presentations  


Professor Ho (right) in the audience at the Chemical Engineering of the Future Symposium
R. Neal Houze
Ph. D., University of Houston, 1968
Professor
Conoco Phillips Faculty Fellow, 2009-10

Selected Professional Activities
Purdue University Senate, Superior Student Committee
Ombudsman for College of Engineering, Purdue University
Interdisciplinary Engineering Committee, College of Engineering, Purdue University

Sangtae Kim
Ph. D., Princeton, 1983

Donald W. Fedderson Distinguished Professor (on leave)
Member, National Academy of Engineering

Research Areas
Pharmaceutical Informatics: Bioinformatics, Cheminformatics, Systems Biology;
Computational Microfluidics and Nanofluidics; Radio Frequency Identification (RFID) and
Enabling Information Technologies

Selected Professional Activities
FDA Science Board Working Group, Chair – IT Subgroup
Vice Chair, World Technology Evaluation Center (WTEC)

Advisory Boards (academic):
Dept. of Chemical Engineering, University of California Santa Barbara
College of Engineering, Illinois Institute of Technology
National University of Singapore, Graduate School Integrative Studies Program
Dept. of Chemical Engineering, Tennessee Tech. University.
Selected Professional Activities
Honorary Professor, The University of Queensland
Member, Solae LLC (St Louis) Scientific Advisory Board Fellow, Institution of Chemical Engineers (UK)
Consultant, International Fine Particle Research Institute Powder Technology Editorial Board (2002-present)
Particle and Particulate Systems Characterisation Editorial Board (2003-present)
AAPS Pharmaceutical Science and Technology Editorial Board (2009-present)

Selected Invited Lectures
“Alice in Wonderland – A Personal Journey through the World of Particle Technology” Procter and Gamble, Newcastle-on-Tyne, UK, June (2009).

Selected Publications

James D. Litster
Ph. D., University of Queensland, 1985
Professor of Chemical Engineering and Industrial and Physical Pharmacy
Director of Graduate Studies, Chemical Engineering
Achievement Award, 9th International Agglomeration Symposium/4th International Granulation Workshop, UK (2009)

Research Areas
Particle Design and Formulation, Granulation and Agglomeration,
Crystallization of Bioactives, Engineering Education


Selected Conference Presentations
van der Hoeven, M., Howes, T., Litster, J.D. and Cameron, I.T., “Particle impact experiments for validation of agglomeration penetration regime map,” 6th World Congress on Particle Technology, Nuremberg, Germany, April (2010).

Book chapters
Julie C. Liu  
Ph. D., Caltech, 2006  
Assistant Professor  
Research Areas  
Biomaterials, Tissue Engineering, Protein Engineering

Professional Activities
American Institute of Chemical Engineers  
• Session co-chair, Injectable Biomaterials, Nov 2009  
• Session co-chair, Polymers as Functional Components of Micro- and Nanodevices, Nov 2009  
• Women’s Initiatives Committee, vice chair, Nov 2009 – Nov 2010  
• 2010 Panel co-organizer, After My Degree – Industry or Academia, April 2010  
• 2010 abstract reviewer for Biomimetics

Selected Publications

Selected Conference Presentations


Liu, J.C., “Bioactive Cues That Influence Mesenchymal Stem Cell Differentiation for Use in Cartilage Tissue Engineering,” invited oral presentation at Biomaterials Day: “Advances in Bioactive Materials and Interfaces for Therapeutics and Diagnostics” sponsored by the Society for Biomaterials and organized by University of Kentucky and Case Western Reserve University, Lexington, KY, Session 3, September (2009).


Professor Liu (left) with Lindsay Williams, a scholarship recipient senior
John A. Morgan  
Ph. D., Rice, 1999  
Associate Professor  
Visiting Associate Professor of Chemical Engineering, National Taiwan University, Fall 2009  
Research Areas: Metabolic Engineering, Biocatalysis

Selected Professional Activities
Associate Editor, Bioprocess and Biosystems Engineering  
Invited Site Reviewer for Singapore’s A*STAR program  
Programming Vice-Chair AIChE, National Meeting Division 15 (2010)

Selected Invited Lectures
“Prediction and determination of metabolic fluxes in photosynthetic microbes,” Chemical and Biological Engineering and Genetics, Development and Cell Biology, Iowa State University, Ames, IA, February (2010).


“Metabolic flux analysis of photosynthetic microorganisms,” Chemical Engineering Department, National Cheng Kung University, Tainan, Taiwan, R.O.C, November (2009).

“Engineering flavonoid biosynthesis in yeast,” National Dong Hua University, Biotechnology Department, Hua Lien, Taiwan, R.O.C., November (2009).

“Metabolic flux analysis of carbon fixation in single celled organisms,” National Taiwan University, Chemical Engineering Department, Taiwan, R.O.C., October (2009).

Selected Publications


Selected Conference Presentations


Joseph F. Pekny
Ph. D., Carnegie Mellon University, 1989

Professor
Interim Head, School of Industrial Engineering

Research Areas
Systems analysis; combinatorial optimization; supply chain management, planning and scheduling systems; pharmaceutical pipeline management; model-based and data driven management; systems analysis and decision models in healthcare engineering, real-time decision systems

Selected Professional Activities
Member of the Purdue Global Policy Research Institute
Co-Leader of the Systems Engineering Task Force/Systems of Systems Institute Working Group for the College of Engineering

Selected Invited Lectures
“Preparing the PEV Workforce, The Business of Plugging In,” A Plug-In Electric Vehicle Conference, Detroit, MI, October (2010).

Selected Publications

Selected Conference Presentations


R. Byron Pipes
Ph. D., University of Texas – Arlington, 1972

John Leighton Bray Distinguished Professor
Director, Purdue Institute for Defense Innovation

Member, National Academy of Engineering

Research Areas
Application of nanotechnology to engineering disciplines including aerospace, composite materials and polymer science and engineering

Selected Professional Activities
Fellow, American Society of Mechanical Engineers
Fellow, Society for Advanced Materials and Process Engineering
Fellow, American Society of Composites
Member, NRC Committee Panel on Building and Fire Research

Selected Publications
Doraiswami Ramkrishna  
Ph. D., University of Minnesota, 1965  
H. C. Peffer Distinguished Professor  
Member, National Academy of Engineering

Research Areas  
Applied Mathematics, Dispersed phase systems, Biochemical engineering, Chemical reaction engineering

Selected Professional Activities  
Member Advisory Council, Pacific Northwest National Laboratory, Richland, WA

Selected Invited Lectures  


“On Dynamic Modeling of Metabolism,” Department of Chemical Engineering, University of California at Santa Barbara, CA, October (2009).

Selected Publications  


Selected Conference Presentations  


Gintaras V. "Rex" Reklaitis
Ph. D., Stanford University, 1969

Burton and Kathryn Gedge Distinguished Professor

George Lappin Award, National Program Committee, AIChE (2010)

Member, National Academy of Engineering

Co-director, Pharmaceutical Technology & Education Center
Deputy Director, NSF ERC on Structured Organic Composites

Research Areas
Process systems engineering, design and operation of batch/semicontinuous systems, enterprise-wide modeling and optimization, applications to pharmaceutical product development, process design and manufacturing

Selected Professional Activities
US National Academy of Engineering, Section 3 Peer Committee, 2010-2012
AIChE Foundation, Board of Trustees, 2010-2012
Smart Process Manufacturing, Steering Committee, NSF EVO, 2007-present
National Institute for Pharmaceutical Technology & Education, Purdue representative, 2005-present

Editorial Advisory Boards
- Computers & Chemical Engineering
- Journal of Pharmaceutical Innovation
- Computer Applications in Engineering Education
- Journal of Process Systems Engineering

Selected Invited Lectures
“Approaches to Energy Systems Modeling, Simulation and Analysis,” Polytechnic University of Catalunya, Department of Chemical Engineering, Barcelona, Spain, January (2010).

“Process Systems Engineering Approaches to Enterprise-wide Decision Problems,” Rensselaer Polytechnic Institute, Department of Chemical and Biological Engineering, September (2009).

Selected Publications


Selected Conference Presentations


**Fabio H. Ribeiro**  
Ph. D., Stanford University, 1989  
Professor  
Purdue University Faculty Scholar (2006 – 2011)  

**Research Areas**  
Surface Science and Kinetics of Heterogeneous Catalytic Reactions

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**Selected Professional Activities**

Member of the Editorial Board for Applied Catalysis B: Environmental  
Member of the Editorial Board for Catalysis Letters  
Vice-chair of the Catalysis and Reaction Engineering Division AIChe (2009)  
Chair of the Catalysis and Reaction Engineering Division AIChe (2010)  
Enter Journal of Catalysis  

**Selected Invited Lectures**

"Catalysis on a crowded surface: the role of surface oxygen on NO oxidation over Pt", University of Houston, TX, January (2010).

"Catalysis on a crowded surface: the role of surface oxygen on NO oxidation over Pt", Yale University, New Haven, CT, February (2010).

**Selected Publications**


**Selected Conference Presentations**


Ribeiro, F. H., “Effect of Pt structure on the kinetics of NO oxidation as studied by Pt(321) and Pt(111) large single crystals and supported clusters from 2-9 nm,” George A. Olah Award in Hydrocarbon or Petroleum Chemistry: Symposium in Honor of Peter C. Stair, The 239th ACS National Meeting, San Francisco, CA (2010).
Kendall T. Thomson  
Ph. D., University of Minnesota, 1999  
Associate Professor  
Purdue University Faculty Scholar (2008-2013)  
Shreve Teaching Award 2010

Research Areas  
Computational Catalysis Design, Computer-Aided Design of Nanoporous Materials, 
Ab Initio Molecular Dynamics, Molecular Electronics, Modeling Nano- and Mesoporous Materials

Selected Publications
Arvind Varma
Ph. D., Minnesota, 1972

R. Games Slayter Distinguished Professor and
Head, School of Chemical Engineering

Elected Foreign Member, Academy of Engineering, Mexico 2010

Research Areas: Chemical and Catalytic Reaction Engineering,
New Energy Sources, Synthesis of Advanced Materials

Selected Professional Activities
Series Editor, Cambridge Series in Chemical Engineering,
Cambridge University Press
Member of Editorial Board, International Journal of Petroleum Science and Technology
Member, GCEP Proposal Review Panel, Stanford University, April 2010
Chair, Plenary Session – 1, International Symposium on Chemical Reaction Engineering-21, Philadelphia, PA, June 2010
Member, Organizing Committee, ISCRE-21, Philadelphia, PA, June 2010
Chair, Amundson Award Committee, ISCRE, 2010

Selected Invited Lectures
Department of Chemical Engineering, Lamar University, Beaumont, TX, April (2010).
Distinguished Engineering Lecture, Univ. of Western Ontario, March (2010).
Department of Chemical Engineering, University of Texas, Austin, TX, September (2009).
MATRIC, Inc, South Charleston, WV, August (2009).

Selected Publications

Selected Conference Presentations


Keynote: “Evolving Trends in Chemical Engineering Education.” 8th World Congress of Chemical Engineering, Montreal, Canada, August (2009).

“New Methods for Hydrogen Generation from Boron Compounds and Water,” 8th World Congress of Chemical Engineering, Montreal, Canada, August (2009).
Venkat Venkatasubramanian  
Ph. D., Cornell, 1984  

Professor  
Professor of Industrial and Physical Pharmacy (Courtesy)  

Computing in Chemical Engineering (CAST) Award, AICHE (2009)  

Research Areas  

Selected Professional Activities  
Editor, Computers and Chemical Engineering  
Program Chair, Computing and Systems Technology (CAST)  
Area 10E, Information Technology, 2010  
Chair Pharmaceutical Engineering in the 21st Century, Topical Symposium, 8th World Congress in Chemical Engineering, Montreal, Canada, Aug 2009

Selected Invited Lectures  
"Abnormal Events Management in Complex Engineered Systems," University of California, Berkeley (EECS Department), February (2010).  
“Drowning in Data: Modeling and Informatics Challenges and Opportunities in Molecular Products Design and Manufacturing," Danish Technical University, Denmark, October (2009).  

Selected Publications  


Selected Conference Presentations  

Keynote Speaker, XI Chemical Engineering Congress, Tecnológico de Monterrey Chemical Engineering Student Society, Monterrey, Mexico, March (2010).

Keynote Speaker, 3rd Graz Pharmaceutical Congress, Graz, Austria, September (2009).

Nien-Hwa Linda Wang
Ph. D., Minnesota, 1978

Professor

Research Areas
Chemical and Biochemical Separations, Ion Exchange, Adsorption, Simulated Moving Bed Chromatography, Complex Adaptive Systems

Selected Professional Activities
Scientific Committee, the 10th International Conference on Fundamentals of Adsorption (FOA-10), Japan May (2010) Co-Chair (2008-2009) and Chair (2010-2011) of Area 2e Adsorption and Ion Exchange in the Separations Division, AIChE

Selected Publications


Selected Conference Presentations


Professor Wang (right) with Professor Franses (center) and Graduate Student Pei-Lun Chung
Phillip C. Wankat
Ph. D., Princeton University, 1970

C. L. Lovell Distinguished Professor
Director, Undergraduate Degree Programs,
Department of Engineering Education

ChE Division, ASEE, Martin Best Paper Award, 2010

Research Areas
Adsorption Operations, Large-scale Chromatography, Distillation, Engineering Education

Selected Professional Activities
Associate Editor of Chemical Engineering Education, 1995-present.
Contributing Editor, College Teaching, 2006-present.
Director AIChE Education Division, 2009-present.
Editorial Board of Adsorption, 1993–present.
Chair of Workshop and Presenter, "Effective and Efficient Teaching for Prospective Faculty," AIChE meeting, Nashville, TN, November 9, 2009, Session 40.

Selected Publications


Selected Conference Presentations


Professor Wankat (left) with Provost Tim Sands
You-Yeong Won
Ph. D., Minnesota, 2000
Associate Professor

Research Areas
Physics of polymers, polyelectrolytes, and block copolymers: polymer synthesis; polymer-based gene delivery; colloid self-assembly at liquid interfaces; scattering; microscopy; rheology

Selected Professional Activities
Chair for a session titled Structure and Properties of Polymers I at the 2009 AIChE Annual Meeting in Nashville, TN

Selected Invited Lectures
“Block Copolymers for Tumor-Targeted Theragnostics”, Department Seminar, Department of Polymer Science and Engineering, University of Massachusetts, Amherst, MA, April (2010).

“Block Copolymer-Based siRNA Delivery for RNAi Cancer Therapy”, Department Seminar, Department of Chemical Engineering, Pohang University of Science and Technology (POTECH), Pohang, Korea, June (2009).

“Block Copolymer-Based siRNA Delivery for RNAi Cancer Therapy”, Department Seminar, Department of Chemical and Biomolecular Engineering, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Korea, June (2009).

“Block Copolymer-Based siRNA Delivery for RNAi Cancer Therapy”, Department Seminar, Department of Chemical and Biological Engineering, Korea University, Seoul, Korea, June (2009).

“Fabrication of Functional Nano/Microstructures via Colloid and Block Copolymer Self-Assembly at Air-Water Interfaces”, Seminar, Active Polymer Center for Pattern Integration (APCPI), Yonsei University, Seoul, Korea, June (2009).

“Block Copolymer-Based siRNA Delivery for RNAi Cancer Therapy”, BK21 Seminar, School of Chemical and Biological Engineering, Seoul National University, Seoul, Korea, June (2009).

Selected Publications


Selected Conference Presentations


Gary, D. J., Won, Y.-Y., “Polymer-Based Delivery of siRNA for Cancer Treatment,” 7th International Nanomedicine and Drug Delivery Symposium (NanoDDS’09), Indianapolis, IN, October (2009).

Yue Wu  
Ph. D., Harvard, 2006  
Assistant Professor  

Air Force Summer Faculty Fellowship, 2010  
DuPont Young Professor Award, 2010  

Research Areas  
Synthesis, Characterization, Assembly of Nanostructured Materials and  
Their Potential Applications in Nanoscale Devices and Sustainable Energy  

Selected Professional Activities  
Reviewer for Nano Letters, Journal of American Chemical  
Society, Journal of Physical Chemistry C, Environmental  
Science and Technology, IEEE Electronic Device Letters,  
Chemistry of Materials, Nanoscale Nano Research, ACS  
Petroleum Research Fund, National Science Foundation.  

Selected Publications  
Zhang, G., Wu, Y., “Performance Enhancement of Hybrid  
Solar Cells Through Chemical Vapor Annealing,” Nano  
Letters, 10(5), 1628-1631 (2010).  

Gautam, Y. G., Susoreny, J. A., Zhang, G., Yang, H., Wu, Y.,  
“An Insight into the Feasibility and Sustainability of Large- 
scale Deployment for Thermoelectric Conversion,” Comments  
on Inorganic Chemistry (submitted).  

Selected Conference Presentations  
Wu, Y., “Performance Enhancement of Nanocrystal-
Conductive Polymer Hybrid Solar Cells Through Chemical  
Vapor Annealing”, 2009 Material Research Society Fall  
Meeting, December (2009). (Contribution talk)  

Intellectual Property  
Y. Wu, “Performance Enhancement of Hybrid Solar Cells  
Through Chemical Vapor Annealing,” US Provisional Patent,  
Application number 61/265,059.  

Y. Wu, G. Zhang, “Ultrathin nanowire-based Thermoelectric  
Conversion,” US Provisional Patent, Application number  
61/327,192  

Y. Wu, G. Zhang, “Nanoscale Heterostructures-based  
Thermoelectric Conversion,” US Provisional Patent,  
Application number 61/327,199.  

Provisional Patent, Application number 61/361,933.  

Professor Wu (center) presenting information to a group of alumni
Chongli Yuan  
Ph. D., Cornell, 2007

Assistant Professor

Research Areas
Biomimetic Nanoparticle Systems, Molecular Biophysics

Selected Professional Activities
AIChE 2010, Biosensor Session Co-chair
Panelist, NSF, Biomedical Engineering, May (2010)
Panelist, NSF, Biotechnology and Bioengineering, June (2010)

Selected Publications

Selected Conference Presentations
Jimenez-Useche, I., Yuan, C., The Effect of a DNA Methylation Pattern on the Nucleosome Array Self Assembly, AIChE annual meeting, Salt Lake City, November (2010) accepted.
Yuan, C., Self-Assembly of Gold Nanoparticles Guided by a Repetitive DNA Template, AIChE annual meeting, Salt Lake City, November (2010) accepted.

Professor Yuan (left) with Mary Ellen Weber, Outstanding Chemical Engineer 2009, and Professor Varma
Graduate Degrees Awarded

(July 1, 2009 to June 30, 2010)

M.S. 12
Ph.D. 18
Total 30

Ph.D. Degrees - August 2009

Boyle, Nanette
*Stoichiometric Modeling of Photoautotrophic Metabolism*, (Morgan), Postdoctoral Fellow, UCLA, CA

Diwan, Moiz
*Hydrogen Generation for Fuel Cell Application*, (Varma), Sr. Research Engineer, Abbott Laboratories, North Chicago, IL

Kelchner, Megan Farrell
*Surface Forces Affecting the Biocompatibility of Modified Polydimethylsiloxane Films*, (Beaudoin), Process Engineer, Intel, Phoenix, AZ

Joohyung Lee
*Development of Fluorescence and Radio Label-Free Detection Methods with Enhanced Sensitivity*, (Savran/Won/Lee), R & D Engineer, Samsung Advanced Inst of Tech, Gyeonggi-do, South Korea

Nair, Hari
*Fundamentals of Metal Oxide Catalysis*, (Baertsch/Kim), R & D Engineer, ExxonMobil, Houston, TX

Pham, Bich Van
*Characterization of Interaction Forces Between Bovine Serum Albumin and Self-Assembled Monolayers Relating to Protein Adhesion*, (Beaudoin), R&D Engineer, Frito Lay, Plano, TX

M.S. Degrees - August 2009

Pathare, Rugved
(Agrawal), MS Non-Thesis, Purdue University, West Lafayette, IN, Continuing for PhD

Sharma, Pradeep
(Wanat), MS Non-Thesis, Purdue University, West Lafayette, IN, Continuing for PhD

Ph.D. Degrees – December 2009

Gatt, Joseph E.
*Development of Metal Oxide Catalysts for use in Target Specific Organic Compound (VOC) Gas Sensors*, (Baertsch), Sr. Research Engr., ExxonMobil, Clinton, NJ

Guo, Qijie
*Development of Multinary Chalcogenide Nanocrystal Inks for Low Cost Solar Cells*, (Agrawal/Hillhouse), Postdoctoral Research Associate, Purdue University/ChE, West Lafayette, IN

Kilroy, Caitlin M.
*Particle Adhesion with Microelectronics Applications*, (Beaudoin), TD Process Engineer, Intel Corporation, Hillsboro, OR

Manz, Thomas A.
*Quantitative Structure Activity Relationships for Olefin Polymerization Catalyzed by Ti and Zr Complexes with Mixed Cyclopentadienyl/Aryloxide Ligation*, (Caruthers/Thomson), Research Scientist, Georgia Institute of Technology, Atlanta, GA

Novstrup, Krista A.
*Development of Fundamental Kinetic Models of Single-Site Olefin Polymerization with a Focus on [rac-(C2H4(1-indeny)2)Zr (Me)2][MeB(C6F5)3] Catalyzed Polymerization of 1-Hexene*, (Caruthers/Delgass), Senior Researcher, ExxonMobil, Annandale, NJ

Singh, Navneet R.
*High Liquid Fuel Yielding Biofuel Processes and a Roadmap for the Future Transportation*, (Agrawal/Ribeiro/Delgass), Process Engineer, Bayer Crop Science, Institute, WV

Smeltz, Andrew D.
*Structure Activity Relationships in Catalysis Studied using Model Catalysts*, (Ribeiro/Delgass), Postdoctoral Research Associate, Purdue University/ChE, West Lafayette, IN

Witte, Kevin
*On the Structure and Thermodynamics of Polymer Brushes*, (Won), Process Engineer, Intel, Rio Rancho, NM

M.S. Degrees - December 2009

Basu, Sumit
(Gore/Litster), MS Non-Thesis, Purdue University, West Lafayette, IN, Continuing for PhD

Gaik, Steven
*Optimization of Double Gyroid Film Synthesis for use in Inorganic Bulk Heterojunction Photovoltaics*, (Hillhouse/Agrawal), Continuing for PhD, Purdue University, West Lafayette, IN

Hamdan, Intan M.
(Reklaitis/Venkatasubramanian), MS Non-Thesis, Purdue University, West Lafayette, IN, Continuing for PhD

Hu, Wenbin
(Varma), MS Non-Thesis, Purdue University, West Lafayette, IN, Continuing for PhD

Park, Voonjoe
(Frances), MS Non-Thesis, Purdue University, West Lafayette, IN, Continuing for PhD

Pazmino, Jorge H.
(Delgass/Ribeiro), MS Non-Thesis, Purdue University, West Lafayette, IN, Continuing for PhD

Ramalingam, Santhosh K.
(Basaran), MS Non-Thesis, Purdue University, West Lafayette, IN, Continuing for PhD

Zhu, Qing
(Harris), MS Non-Thesis, Purdue University, West Lafayette, IN, Continuing for PhD
Ph.D. May 2010

Bhattacharya, Aparajita
Experimental Investigation and Constitutive Modeling of the Large Deformation Mechanical Behavior of Unfilled and Carbon Black Elastomers, (Caruthers/Venkatasubramanian)

Park, Yoonjee
Developing Aqueous Lipid Formulations with Low Surface Tension Behavior at Physiological Conditions and Stability against Aggregation, (Franses), Postdoctoral Research Associate, Boston University, Boston, MA

Sturtevant, Bryce D.
Computational Studies of Model Colloidal Dispersions, (Corti), Postdoctoral Research Associate, Purdue University, West Lafayette, IN

Werner, Sean R.
Engineering Saccharomyces cerevisiae for Production of Non-Natural and Glycosylated Flavonoids, (Morgan), Researcher, ExxonMobil, Paulsboro, NJ

M.S. Degrees – May 2010

O’Grady, John P.
Effects of Substrates and Light on the Growth and Lipid Production of Chlorella Protothecoides, (Morgan), Purdue University, West Lafayette, IN, Continuing for PhD

Shukla, Aviral
Venkatasubramanian MS Non-Thesis, Purdue University, West Lafayette, IN, Continuing for PhD

ChE Graduate Students
<table>
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<tr>
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<td>Corti</td>
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<td>Fall 2004</td>
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<td>Su</td>
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<td>Fall 2009</td>
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<td>Suchomel</td>
<td>Mark</td>
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<td>University of Minnesota,Duluth</td>
<td>Fall 2009</td>
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<td>Sung</td>
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<td>Harris</td>
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<td>Fall 2006</td>
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<td>Switzer</td>
<td>Jeffrey</td>
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<td>University of California, Davis</td>
<td>Fall 2006</td>
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<td>Torabi</td>
<td>Korosh</td>
<td>Corti</td>
<td>Isfan University/IIT-Chicago*</td>
<td>Fall 2007</td>
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<td>Tsui</td>
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<td>Franses/Wang</td>
<td>National Taiwan University*</td>
<td>Fall 2009</td>
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<td>Venkatakrishnan</td>
<td>Vinod</td>
<td>Agrawal/Delgass/Ribeiro</td>
<td>Indian Institute of Technology, Madras</td>
<td>Fall 2009</td>
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<td>Venkatesan</td>
<td>Anand</td>
<td>Wankat</td>
<td>Indian Institute of Technology, Madras</td>
<td>Fall 2008</td>
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<td>Vora</td>
<td>Shaunak</td>
<td>Litster</td>
<td>UICT - Mumbai</td>
<td>Fall 2007</td>
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<td>Walker</td>
<td>Bryce</td>
<td>Hillhouse/Agrawal</td>
<td>Brigham Young University</td>
<td>Fall 2009</td>
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<td>Werner</td>
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<td>Morgan</td>
<td>University of Illinois</td>
<td>Fall 2005</td>
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<td>Williams</td>
<td>W. Damion</td>
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<td>University of Oklahoma</td>
<td>Fall 2006</td>
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<td>Witte</td>
<td>Kevin</td>
<td>Won/Kim</td>
<td>Ohio State University</td>
<td>Fall 2004</td>
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<td>Xiong</td>
<td>Silei</td>
<td>Caruthers/Delgass/Thomson</td>
<td>Tsinghua University</td>
<td>Fall 2009</td>
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<td>Yadav</td>
<td>Gautam</td>
<td>Wu</td>
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<td>Fall 2009</td>
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<tr>
<td>Yang</td>
<td>Haoran</td>
<td>Wu</td>
<td>Tsinghua University</td>
<td>Spring 2010</td>
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<td>Yohe</td>
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<td>University of Minnesota,Twin Cities</td>
<td>Fall 2008</td>
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<td>Zarate</td>
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<td>Illinois Institute of Technology, Chicago</td>
<td>Fall 2008</td>
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<td>Zhang</td>
<td>Rong</td>
<td>Baertsch</td>
<td>Jilin University/Miami University*</td>
<td>Fall 2007</td>
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<td>Zhu</td>
<td>Qing</td>
<td>Harris/Taylor</td>
<td>Zhejiang University</td>
<td>Fall 2006</td>
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</tbody>
</table>

*MS Institution
Facilities

Forney Hall of Chemical Engineering
In October 2004, the School of Chemical Engineering dedicated a 100,000 ft² expansion that more than doubled the size of our building. The building was then re-named the Forney Hall of Chemical Engineering. With new lecture facilities and new bioengineering, catalysis, and nanoscience research laboratories, the School has, for the first time in decades, space to grow. The old building is currently undergoing modernization, particularly in the laboratory and associated spaces. Renovation is scheduled to be completed in 2011.

Discovery Park
Since 2002, Discovery Park - made up of 10 centers - has grown from an idea to a $450 million interdisciplinary research, learning and engagement complex. More than 1,000 faculty have been involved in Discovery Park. Nearly 3,000 students have participated in Discovery Park programs, and 250 graduate students have offices there. Our faculty are involved in cutting edge research in the Bindley Bioscience, Birck Nanotechnology, Energy, and Oncological Sciences Centers.

Bindley Bioscience Center
The Bindley Bioscience Center initiates and facilitates multi-investigator, multidisciplinary research that blends life sciences and engineering. State-of-the-art research programs focus along strategic lines that advance proteomic science and technology, bionanotechnology and biomicrotechnology, spectroscopy-microscopy for cellular and tissue imaging, tissue engineering, and bio-informatics.

Birck Nanotechnology Center
The Birck Nanotechnology Center is a leading-edge national center for nanoscale research. The BNC leverages advances in nano-scale science and engineering to create innovative nanotechnologies that address challenges in computing, communications, the environment, security, energy independence and health. The Center is located in a $54 million state-of-the-art building that houses specialized laboratories for nano-scale chemistry, physics, and biology; semiconductor-grade cleanrooms; and office space.

Energy Center
The Energy Center is a multidisciplinary community of researchers, scientists, engineers, political scientists and economists. Their goal is create the energy solutions needed by Indiana, the Nation, and the World. Energy research areas include clean coal, solar, bio, wind, electrochemical, electric machines and power electronics, hydrogen and nuclear. Global partnerships and the social, economic and political aspects of energy use and policy are also being advanced. Research on the conversion of agricultural waste into transportation fuels is conducted in the Laboratory for Renewable Resource Engineering (LORRE) in the Energy Center.

Oncology Center
The Oncological Sciences Center’s mission is to eliminate cancer as a cause of suffering and death by applying and synergizing Purdue’s strengths in the biological, chemical, engineering and human behavioral sciences. The Oncological Sciences Center builds and expands on the strong foundation of Purdue's NCI-designated Cancer Center. The Center has established strategic research partnerships with the Walther Cancer Institute and the Indiana University Simon Cancer in Indianapolis. The relationship with the Indiana University Simon Cancer Center provides the clinical setting necessary to advance and refine early-stage detection and treatment of cancers.
Visiting Faculty

Dr. Parag Gogate  
Lecturer in Chemical Engineering  
at Institute of Chemical Technology  
University of Mumbai

Dr. Luis Puigjaner  
UPC - ETSEIB  
Dpt. Enginyeria Química, Barcelona, Spain

Dr. Enrico Martinez  
Profesor, Instituto de Estudios Superiores de  
Tamaulipas Altamira, Mexic

Academic Advisory Board

Formed in 2006 to provide input on academic issues, the Academic Advisory Board had its 2009 meeting on April 1-2. Current Board members are:

- Kristi Anseth, Distinguished Professor, University of Colorado, Boulder;
- Alex Bell, Warren and Katharine Schlinger Distinguished Professor of Chemical Engineering, UC-Berkeley;
- Ignacio Grossman, Rudolph R. and Florence Dean University Professor of Chemical Engineering, Carnegie-Mellon University;
- Michael Ramage, Executive Vice President, ExxonMobil (Retired);
- Greg Stephanopoulos, Bayer Professor of Chemical Engineering, MIT;
- Matt Tirrell, Arnold and Barbara Silverman Professor in Departments of Bioengineering, Chemical Engineering and Materials Science & Engineering, University of California, Berkeley.

Industrial Advisory Council

The Chemical Engineering Industrial Advisory Council (IAC) was initiated in 1988 through the leadership support of senior executives from Abbott Laboratories, Air Products and Chemicals, Amoco, Dow Chemical and Quantum Chemical. Today the ChE IAC remains a partnership of leading corporations with the School of Chemical Engineering to advance and improve the education and professional preparation of chemical engineers who will meet the needs of industry in the 21st century. The current IAC members are listed below.

3M  
Abbott  
Air Liquide  
Air Products and Chemicals Inc.  
Anheuser-Busch, Inc.  
BP  
ChevronPhillips Chemical  
Dow Chemical Company  
Du Pont  
Eastman Chemical Company  
Elanco Animal Health, a division of Eli Lilly  
ExxonMobil Chemical Co.  
Honeywell Process Solutions  
Lubrizol Corporation  
LyondellBasell  
National Starch & Chemical Corp.  
Pfizer Global  
Procter & Gamble Co.  
Roquette America Inc.  
Shell Global Solutions (US) Inc.  
UOP LLC

These corporations provide financial support for curriculum innovations, scholarships, experimental facilities enhancements, instructional computing facilities and start-up support for young faculty. The Fall 2009 meeting took place on September 24, 2009 in Forney Hall, Purdue; the Spring 2010 meeting occurred February 12, 2010 in Naples, Florida.
September 8, 2009  
**Dr. James S. Nairne**  
Reese McGee Distinguished Professor  
Department of Psychological Sciences  
Purdue University  
“Adaptive Memory: How and Why We Remember”

September 15, 2009  
**Dr. Darsh Wasan**  
Motorola Chair Professor in Chemical Engineering & Vice President  
Illinois Institute of Technology  
“New Vistas in Dispersion Science and Engineering”

September 29, 2009  
**Dr. Antony Beris**  
Arthur B. Metzner Professor of Chemical Engineering  
University of Delaware  
“Polymer-modified Turbulence: Large and Small Scale Analysis”

October 6, 2009  
**Dr. Peter A. Monson**  
Professor of Chemical Engineering, Adjunct Professor of Chemistry  
University of Massachusetts  
“Molecular Modeling of the Thermodynamics and Dynamics of Adsorption in Mesoporous Materials”

October 15, 2009  
**Dr. Lorenz T. Biegler**  
Bayer Professor of Chemical Engineering, Carnegie Mellon University  
“Algorithmic Advances and Applications for Chemical Process Optimization”

October 20, 2009  
**Dr. Timothy Anderson**  
Associate Dean for Research & Graduate Programs/  
Distinguished Professor of Chemical Engineering  
University of Florida  
“Light In and Light Out: Solid-state Lighting and Thin Film Photovoltaics”

November 3, 2009  
**Dr. Paula T. Hammond**  
Bayer Professor & Executive Officer  
Department of Chemical Engineering  
Massachusetts Institute of Technology  
“Self-Assembly Approaches toward Directed Drug Delivery: from Patchy Micelles to MAD Nanolayers”

November 17, 2009  
**Dr. Liang-Shih Fan**  
Distinguished University Professor and C. John Easton Professor in Engineering  
The Ohio State University  
“Chemical Looping Technology”

December 1, 2009  
**Dr. Alexander Couzis**  
Herbert G. Hayser Professor and Chairman  
Chemical Engineering Department  
City College of New York  
“Spatially Addressable Biosensor Arrays Based on Liposome Self-Assembly Into Microwells”

December 8, 2009  
**Dr. Enrico Martinez**  
Visiting Professor  
Instituto de Estudios Superiores de Tamaulipas Altamira, Mexico  
Seminar Speakers – Spring 2010

January 26  
**Dr. Christopher Bowman**  
Patten Professor of  
Chemical & Biological Engineering  
Associate Dean for Research  
University of Colorado-Boulder  
“Photochemically and Thermally Triggered Covalent Adaptable Polymer Networks”

February 9, 2010  
**Dr. Richard Register**  
Professor and Chair of the Chemical Engineering Department  
Princeton University  
“Shear Alignment of Block Copolymer Films and their Applications in Nanopatterning”

February 16  
**Dr. David Green**  
Assistant Professor of Chemical Engineering  
University of Virginia  
“Controlling Nanoparticle Dispersion in Polymer Melts”

February 23, 2010  
**Dr. Brian A. Korgel**  
Matthew Van Winkle Regents Professor of Chemical Engineering  
University of Texas at Austin  
“Semiconductor Nanowires and Nanocrystals for Transistor and Photovoltaic Applications”

March 2, 2010  
**Dr. D. Bhattacharyya**  
University Alumni Professor  
Department of Chemical and Materials Engineering  
University of Kentucky  
“Functionalized Membranes for Separations and Reactions”

March 9, 2010  
**Dr. Abhaya K. Datye**  
Distinguished Regents Professor of Chemical & Nuclear Engineering  
University of New Mexico  
“Steam Reforming of Methanol for Portable Power”

March 23, 2010  
**Dr. Parag Gogate**  
Lecturer in Chemical Engineering  
at Institute of Chemical Technology  
University of Mumbai  
“Process Intensification/Improvement using Cavitational Reactors”

**Kelly Lectures**  
**Dr. Rakesh Jain**  
Andrew Werk Cook Professor of Tumor Biology, Harvard Medical School  
Director, Edwin L Steele Laboratory for Tumor Biology, Massachusetts General Hospital  
March 30, 2010 @ 3:30-4:30 p.m.  
“Normalizing Tumor Vasculature to Treat Cancer: From Mathematical Model to Mouse to Man”

March 31, 2010 @ 9:30 a.m.-10:30 p.m.  
“Delivery of Molecular and Nano Medicine in Tumors”

April 6, 2010  
**GSO Seminar**  
**Dr. Chau-Chyun Chen**  
Vice President of Technology  
Aspen Technology  
“Process Modeling for the Changing World: From CO₂ Capture to Drug Molecule Solubility”

April 13, 2010  
**Dr. William J. Koros**  
Roberto C. Goizueta Chair for Excellence in Chemical Engineering & GRA Eminent Scholar in Membranes  
Georgia Tech  
“Alternatives to Large Scale Thermally-Driven Separation Processes: Realistic Paths Around Difficult Hurdles?”

April 20, 2010  
**Dr. Gregory B. McKenna**  
Horn Professor, Dept. of Chemical Engineering  
Texas Tech University  
“Using Mechanics to Probe the Behavior of Glassy Materials: Equilibrium and Non-equilibrium Behaviors”

April 27, 2010  
**Dr. Michael P. Thien**  
Senior Vice President, Global Science, Technology & Commercialization  
Merck Manufacturing Division, Merck & Company, Inc.  
“Engineering Contributions to Fighting AIDS: A Small Tale in a Big Story”