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Message from the Head

This fall we celebrate a wonderful milestone in our School and building history, the renovation and upgrade of the Unit Operations Laboratory. Ever since the beginning of the ChE program at Purdue in 1911, the Unit Operations Laboratory has been a cornerstone of our undergraduate education, the place where our seniors apply all the concepts they have acquired during their professional journey in Chemical Engineering. Through generous donations from alumni, corporations, and a Purdue University Repair and Rehabilitation contribution, we were able to not only complete the physical renovation of the lab and introduce several new experiments, but also to gratefully secure an endowment for the laboratory from alumnus Alan H. Fox (BSChE ’55) so that all future annual operation and upgrade needs will be covered in perpetuity.

We are entering a period of unprecedented growth in our School, which will begin by hiring several additional faculty members, which in turn will lead to a 10% increase in our undergraduate student population and significant growth of the graduate program. This growth is implemented as a part of the College of Engineering plan to align our student per faculty ratios to the same levels as our peers, and a need to expand and deepen our expertise into game changing areas, such as energy storage and personalized medicine. As a prelude to this growth, this spring we welcomed Associate Professor Jeffrey Greeley (Ph. D., University of Wisconsin-Madison, 2004), and this fall Assistant Professor Raj Gounder (PhD, University of California – Berkeley, 2011). In January 2014, we’ll be joined by two new Associate Professors: Drs Carl Laird (PhD, Carnegie Mellon University, 2006) and Vilas Pol (PhD, University of Bar-Ilan, Israel, 2005).

The 2012-13 academic year brought a number of prestigious recognitions to our School. Distinguished Professor Sangtae Kim received the 2013 Ho-Am Engineering Prize from Korea, that nation's highest engineering research award. We are delighted to welcome Professor Kim back to Purdue and to our School after a leave of absence for a few years. Professor Rakesh Agrawal, Winthrop E. Stone Distinguished Professor of Chemical Engineering, was elected to be a member of the prestigious American Academy of Arts & Sciences. The 2013 AIChE annual meeting is again an occasion for celebration for our School - yours truly will receive the 2013 AIChE Warren K. Lewis Award for Chemical Engineering Education. Our alumni also received stellar recognitions this past year: Kristi Anseth (BSChE ’92) was elected a member of the National Academy of Sciences and Antonios Mikos (MS’85, PhD ’88) was elected to the Institute of Medicine of the National Academies. Anthony Lowman (PhD ’97) was named Dean of Engineering at Rowan University; Chris Bowman (BS ChE ’88, PhD ’91) was named a Distinguished Professor at the University of Colorado and Bruce Dale (PhD ’79) was named Distinguished Professor at Michigan State University.

With 541 undergraduate students (sophomores to seniors) and 142 graduate students enrolled for fall 2013, we are among the largest Chemical Engineering educational programs in the United States. As always, the quality of our students is exemplified by their achievements. For example, for the second year in a row, the Indiana Soybean Alliance Innovation Competition $20,000 top prize went to a team including a Purdue ChE graduate student, Anshu Gupta, for their soy protein fiber insulation that can be used in bedding, sleeping bags and apparel. We are proud of our faculty, staff, students and alumni, and look forward to showcase their work and accomplishments - just stop by for a visit!

Sincerely,

Avind Varma
R. Games Slayter Distinguished Professor
Jay and Cynthia Ihlenfeld Head 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 expands 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.
Research Areas

Research by Fundamental Topic Area

Biochemical and Biomolecular Engineering: Franses, Morgan, Ramkrishna, Wang, Won

Catalysis and Reaction Engineering: Andres, Delgass, Gounder, Greeley, Ramkrishna, Ribeiro, Thomson, Varma

Fluid Mechanics and Interfacial Phenomena: Basaran, Beaudoin, Corti, Franses, Harris, Kim, Litster

Mass Transfer and Separations: Agrawal, Boudouris, Wang, Wankat

Nanoscale Science and Engineering: Agrawal, Andres, Beaudoin, Boudouris, Corti, Delgass, Franses, Harris, Ribeiro, Thomson, Won

Polymers and Materials: Boudouris Caruthers, Harris, Litster, Pipes, Varma, Won, Wu


Thermodynamics, Molecular and Nanoscale Modeling: Corti, Greeley, Thomson, Won

Research by Application Area

Biotechnology: Franses, Harris, Liu, Ramkrishna, Wang, Won, Yuan

Electronics: Agrawal, Beaudoin, Boudouris, Wu

Energy: Agrawal, Boudouris, Morgan, Pekny, Reklaitis, Ribeiro, Varma, Wu

Manufacturing: Agrawal, Basaran, Corti, Franses, Harris, Pekny, Reklaitis, Wang

Pharmaceuticals: Basaran, Beaudoin, Harris, Litster, Nagy, Reklaitis

Security: Beaudoin, Boudouris
Rakesh Agrawal

Sc. D., Massachusetts Institute of Technology, 1980

Winthrop E. Stone Distinguished Professor

Member, National Academy of Engineering
Elected Member, American Academy of Arts and Sciences, 2013
IIT-Kanpur Distinguished Alumns Awards, 2013


Selected Professional Activities
Fellow, AIChE
Member, Editorial Advisory Board, I&EC Research
Consulting Editor, AIChE Journal
Member, ChE Department Advisory Committee, WPI
Visiting Chair Professor, ExxonMobil, Dept. of ChE & Biomolecular Engr., National University of Singapore, 2011-present
Member, ATMI, 2010-present
Member, Editorial Board, Current Opinion in ChE, 2012-present
Member, Advisory Council, Dept. of Chemical and Biomolecular Engineering, University of Delaware, 2012-present
Member, Consulting Editors Board, AIChE Journal, 2012-2016
Member, Editorial Board, Energy Technology, 2012-present
Member, Aspen Tech Academy, Aspen Tech, 2012-present

Selected Invited Lectures
"Thin Film Solar Cells from Nanocrystal Inks of Quaternary Chalcogenides," AVS Materials for Energy Meeting, University of Illinois at Urbana-Champaign, Urbana, IL; Brookhaven National Lab, Upton, NY, September (2012); Plenary talk, 7th Singapore International Chemistry Conference (SICC-7), Singapore, December (2012)

"Improved Performance of Earth-Abundant Cu2ZnSn(SxSel-x)4 Solar Cells Through Ge Incorporation," AIChE Annual Meeting, Pittsburgh, PA, October (2012)


"Thin Film Solar Cells from Nanocrystals of Quaternary Semiconductors," Joint Symposium of Korean Institute of Chemical Engineering (KIChe) and AIChE to Celebrate 50th Anniversary of KIChe, Pittsburgh, PA, October (2012); Indian Institute of Petroleum, Dehradun, India, January (2013); Keynote Lecture, Columbia-US Workshop, Nanotechnology in Energy and Medical Applications, Medellin, Colombia, March (2013)

"Copper-zinc-tin Chalcogenide Absorbers Derived from Controlled Sulfide Nanocrystals of Wurtzite and Kesterite Structures," MRS Fall Meeting, Boston, MA, November (2012)

"Nanocrystal Ink based route for Cu(In,Ga)Se2 and Cu2ZnSnS4 Based Efficient Solar Cells," National University of Singapore, Singapore, December (2012)


"Analysis of Recombination in Cu2ZnSn1-xGexSySe4-y thin films by Photoluminescence Spectroscopy," MRS Spring Meeting, San Francisco, CA, April (2013)


Selected Publications


Book Chapters
Osman A. Basaran
Ph. D., University of Minnesota, 1984
Burton and Kathryn Gedge Professor
Research Areas: Fluid Mechanics, Rheology, Drop Dynamics, Interfacial Phenomena, Finite Elements, Computational Analysis, Ink-Jet Printing, MEMS, Electroseparations

Selected Professional Activities
Fellow, American Physical Society
Chair, National Committee on Membership, American Physical Society

Selected Invited Lectures
“Drop dynamics and small-scale flows exhibiting singularity formation, interface rupture, and unexpected physics,” Beckman Coulter Corporation, Indianapolis, IN, October (2012)

“Fluid dynamics of electrosprays,” Beckman Coulter Corporation, Indianapolis, IN, December (2012)

“Universal Scaling Laws for the Disintegration of Electrified Drops,” Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, Urbana, IL, April (2013)

“Universal Scaling Laws for the Disintegration of Electrified Drops,” Department of Mechanical Engineering, Johns Hopkins University, Baltimore, MD, May (2013)

Selected Publications


Selected Conference Presentations


Pommer, C. A., Harris, M. T., Basaran, O. A., “Scaling in the transition from selective withdrawal to entrainment,” AIChE Annual Meeting, Pittsburgh, PA, October-November (Received Best Paper Award in Session 353, Interfacial and Nonlinear Flows I) (2012)


Dr. Basaran with Graduate Student Krishnaraj Sambath
Selected Professional Activities
Member, American Heart Association Science Council, 2002-present
Member, National Programming Committee, American Institute of Chemical Engineers, 2000-present
Fundamentals Division Programming Chair, Environmental Division, American Institute of Chemical Engineers, 1997-present
Technical Reviewer, NSF Sensors Panelist, Chemical and Transport Systems
Technical Reviewer, NSF Nanoscale Interdisciplinary Research Teams (NIRT) Panelist, Chemical and Transport Systems
Technical Reviewer, NSF CAREER Panelist, Chemical and Transport Systems
Technical Reviewer, NSF/EPA-Technology, Sustainable Environment Panelist
Technical Reviewer, Oklahoma State University Environmental Institute Energy Research Grant Program
Technical Reviewer, University of Minnesota/NSF, Fluid Mechanics Modules Panel Review

Selected Publications

Selected Conference Presentations

Stephen P. Beaudoin
Ph. D., North Carolina State University, 1995
Professor
Research Areas: Particle and Thin Film Adhesion, Explosives Detection, Electronic Materials

Dr. Beaudoin with Gerald Forney
Selected Professional Activities
Founding Program Director, Purdue Section’s ACS Project SEED Program
Proposal Reviewer, National Science Foundation (NSF), the Department of Energy (DOE), and Air Force Office of Scientific Research (AFOSR)
Reviewer, Stanford Synchrotron Radiation Lightsource (SSRL) and Molecular Foundry Lawrence Berkeley National Laboratory (LBNL) User Proposals

Selected Invited Lectures

“Designing Macromolecules with Specific Optoelectronic and Chemical Functionalities for Advanced Energy and Biomedical Applications,” Purdue University, Department of Chemistry (Organic Chemistry Division), West Lafayette, IN, April (2013)

Selected Publications

Selected Conference Presentations
Selected Professional Activities
Chair, NSF Working Group on Life Performance of Polymer Based Engineering Materials: The Interaction between Mechanics and Chemistry
Associate Editor, Rubber Chemistry and Technology
Associate Editor, Journal of Time Dependent Materials

Selected Invited Lectures


Selected Publications


Selected Conference Presentations


Dr. Caruthers with Dr. Ramkrishna
David S. Corti

Ph. D., Princeton University, 1997

Professor
Director of Undergraduate Studies
University Faculty Scholar, Purdue University, 2011-2016

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

Selected Professional Activities
Chair, Area 1a Programming Committee, AIChE, 2010-2013
Editorial Board, ISRN Computational Mathematics
University Faculty Scholar, Purdue University, 2011-2016

Selected Publications

Selected Conference Presentations


Selected Publications


Selected Conference Presentations


Jeffrey P. Greeley
Ph. D., University of Wisconsin-Madison, 2004
Associate Professor

Research Areas: Heterogeneous Catalysis, Electrocatalysis, Energy Storage in Batteries

Selected Invited Lectures
“A first principles view of reactivity and trends in heterogeneous catalysis and electrocatalysis,” Department of Materials Science, Johns Hopkins University, Baltimore, MD, March (2013)
“A first principles view of reactivity and trends in heterogeneous catalysis and electrocatalysis,” Molecular Foundry, Lawrence Berkeley National Laboratory, Berkeley, CA, March (2013)
“First principles analysis of activity and selectivity trends in heterogeneous biomass conversion,” American Chemical Society Spring Meeting, New Orleans, LA, April (2013)

Selected Publications

Selected Conference Presentations
Gordon Research Conference on Electrodeposition, Biddeford, ME, August (2012) (invited)
American Chemical Society Spring Meeting, New Orleans, LA, April (2013) (invited)
Robert E. Hannemann

M.D., Indiana University, 1959

Visiting Professor

Research Areas: Healthcare Engineering, Modeling Erythrocyte Size Distribution for Evaluation of Leukemia Therapy, Serum Bilirubin Determination by Skin Reflectance, Surfactant in Respiratory Distress Syndrome Treatment

Selected Professional Activities
Executive Committee and Liaison, 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
Indiana Clinical and Transitional Sciences Institute Project Development Team

R. Neal Houze

Ph.D., University of Houston, 1966

Professor

Selected Professional Activities
Member, American Institute for Chemical Engineers
Member, American Society for Engineering Education
Member, Tau Beta Pi
Member, Phi Kappa Phi
Member, Sigma Xi
Member, Omega Chi Epsilon
Honorary Member, Mortar Board
Reviewer, McGraw-Hill Company, 2003-present
Reviewer, J. Wiley & Sons, 2004-present
Reviewer, Chemical Engineering Education, 2002-present

Selected Conference Presentations

Professor Franses and Professor Houze at the 2012 GSO Symposium
Michael T. Harris
Ph. D., University of Tennessee-Knoxville, 1992
Professor
Director, Graduate Studies, School of Chemical Engineering
Associate Dean, Undergraduate Education, College of Engineering


Selected Professional Activities
Fellow, AIChE
Chair, Minorities in Engineering Division, ASEE

Selected Publications


Selected Conference Presentations


Zhao, Y., Li, F., and Harris, M. T., “Formulation of Bovine Serum Albumin Encapsulated Cal-Alginate Microspheres by Electrodispersion for a Simulated Release in a Gastric Fluid,” paper 262e, AIChE Meeting, Pittsburgh, PA, October (2012)


Hirschfield, L., Giridher, A., Reklaitis, G. V., Harris, M. T., and Venkatsubramanian, V., “Automation and Control of Drug-on-Demand Technology,” paper 533g, AIChE Meeting, Pittsburgh, PA, October (2012)


James D. Litster
Ph. D., University of Queensland, 1985
Professor of Chemical Engineering and Industrial and Physical Pharmacy

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

Selected Professional Activities
Member, Australian Academy of Technological Sciences
Honorary Professor, University of Queensland
Member, Solae LLC, St Louis, Scientific Advisory Board
Fellow, Institution of Chemical Engineers, UK
Consultant, International Fine Particle Research Institute
Editorial Board, Particle and Particulate Systems Characterization
Editorial Board, AAPS Pharmaceutical Science and Technology
Member, National Institute of Pharmaceutical Technology and Education (NIPTE) Faculty Committee

Selected Invited Lectures
“Multiscale design models for continuous agglomeration for solids dosage form manufacture,” CMAC Open Day, Strathclyde University, Scotland, October (2012)


Selected Publications


Selected Conference Presentations


Selected Professional Activities
American Institute of Chemical Engineers
- Women’s Initiatives Committee, past chair, November 2011 – November 2012
- Engineering Fundamentals in Life Science (Area 15d/e), vice programming chair, 2011-2012, programming chair, 2012-2013

Society for Biomaterials
- Elected Member, National Membership Committee, 2011-2012
- Biomaterials Education Special Interest Group, Vice Chair, 2011-2013, Chair, 2013-2015

Review Panel, NSF

Selected Invited Lectures
“Protein-based Biomaterials for Stem Cell Differentiation and Tissue Regeneration,” Materials Science and Engineering, University of Delaware, February (2013)

“Protein-based Biomaterials for Stem Cell Differentiation and Tissue Regeneration,” Basic Medical Sciences, Purdue University, West Lafayette, IN, February (2013)

Selected Publications


Selected Conference Presentations


Kim, Y. and Liu, J. C., “Protein-based Biomaterials Accelerate Osteogenic Differentiation,” SFB Annual Meeting, Boston, MA, April (2013)


John A. Morgan

Ph. D., Rice, 1999

Associate Professor

Research Areas: Metabolic Engineering, Biocatalysis

Selected Professional Activities
Associate Editor, Biprocess and Biosystems Engineering Reviewer, Consortium for Plant Biotechnology Research Review Panel, NSF CBET division Review Panel, DOW-ARPA-E Review Panel, DOE-Young Investigator Program

Selected Invited Lectures
"Metabolic flux analysis of photosynthetic bacteria," Department of Chemical and Biological Engineering, University of British Columbia, Canada (2013)

Selected Publications


Selected Conference Presentations


Zoltan K. Nagy
Ph. D., Babes-Bolyai University, Romania, 2001

Professor


Selected Professional Activities
Associate Editor, Journal of Process Control
Associate Editor, Control Engineering Practice
Associate Editor, Chemical Engineering Research and Design
Associate Editor, Asia-Pacific Journal of Chemical Engineering
Member, Steering Committee of the American Association for Crystallization Technology
Member, Steering Committee of the Crystallization Working Party of the European Federation of Chemical Engineering
Member, Steering Committee of the Process Management and Control Group of the IChemE
Chair, Young Author Prize Committee of International Federation of Automatic Control
Member, Review Panels for Proposal, UK, Netherlands, Switzerland, Canada, Romania, France, Ireland, Belgium, Croatia, Denmark, and others

Selected Invited Lectures
“Recent advances in the model-based and model-free control of crystallization processes,” University of Szeged, Szeged, Hungary, October (2012) and Pfizer, Groton, New London, CT, February (2013)

“Recent advances in crystallization systems engineering,” Ranbaxy, Delhi, India, February (2013)

“Recent advances in the process analytical technology based crystallization process monitoring and control,” BASF Schweiz AG Schweizerhalle, Switzerland, April (2013)


“Recent advances in the model-based and model-free control of crystallization systems,” AbbVie, Chicago, IL, June (2013)

Selected Publications


Selected Conference Presentations


Joseph F. Pekny

Ph. D., Carnegie Mellon University, 1989

Professor


Selected Professional Activities
Interim Director, Burton D. Morgan Center for Entrepreneurship
Faculty Director, Engineering Entrepreneurship, College of Engineering
Faculty Liaison, Purdue West Coast Partnership Center
Technical Advisor, Advanced Process Combinatorics, Inc.

Selected Publications


Selected Conference Presentations
“Capstone Design at Purdue University,” AIChE Regional Meeting, Chicago, IL, January (2013)

“Knowledge Acquisition Frameworks and Deliberate Innovation – Perspectives from and Next Steps for a Journey in Engineering Complexity,” Faculty Career Celebration, College of Engineering, Purdue University, West Lafayette, IN, March (2013) (invited)
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
Key Note, ASC Conference, Arlington, TX, 2012
Session Chair ICCM-19 Conference, Montreal, CA
Chairman, Army Research Laboratory Technical Assessment Board, 2013-2015

Selected Invited Lectures

Selected Publications


Selected Conference Presentations


Graduate Students Caleb Miskin and Charles Hages
Doraiswamy 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
Fellow, AIChE
Fellow, American Institute of Medical and Biological Engineering
Member, Advisory Council, Pacific Northwest National Laboratory, Richland, WA
Member, Peer Committee of Section 3, National Academy of Engineering

Selected Invited Lectures
“Dynamic Modeling of Metabolism. The Cybernetic Approach,” Department of Chemical and Biological Engineering, University of Wisconsin, Madison, WI, November (2012)

Doraiswamy, L. K., Department of Chemical & Biological Engineering, Iowa State University, Ames, IA, March (2013)

Selected Publications


Selected Conference Presentations


Selected Conference Presentations


Selected Conference Presentations


Gintaras V. “Rex” Reklaitis
Ph. D., Stanford University, 1969
Member, National Academy of Engineering
Deputy Directory, NSF ERC on Structured Organic Composites


Selected Professional Activities
Fellow, AIChE
AIChE Foundation, Board of Trustees, 2010-present
Smart Manufacturing Leadership Coalition, 2011-present
Editorial Advisory Boards
- Computers & Chemical Engineering
- Journal of Pharmaceutical Innovation
- Computer Applications in Engineering Education
- Journal of Process Systems Engineering

Selected Invited Lectures


“Progress and Prospects for the Engineering Research Center on Structured Organic Particulate Systems,” ChE & Bio, Tufts University, Evanston, IL, April (2013)


Selected Publications


Selected Conference Presentations
“Individualizing the Dosing of Gabapentin with Two Blood Draws,” Indiana Clinical and Translational Sciences Institute Annual Meeting, Indianapolis, IN, July (2012)

“Art Westerberg’s contributions to process systems engineering,” Session in honor of Art Westerberg, AIChE Annual Meeting, Pittsburgh, PA, October (2012) (invited)


“Intelligent Alarm System applied to Continuous Pharmaceutical Manufacturing,” European Symposium on Computer Aided Process Engineering, Received Best Poster Award (Anshu Gupta), Lappeenranta, Finland, June (2013) (invited)

Selected Professional Activities


Selected Invited Lectures

“An overview of the water-gas shift catalysis on metals,” Institut für Oberflöchenchemie und Katalyse, Universität Ulm, Germany, November (2012)

“An overview of the water-gas shift catalysis on metals,” Eidgenessische Technische Hochschule (ETH), Zurich, Switzerland, November (2012)


“An overview of the water-gas shift catalysis on metals,” Inorganic Chemistry Seminar, Chemistry Department, Purdue University, West Lafayette, IN, January (2013)


Selected Publications


Selected Conference Presentations


Kendall T. Thomson

Ph. D., University of Minnesota, 1999

Associate Professor
Purdue University Faculty Scholar, 2008-2013

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

Selected Publications
Switzer, J. M., Travia, N. E., Steelman, D. K., Medvedev, G. A., Thomson, K. T., Delgass, W. N., Abu-Omar, M. M., and Caruthers, J. M., "Kinetic Modeling of 1-Hexene Polymerization Catalyzed by Zr(tBu-ON\textsubscript{Me}\textsubscript{2})\textsubscript{2}B\textsubscript{3}N\textsubscript{3}O\textsubscript{3}B\textsubscript{2}(C\textsubscript{6}F\textsubscript{5})\textsubscript{3}," *Macromol.*, 45(12), 4978-4988 (2012)

Selected Conference Presentations

Graduate Students Holly Chan, Lizbeth Rostro and Edward Tomlinson
Arvind Varma

Ph. D., Minnesota, 1972

R. Games Slayter Distinguished Professor
Jay and Cynthia Ihlenfeld Head of Chemical Engineering

Warren K. Lewis Award, AIChE 2013

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

Selected Professional Activities
Fellow, AIChE; Fellow, AAAS
Fellow, ACS; Industrial and Engineering Chemistry Division
Foreign Member, Academy of Engineering, Mexico
Series Editor, Cambridge Series in Chemical Engineering, Cambridge University Press
Member, Editorial Board, International Journal of Petroleum Science and Technology
Member, Editorial Board, Industrial & Engineering Chemistry Research
Member, International Committee, AIChE
Member, ISCRE Board of Directors
Member, Scientific Committee, ISCRE-22, Maastricht, the Netherlands, September 2012
Member, Program Steering Committee, AIChE Midwest Regional Conference, January 2013
Chair, Awards Committee, I&EC Division, ACS
Chair, Engineering Research Council Awards Committee, ASEE
Member, Advisory Committee, Department of Chemical and Biological Engineering, University of Colorado-Boulder
Member, Board of Judges, 2013 Kirkpatrick Award, Chemical Engineering Magazine
Member, International Advisory Committee, 9th World Congress of Chemical Engineering, Seoul, Korea, August 2013

Selected Invited Lectures


Selected Conference Presentations


“Pressure Drop and Hydrodynamics of Trickle-Bed Reactors with Particle Size Distributions,” AIChE Annual Meeting, Pittsburgh, PA, October (2012)


Intellectual Property


Selected Publications


N. H. Linda Wang

Ph. D., University of Minnesota, 1978

Professor

Research Areas: Chemical and Biochemical Separations, Mass Transfer, Adsorption, Ion Exchange, Simulated Moving Bed Chromatography

Selected Professional Activities
Fellow, American Institute for Medical and Biological Engineering
Fellow, American Institute of Chemical Engineers
Chair of the Separations Division, AIChE, 2013

Selected Invited Lectures

"Simulated Moving Bed Chromatography: Design Methods and Simulations Tools to Achieve High Product Purity and High Yield," ADM, Decatur, IL, April (2013)

Selected Publications


Selected Conference Presentations


Dr. Varma, William Clark (BSChE ’82) and Dr. Wang at the 2012 Outstanding Chemical Engineer Awards
Selected Professional Activities
Fellow, AIChE
Fellow, ASEE
Associate Editor, Chemical Engineering Education, 1995-present
Contributing Editor, College Teaching, 2006-present
Editorial Board, Separation Science and Technology, 1977-present
Editorial Board, Adsorption, 1993-2013
Editorial Board, Separation and Purification Reviews, 1998-present
AIChE, Member Group 4, Education and Consulting of National Program Committee, 1977-present

Selected Invited Lectures


Selected Publications


Selected Conference Presentations


Books

Book Chapters
Selected Invited Lectures

“Polymer Micelle-Based siRNA Carriers “Micelleplexes”: Influence of Nanocarrier Architecture on Delivery Properties,” KIST Global RANi Carrier Initiative Program Workshop, Jeju, Korea, July (2012)


“A Photo-Degradable Gene Delivery System for Enhanced Nuclear Transport (Missing Pieces in Understanding the Cell Interaction Behavior of Polyplexes),” Bindley Bioscience Center, Purdue University, West Lafayette, IN, November (2012)

“Self-Assembly of Block Copolymers and Colloids at Aqueous Interfaces,” Research Seminar, SK Innovation R&D Center, Daejon, Korea, December (2012)

“A Photo-Degradable Gene Delivery System for Enhanced Nuclear Transport (‘Missing Pieces in Understanding the Cell Interaction Behavior of Polyplexes’),” Department Seminar, Department of Chemical and Biological Engineering, Korea University, Seoul, Korea, March (2013)


Selected Publications


Selected Conference Presentations


Yue Wu

Ph. D., Harvard University, 2006

Assistant Professor

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

Selected Professional Activities
Reviewer, ACS Petroleum Research Fund
Reviewer, National Science Foundation
Reviewer, AFOSR, Qatar National Research Fund
Co-Chair, Nanoscale Science Engineering Forum Poster Session, AIChE
Judge, Nanoscale Science Engineering Forum Poster Session, AIChE
Session Chair, Thermal Transport in Electronic Materials & Nanomaterials for Thermal-to-Electric Conversion, AIChE, 2013

Selected Invited Lectures
“Advanced Nanomaterials for Thermoelectric Energy Harvesting,” Department of Chemistry, Purdue University, West Lafayette, IN, December (2012)


Selected Publications

Selected Conference Presentations


Dr. Wu with his Graduate Students
Chongli Yuan
Ph. D., Cornell University, 2007
Assistant Professor

Research Areas: Effect of Chromosome Structure on Gene Transcription Activity, Effect of a Polyelectrolyte on the Oppositely Charged Colloidal Suspension

Selected Professional Activities
Nanoscale Science Co-Chair, AIChE, 2012

Selected Invited Lectures
“Integrating biological component into chemical engineering education,” 2012 ASEE Chemical Engineering Summer School, San Antonio, TX, July (2012)

Selected Publications


Selected Conference Presentations
Yuan, C., “Exploring the traits of epigenetic modifications on chromosome structure,” Biochemistry, Purdue University, West Lafayette, IN (2012) (invited)

Yuan, C., “Exploring the traits of epigenetic modifications on chromosome structure,” Biomedical Engineering, Indiana University-Purdue University Indianapolis, Indianapolis, IN (2012)


Ernesto Marinero
Ph.D., Heriot-Watt University, 1977
Professor of Engineering Practice

Research Areas: Synthesis and Fabrication of Nano-Scale Magnetic Materials and Devices for Future Magnetic Storage Technology, Nanomaterials and Devices for Applications in Bio-Sensing, Energy Generation and Storage for Environmental Needs

Selected Professional Activities
Executive Committee and Proposal Reviewer, Molecular Foundry, DOE Nanoscience Center, Users
Editorial Board Member, Physical Review X
Symposium Organizer and Chair, Frontiers in Nanomanufacturing, APS March Meeting, Baltimore, MD, 2013
Symposium Organizer and Chair, Strategies for Academy-Industry Relationships, International Materials Research Congress, Cancun, Mexico, 2013
Chair, 41st Electronics Materials Symposium, Santa Clara, CA, 2013

Selected Invited Lectures
“Materials and Device Challenges for Future Information Storage Technology,” International Forum on Industrial Applications of Nanotechnology, Monterrey, Mexico, November (2012)


Selected Publications


Selected Conference Presentations


Intellectual Property
Hellwig, O., Marinero, E. E., and Weller, D. K., “Patterned Perpendicular Recording Medium with Ultrathin Oxide Film and Reduced Switching Field Distribution,” 8/268,461, filed on September 18, 2012

Gurney, B. A. and Marinero, E. E., “Magnetoresistive sensor having a quantum well structure and a P-doped trapping layer to prevent surface charge carriers from migrating to the quantum well structure,” 8/274,763, filed on September 25, 2012

Enrico Martinez

Ph.D., University of Notre Dame, 1972

Visiting Professor
National Researcher, National System of Researchers, Mexico

Selected Professional Activities
Secretary of the Chemical Engineering Division, National Academy of Engineering-Mexico, 2012-2014
Editor in Chief, Journal of Enzyme Engineering, 2012-present
Specialized Reviewer, Revista Ingeniería InvestigaciónY Tecnología, National University of Mexico
Associate Director, Purdue – Mexico Center for Sustainability

Teaching Contributions
ChE 348 – Chemical Reaction Engineering
ChE 435 – Chemical Engineering Laboratory

Selected Conference Presentations
“Jose Uriel Arechiga a Professional Chemical engineer and Teacher,” Department of Process and Hydraulic Engineering, Universidad Autonoma Metropolitana-Iztapalapa, Mexico City, Mexico, January (2013)

Selected Publications

Undergraduate student in the Unit Operations Laboratory
Jeffrey J. Siirola

Ph. D., University of Wisconsin-Madison, 1970

Professor of Engineering Practice

Member, National Academy of Engineering


Selected Professional Activities

Fellow, AIChE
Publications Committee, AIChE, 1994-present
Research and New Technology Committee, AIChE, 1993-present
Education and Accreditation Committee, AIChE, 1992-present
Chair and ABET Society Liaison, 2006-present
Chemical Engineering Program Evaluator, 1988-present
Conferences Committee Chair, CACHE Corporation, 1993-present
Industrial Trustee, CACHE Corporation, 1983-present
Secretary, ABET, 2011-present
Board of Directors, ABET, 2006-present
Finance Committee, 2010-present
International Evaluator, ABET, 2002-present
Consulting Editors Board, AIChE Journal, 2012-present
Editorial Advisory Board, Academic Process Systems Engineering Series, 1997-present
Editorial Advisory Board, Computers & Chemical Engineering, 1996-present
Advisory Board, Lehigh University, Chemical Engineering Department, 2007-present
Advisory Council, University of Delaware, Chemical Engineering, 2006-present
Advisory Board, Energy Institute, 2008-present
Advisory Board, Catalyst Center for Energy Innovation, 2009-present
Advisory Board, University of California-Los Angeles, Chemical and Biomolecular Engineering, 2006-present
Advisory Board, Tennessee Technological University, Chemical Engineering, 2005-present
Advisory Board, City College of the City University of New York, Chemical Engineering, 2004-present
External Advisory Council, Purdue University, Discovery Park, 2003-present
Advisory Board, University of California-Santa Barbara, Chemical Engineering, 2003-present
External Advisory Board, Georgia Institute of Technology, Chemical and Biomolecular Engineering, 2002-present
Advisory Committee, Illinois Institute of Technology, Chemical and Biological Engineering Department, 2000-present
External Advisory Board, University of South Carolina, 2012-present
Industrial Advisory Board, University of Utah, Chemical Engineering, 1999-present
Industrial Advisory Board, Department of Energy Carbon Capture Simulation Initiative, 2010-present
Advisory Board, National Energy Technology Laboratory Modular Framework, 2010-present

Teaching Contributions

ChE 450 – Design and Analysis of Process Systems
ChE 597 – Chemical Process Technology and Industry Structure

Geoffrey Bruening (BSChE 2013) with Dr. Siirola
Graduate Degrees Awarded

July 1, 2012 to June 30, 2013
PhD Degrees - 21
MS Degrees - 6

PhD Degrees Awarded August 4, 2012

Appathurai, Santosh
Breakup and Coalescence of Liquid Drops, (Basaran, Harris), Lead Facilities Engineer, Chevron, Houston, TX

Kispersky, Vincent
Kinetic and Spectroscopic Catalysts for Water-Gas Shift and Nox Removal, (Litster), Process Systems Enterprise Consultant, Naperville, IL

Li, Jianfeng

Pommer, Chris
Scaling in Multi-Phase Flows, (Basaran, Harris), Mechanical Response of Elastomers, Senior Research Engineer, 3M Corporate Research Process Lab, Minneapolis, MN

Prabhu, Rasika
A Critical Investigation of the Viscoelastic Mechanical Response of Elastomers, (Caruthers), Schlumberger, Chemical Engineering, Sugarland, TX

Renner, Julie N.
Modular Protein Matrices for Cartilage Repair, (Liu), Proton OnSite, Postdoc, Wallingford, CT

Shekhar, Mayank
Water-Gas Shift Catalysis over Supported Au and Pt Nanoparticles, (Ribeiro, Delgass), Senior Engineer, The DowChemical Company, Freeport, TX

Shenvi, Arnirudh
Synthesis of Energy Distillation Configurations, (Agrawal), ChE Consultant, DuPong Company, Wilmington, DE

Shu, Che-Chi
Modeling Signal Transduction Process in Cell Population, (Ramkrishna), Postdoc, University of Minnesota, Minneapolis, MN

MS Degrees Awarded August 4, 2012

Straub, Dean
MS ChE Non-Thesis, (Wang), Jacobs Engineering Process Engineer

PhD Degrees Awarded December 15, 2012

Cipich, Michelle N. C.
Contact Between Swabs and Surfaces during Explosives Detection, (Beaudoin)

Dong, Jiannan
Experimental and Modeling Studies of Colloidal Dispersion Stability of CuPc Pigment Nanoparticles in Aqueous Solution, (Franses, Corti), Postdoc, University of Texas at Austin, Austin, TX

Gawecki, Piotr
Fundamental Studies of Biomass Fast Pyrolysis for the Direct Production of Molecules in the Fuel Range, (Agrawal, Delgass, Ribeiro), Technologist, Royal Dutch Shell, Houston, TX

Kim, Dae Hwan
Surface Modification of Nanoparticles by Polymer Grafting, (Won), Researcher, KCC Central Research Institute, Yongin, Korea

Lee, Wen-Sheng
Catalytic Sites in Au/TS-1 and Related, (Delgass, Ribeiro), Postdoc, University of Minnesota, Department of Chemical Engineering, Minneapolis, MN

McCarthy, Robert
The Fabrication and Characterization of Double-Gyroid and Thin Film Photovoltaics, (Hillhouse, Agrawal), St, Louis, MO

Misiego Arpa, Carmen R.
Carbon Nanotube Dispersion and Characteristics: Thermo-Mechanical Properties and Conductivity of Plymise Nanocomposites, (Pipes), SABIC IP Process Technology Engineer, Murcia, Spain

PhD Degrees Awarded May 11, 2013

Galas, Richard
Microenvironmental Cues for Vascular Tissue Engineering, (Liu), Internship, BASF, Ludwigshafen, Germany

O’Grady, John
Metabolic Flux Analysis of Oleaginous Algae, (Morgan), Postdoc, Purdue University, West Lafayette, IN

Singh, Meenesh
Towards the Control of Crystal Shape and Morphology Distributions In Crystallizers, (Ramkrishna), Postdoc, Lawrence Berkeley National Lab, Berkeley, CA

Venkatesan, Anand
Low Cost Synergistic Desalination Processes, (Wankat), Associate Engineer, Phillips 66, Bartlesville, OK

Zarate, Nyah
Multi-Scale Modeling of Particulate Systems by Incorporating Particle Roughness, (Litster, Beaudoin), Senior Process Engineer, Intel Corporation, Hillsboro, OR
MS Degrees Awarded May 11, 2013

O'Regan, Peter
Defect Detection for Lithium Ion Battery Manufacturing via Automated Image Processing of Pulse Thermography, (Caruthers)

Hsu, Hsin-Yun
MS ChE Non-Thesis, (Harris) Purdue University, West Lafayette, IN, Continuing for PhD

Jimenez-Useche, Isabel
MS ChE Non-Thesis, (Yuan), Purdue University, West Lafayette, IN, Continuing on for PhD

Mallapragada, Dharik S.
MS ChE Non-Thesis, (Ribeiro), Purdue University, West Lafayette, IN, Continuing on for PhD

Mehta, Dhairya D.
MS ChE Non-Thesis, (Ribeiro, Agrawal), Purdue University, West Lafayette, IN, Continuing on for PhD
<table>
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<tr>
<th>Last Name</th>
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<td>Sardar Patel University</td>
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<td>Fred</td>
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<td>Vinod</td>
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<td>Xiong</td>
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<td>Fall 2011</td>
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<td>Sara</td>
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<td>Illinois Institute of Technology, Chicago</td>
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<td>Zhao</td>
<td>Xin</td>
<td>Agrawal</td>
<td>Sun Yat-Sen University/Tsinghua University</td>
<td>Fall 2012</td>
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Facilities

Forney Hall of Chemical Engineering
In October 2004, the School of Chemical Engineering dedicated a 100,000 ft² expansion ($20 million) that more than doubled the size of our building. The building was then renamed 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 renovation of the original building ($10.5 million), including associated spaces, was completed in Spring 2012.

Discovery Park
Since 2001, Discovery Park, made up of 10 – soon to be 12 – centers, has over thousands of square feet space to have an economic impact of $750 million in buildings, equipment and grants. Discovery Park is highly collaborative while its facilities attract researchers and students from all over to participate in research in the Birck Nanotechnology Center, Bindley Bioscience Center, Burton D. Morgan Center for Entrepreneurship, Gerald D. and Edna E. Mann Hall, Hall for Discovery and Learning Research, and the Oncological Sciences Center.

Bindley Bioscience Center
The Bindley Bioscience Center, a $15 million building, consists of 48,000 ft², including 20,000 ft² of lab space to facilitate research activity of multiple life sciences teams in parallel. Research core activity in metabolomics, proteomics and cytomics supports dozens of academic and corporate projects. The facility’s equipment, technology, state-of-the-art labs and research expertise have sparked life science and bioscience research collaborations with state, regional, national and international industry partners.

Birck Nanotechnology Center
The Birck Nanotechnology Center is a 207,000 ft², $58 million home for a class 1-10-100 nanofabrication cleanroom, the Scifres Nanofabrication Laboratory. Analytical services to support a wide variety of research. Surface analysis facility includes nanotech labs to support and facilitate technology transfer and entrepreneurship. High collaborative atmosphere is supported by functionally designated labs, including lab space for industry partners and companies.

Oncological Sciences Center
The Oncological Sciences Center is housed at the Burton D. Morgan Center for Entrepreneurship. The Oncological Sciences Center is seeking to discover new opportunities, forge new partnerships, and nurture new relationships to advance cancer research beyond the laboratory. The $7 million, 26,000 ft² building offers central meeting places for workshops, seminars and classes, and works in conjunction with all Discovery Park centers and the Purdue Research Park.

Multidisciplinary Cancer Research
The Multidisciplinary Cancer Research Facility will enhance existing capabilities of Birck Nanotechnology, Center for Cancer Research, Biomedical Engineering and Structural Biology to integrate scientific expertise from the molecular level through animal disease modeling. This $15.9 million facility is expected to be completed in Spring 2014.

Drug Discovery Facility
The Drug Discovery Facility will provide state-of-the-art drug discovery research space that is modular and capable of strict environmental control. This $28.7 million facility is expected to be completed in Spring 2014.
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:

- AbbVie
- Air Liquide
- Air Products and Chemicals
- Anheuser-Busch
- BP
- ChevronPhillips Chemical
- Dow Chemical Company
- Du Pont
- Eastman Chemical Company
- Elanco Animal Health / Eli Lilly
- ExxonMobil
- Honeywell
- Lubrizol
- Pfizer
- Phillips 66
- Procter & Gamble
- Shell
- UOP

These corporations provide financial support for curriculum innovations, scholarships, experimental facilities enhancements, instructional computing facilities and start-up support for young faculty. The Fall 2012 meeting took place on October 5, 2012 in Forney Hall, Purdue University; the Spring 2013 meeting was held on March 1, 2013 in Houston, TX, hosted by Shell.
### Seminar Speakers
#### Fall 2012

<table>
<thead>
<tr>
<th>Date</th>
<th>Speaker</th>
<th>Institution</th>
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<tbody>
<tr>
<td><strong>September 4, 2012</strong></td>
<td>Prof. Sohail Murad, Head Dept. of Chemical Engineering University of Illinois at Chicago</td>
<td>“Fluid and Nanoparticle Transport in Lipid Bilayer Membranes Using Coarse Grained Molecular Dynamics Simulations”</td>
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<tr>
<td><strong>September 11, 2012</strong></td>
<td>Prof. Mahdi Abu-Omar Dept. of Chemistry Purdue University</td>
<td>“Chemical Catalysis for Sustainable Energy and the Environment”</td>
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<td><strong>September 18, 2012</strong></td>
<td>Prof. Shekhar Garde, Head Dept. of Chemical &amp; Biological Engr. Rensselaer Polytechnic Institute, NY</td>
<td>“Water at Interfaces of Physical and Biological Systems: A New Molecular Perspective”</td>
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<td><strong>September 25, 2012</strong></td>
<td>Prof. Lance Lobban School of Chemical, Biological &amp; Materials Engr. Oklahoma State University</td>
<td>“Biomass conversion to fuels and chemicals via initial thermal treatment: process options and catalytic reactions”</td>
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<tr>
<td><strong>October 2, 2012</strong></td>
<td>Prof. Dehua Liu Dept. of Chemical Engineering Tsinghua University, Beijing, China</td>
<td>“A commercial Demonstration on Biorefinery of Lipids: Co-production of Biodiesel and 1,3-propanediol”</td>
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<td><strong>October 16, 2012</strong></td>
<td>Prof. Eray Aydil Dept. of Chemical Engr. &amp; Materials Science University of Minnesota</td>
<td>“CIGS and CZTS Solar Cells”</td>
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<tr>
<td><strong>November 6, 2012</strong></td>
<td>Prof. Giorgio Carta Dept. of Chemical Engineering University of Virginia</td>
<td>“Transport Phenomena in New and Improved Stationary Phases for Downstream Processing of Biopharmaceuticals”</td>
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<td><strong>November 13, 2012</strong></td>
<td>Dr. Jim Michaels Senior Scientific Director Merck &amp; Company</td>
<td>“Development of Material Attribute Design Spaces for Particulate Dosage Forms”</td>
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<td><strong>November 27, 2012</strong></td>
<td>Dr. Steven Visco, CEO PolyPlus Battery Company</td>
<td>“The Road to Next Generation Battery Technology: Challenges and Opportunities”</td>
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<td><strong>December 4, 2012</strong></td>
<td>Prof. G.V. Rex Reklaitis School of Chemical Engineering Purdue University</td>
<td>“Progress and Prospects for the ERC on Structured Organic Particulate Systems”</td>
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### Seminar Speakers

#### Spring 2013

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<tr>
<td>January 15, 2013</td>
<td>Prof. Yue Wu</td>
<td>School of Chemical Engineering, Purdue University</td>
<td>&quot;Advanced Nanostructures for Thermoelectric Applications&quot;</td>
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<tr>
<td>January 29, 2013</td>
<td>Prof. Bradley Olsen</td>
<td>Department of Chemical Engineering, Massachusetts Inst. of Technology</td>
<td>&quot;Nanomaterials From the Self-Assembly of Globular Proteins&quot;</td>
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<tr>
<td>February 5, 2013</td>
<td>Prof. Robert Kelly</td>
<td>Dept. of Chemical &amp; Biomolecular Engineering, North Carolina State University</td>
<td>&quot;More Heat than Light: How Extremely Thermophilic Microorganisms and Enzymes Fit into the Energy Picture&quot;</td>
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<td>February 12, 2013</td>
<td>Prof. Ali Khademhosseini</td>
<td>Harvard Medical School</td>
<td>&quot;Microengineered Hydrogels for Stem Cell Bioengineering and Tissue Regeneration&quot;</td>
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<tr>
<td>February 26, 2013</td>
<td>Prof. Mahmoud El-Halwagi</td>
<td>Department of Chemical Engineering, Texas A&amp;M University</td>
<td>&quot;Sustainable Process Design Through Mass and Property Integration&quot;</td>
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<td>March 5, 2013</td>
<td>Prof. Song Li</td>
<td>Department of Bioengineering, University of California, Berkeley</td>
<td>&quot;Stem Cells in Vascular Regeneration and Remodeling&quot;</td>
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<tr>
<td>March 19, 2013</td>
<td>Prof. Konstantinos Konstantopoulos</td>
<td>Dept. of Chemical &amp; Biomolecular Engr., Johns Hopkins University</td>
<td>&quot;Integrating Engineering and Biology in Cancer Research&quot;</td>
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<tr>
<td>April 2, 2013</td>
<td>Prof. Paul Nealey</td>
<td>Institute of Molecular Engineering, University of Chicago</td>
<td>&quot;Directed Assembly of Block Copolymers on Lithographically Defined Chemically Nanopatterned Substrates&quot;</td>
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<td>April 9, 2013</td>
<td>Prof. Shankar Subramaniam, Chair</td>
<td>Bioengineering Department, University of California at San Diego</td>
<td>&quot;Engineering: the sine qua non for Systems Biology and Medicine&quot;</td>
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<tr>
<td>April 16, 2013</td>
<td>Prof. Michael F. Doherty</td>
<td>Department of Chemical Engineering, University of California, Santa Barbara</td>
<td>&quot;Rapid Process Design: Sorting the Wheat from the Chaff&quot;</td>
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<tr>
<td>April 23, 2013</td>
<td>Dr. Julie Renner</td>
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<td>&quot;Modular Protein Matrices for Cartilage Repair&quot;</td>
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**Kelly Lectures**

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<tr>
<td>April 17, 2013</td>
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<td>&quot;Crystals are Like People: Growth and Defects are What Make Them Interesting&quot;</td>
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<tr>
<td>April 23, 2013</td>
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<td>&quot;Modular Protein Matrices for Cartilage Repair&quot;</td>
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