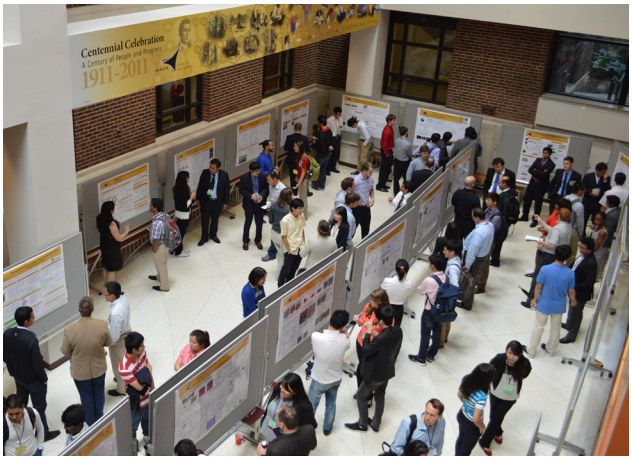
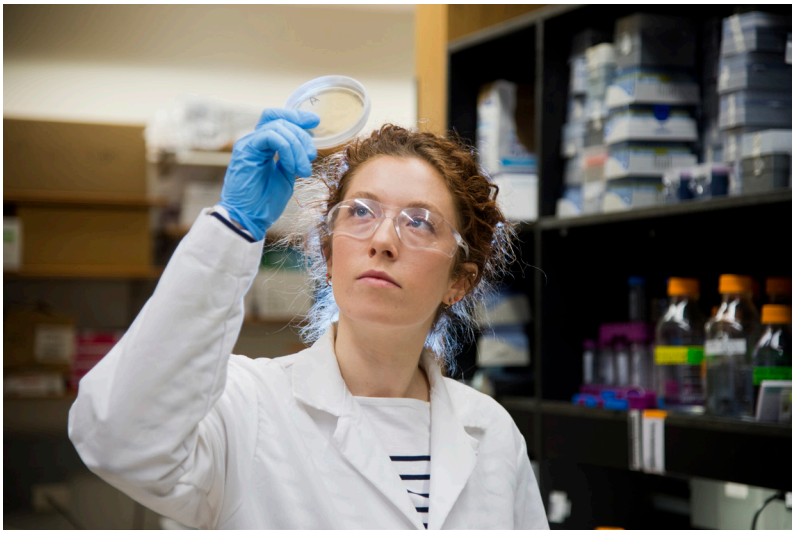
PURDUE CHEMICAL ENGINEERING

2013-2014





SCHOOL OF CHEMICAL ENGINEERING
PROFESSIONAL ACTIVITY
REPORT

PURDUE UNIVERSITY

MESSAGE FROM THE HEAD

The Fall 2014 semester began with the same high level of excitement, energy, and anticipation as always. This fall, our School is home for 555 undergraduate students, 139 graduate students (essentially all PhD, including 6 National Science Foundation Graduate Research Fellows), and 30 faculty members (including 6 members of the National Academy of Engineering.)

Looking back over the past year, we have good reasons to be proud of our faculty accomplishments. Fabio Ribeiro, the R. Norris and Eleanor Shreve Professor, was elected a Fellow of AIChE; Professor Elias Franses published a new textbook "Thermodynamics with Chemical Engineering Applications; R. Byron Pipes, John Leighton Bray Distinguished Professor, published the fourth edition of his book "Experimental Characterization of Advanced Composite Materials; Drs Carl Laird and Zoltan Nagy were invited to attend the 2014 Frontiers of Engineering Education Symposium; Dr. Raj Gounder received the Ralph E. Powe research award; and yours truly received the 2013 AIChE Warren K. Lewis award. On the local front, John Morgan and You-Yeon Won were promoted to Professor rank while Julie Liu was promoted to Associate Professor rank with tenure.

Our students also had an amazing year. For the fourth year in a row, students from the School of Chemical Engineering were part of the winning team in the annual Student Soybean Product Innovation Contest sponsored by the Indiana Soybean Alliance. Graduate student Nicole Devlin, and then senior Yanssen Tandy (who graduated with a BSChE degree in May 2014) were part of the three person team which won the top honors and took home a $20,000 prize. Austin Tackaberry, a senior, serves as Chair of the national AIChE Executive Student Committee for the 2014-15 term; he is also the recipient of the 2014 John J. McKetta Undergraduate Scholarship Award, AIChE's largest national financial undergraduate award. Haefa Mansour, current senior, has garnered numerous recognitions, including a prestigious Barry Goldwater scholarship.

It is great to enjoy current results, but sustainable accomplishments can only be achieved with strategic foresight. Our School is now formulating the 2015-19 strategic plan, in an effort to build on the success of the current strategic plan and also to implement the College of Engineering strategic growth initiative which calls for adding 107 more faculty members, 88 TAs and 105 staff members over a course of the next four years. To host such growth, we need top quality facilities. We are in the fortunate position of having sufficient space in Forney Hall and were thrilled to receive a $6.02 million allocation from the State of Indiana and Purdue to renovate the East Wing of Forney Hall, the last part of the building that had not yet been renovated. Work is scheduled to begin in summer 2015 and complete in fall 2016. At the completion of this project, we will have state-of-the-art facilities throughout Forney Hall (total space 177,000 square feet), including the new wing that was built in 2004, enabling us to educate the next generation of ChE leaders and conduct field-defining research with wide impact.

As you will see from each page of this report, we are enjoying productive, exciting times and we invite you to stop by for a visit to witness our progress.

Sincerely,

AVarma

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

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2010 - 2014 STRATEGIC PLAN

OUR VISION:

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

OUR MISSION:

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

RESEARCH: To pursue breakthrough research that extends the boundaries of chemical engineering into areas which promote sustainability and which will have the greatest 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 ofundergraduates, 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 elvels. Promote entrepreneurial activity, leading to intellectual property, including invention disclosures and patents. Become a leader in sustainability on the Purdue campus.

PROFESSIONAL DEVELOPMENT & 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 & 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.

OUR VALUES: Leadership; excellence and innovation; relevance and impact; committment and responsibility; teamwork and partnership; diversity and respect; safety and sustainability

RESEARCH BY FUNDAMENTAL TOPIC AREA:

BIOCHEMICAL AND BIOMOLECULAR ENGINEERING:
Franses, Liu, Morgan, Ramkrishna, Wang, Won, Yuan

CATALYSIS AND REACTION ENGINEERING:
Andres, Delgass, Gounder, Greeley, Morgan, 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, Gounder, Harris, Pol, Ribeiro, Thomson, Won

POLYMERS AND MATERIALS:
Boudouris, Caruthers, Harris, Litster, Liu, Pipes, Varma, Won, Yuan

PRODUCT AND PROCESS SYSTEMS ENGINEERING:
Agrawal, Kim, Laird, Litster, Nagy, Pekny, Reklaitis

THERMODYNAMICS, MOLECULAR AND NANOSCALE MODELING:
Corti, Greeley, Thomson, Won

RESEARCH BY APPLICATION AREA:

BIOTECHNOLOGY:
Franses, Harris, Liu, Morgan, Ramkrishna, Wang, Won, Yuan

ELECTRONICS:
Agrawal, Beaudoin, Boudouris

ENERGY:
Agrawal, Boudouris, Gounder, Greeley, Morgan, Pekny, Pol, Reklaitis, Ribeiro, Varma

MANUFACTURING:
Agrawal, Basaran, Corti, Franses, Harris, Kim, Nagy, Pekny, Reklaitis, Varma, Wang

PHARMACEUTICALS:
Basaran, Beaudoin, Harris, Kim, Laird, Litster, Nagy, Reklaitis, Varma

HOMELAND SECURITY:
Basaran, Beaudoin, Boudouris, Laird, Nagy

RAKESH AGRAWAL

Winthrop E. Stone Distinguished Professor

Sc. D., Massachusetts Institute of Technology, 1980

Member, National Academy of Engineering
Member, American Academy of Arts and Sciences

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

Fellow, AIChE
Member, Editorial Advisory Board, I&EC Research
Member, ChE Department Advisory Committee, WPI
Visiting Chair Professor, ExxonMobil, Dept. of ChE & Biomolecular Engr., National University of Singapore, 2011-2014
Member, ATMI, 2010-present
Member, Editorial Board, Current Opinion in ChE, 2011-present
Member, Editorial Advisory Board, ChE Progress, 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

"Nanocrystal Ink Based Route for Thin Film Solar Cells of Quaternary Chalcogenides," Keynote Lecture, 3rd International Congress on Sustainability Science and Engineering (ICOSSE), Naghama, Japan, September (2013)

"Nanocrystal Ink Based Route for Quaternary Chalcogenides Solar Cells," Invited Opening Lecture, The 16th International Conference on II-VI Compound and Related Materials, Nagahama, Japan, September (2013)

"Process Engineering in Renewable Energy," Conference Plenary Lecture, XIV Congrés SFGP 2013, Lyon, France, October (2013)

"Engineering a Sustainable Energy Future," Allan P. Colburn Honorary Lecture, DuPont Experimental Station, E. I. du Pont de Nemours and Company, Wilmington, DE, October (2013)

"Energy Efficiency Improvement and Process Intensification for Multicomponent Distillation," ExxonMobil, Clinton, NJ, November (2013)

"Nanoparticle Ink Based Route for Efficient Thin Film Solar Cells," The 3rd Annual KAIST CBE Global Distinguished Lecture, Department of Chemical and Biomolecular Engineering, KAIST, Daejeon, Korea, November (2013)

"Nanoparticle Ink Based Route for Efficient Thin Film Solar Cells," CHEMCON, Indian Institute of Chemical Engineers, Mumbai, India December (2013)

"Solar Energy - A Key to a Sustainable Energy Future, " Purdue President's Westwood Colloquia, West Lafayette, IN, February (2014)

Selected Publications

Mallapragada, D., Singh, N., Curteanu, V., and Agrawal, R., "Sun-to-Fuel Assessment of Routes for Fixing CO2 as Liquid Fuel," *I&EC Res,* 52, 5136 (2013)

Mainz, R., Walker, B., Schmidt, S. S., Zander, O., Weber, A., Rodriguez-Alvarez, H., Just, J., Klaus, M., Agrawal, R., and Unold, T., "Real-time Observation of Cu2ZnSn(S,Se)4 Solar Cell Absorber Layer Formation from Nanoparticle Precursors," *Phys. Chem. Chem. Phys.,* 15, 18281 (2013)

Hurt, M., Degenstein, J., Gawecki, P., Borton, D., Vinueza, N., Yang, L., Agrawal, R., Delgass, W. N., Ribeiro, F., and Kenttamaa, H., "On-Line Mass Spectrometric Methods for the Determination of the Primary Products of Fast Pyrolysis of Carbohydrates and for Their Gas-Phase Manipulation," *Analytical Chemistry*, 85, 10927 (2013)

Hages, C. J., Levcenco, S., Miskin, C. K., Alsmeier, J. H., Abou-Ras, D., Wilks, R. G., Bär, M., Unold, T., and Agrawal, R., "Improved performance of Ge-alloyed CZTGeSSe Thin-Film Solar Cells through Control of Elemental Losses," *Progress in Photovoltaics: Research and Applications,* http://onlinelibrary.wiley.com/doi/10.1002/pip.2442/abstract (2013)

Venkatakrishnan, V. K., Degenstein, J. C., Smeltz, A. D., Delgass, W. N., Agrawal, R., and Ribeiro, F. H., "High-pressure Fast-Pyrolysis, Fast-Hydropyrolysis and Catalytic Hydrodeoxygenation of Cellulose: Production of Liquid Fuel from Biomass," *Green Chemistry,* 16, 792 (2014)

Mallapragada, D. S. and Agrawal, R., "Limiting and Archievable Efficiencies for Solar Thermal Hydrogen Production," *International Journal of Hydrogen Energy*, 39, 62 (2014)

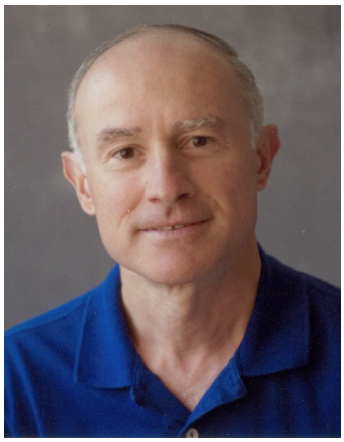
Mallapragada, D. S., Duan, G., and Agrawal, R., "From Shale Gas to Renewable Energy Based Transportation Solutions," *Energy Policy,* 67, 499 (2014)

Miskin, C. K., Yang, W. C., Hages, C. J., Carter, N. J., Joglekar, C. S., Stach, E. A., and Agrawal, R., "9% Efficient Cu2ZnSn(S,Se)4 Solar Cells from Selenized Nanoparticle Inks," http://onlinelibrary.wiley.com/doi/10.1002/pip.2472/abstract (2014)

Ramapriya, G. M., Tawarmalani, M., and Agrawal, R., "Modified Basic Distillation Configurations with Intermediate Sections for Energy Savings," *AIChE Journal,* 60(3), 1091 (2014)

Carter, N. J., Yang, W. C., Miskin, C. K., Hages, C. J., Stach, E. A., and Agrawal, R., "Cu2ZnSn(S,Se)4 Solar Cells from Inks of Heterogeneous Cu-Zn-Sn-S Nanocrystals," *Solar Energy Materials and Solar Cells,* 123, 189 (2014)

Al-Musleh, E. I., Mallapragada, D. S., Duan, G., and Agrawal, R., "Continuous Power Supply from a Baseload Renewable Power Plant," *Applied Energy,* 122, 83 (2014)



OSMAN A. BASARAN

Burton and Kathryn Gedge Professor

Ph.D., University of Minnesota, 1984

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
Member, AIChE Journal Consulting Editors Board, 2012-2016

Selected Publications

Sambath, K. and Basaran, O. A., "Electrohydrostatics of capillary Switches," *AIChE Journal,* 60, 1451-1459 (Published in Founder's Issue honoring R. B. Bird) (2014)

Selected Conference Presentations

Sambath, K., Thete, S., Subramani, H. J., and Basaran, O. A., "Collision and Coalescence of Liquid Drops in a Dynamically Active Ambient Fluid," AIChE Annual Meeting, San Franciso, CA, November (2013)

Castrejon-Pita, A., Castrejon-Pita, R., Thete, S., Sambath, K., Hinch, J., Hutchings, I., Litster, J., and Basaran, O. A., "Scaling Transitions During the Thinning of Viscous Dripping Droplets," 66th Annual Meeting of the Division of Fluid Dynamics (DFD) of the American Physical Society (APS), Pittsburgh, PA, November (2013)

Thete, S., Sambath, K., Basaran, O. A., Castrejon-Pita, R., Castrejon-Pita, A., Hutchings, I., Hinch, J., and Litster, J., "Analysis of Scaling During Pinch-off of Newtonian Filaments by Numerical Analysis," 66th Annual Meeting of the Division of Fluid Dynamics (DFD) of the American Physical Society (APS), Pittsburgh, PA, November (2013)

Anthony, C., Theta, S., Appathurai, S., Bhat, P., Basaran, O. A., and Harris, M. T., "Dynamics of Contracting Asymmetric Viscoelastic Filaments," 66th Annual Meeting of the Division of Fluid Dynamics (DFD) of the American Physical Society (APS), Pittsburgh, PA, November (2013)

Kamat, P., Thete, S., Xu, Q., and Basaran, O. A., "Dynamics of Contracting Surfactant-Covered Filaments," 66th Annual Meeting of the Division of Fluid Dynamics (DFD) of the American Physical Society (APS), Pittsburgh, PA, November (2013)

(below) Professor Basaran, Ron Unnerstall (BSChE 1983, OChE 2013) and Arvind Varma, at the Fall 2013 Outstanding Chemical Engineer Awards Banquet

STEPHEN P. BEAUDOIN

Professor

Interim Associate Vice Provost for Academic Affairs

Ph.D., Noth Carolina State University, 1995

Research Areas: Particle and Thin Film Adhesion, Explosives Detection, Electronic Materials

Selected Professional Activities

Honorary Member, Alpha Lambda Delta Phi Eta Sigma Honor Society

Selected Invited Lectures

Beaudoin, S., "Predictive Particle Interactions," American Association of Pharmaceutical Scientists (AAPS) Arden Conference, Arlington, VA, March (2013)

Harrison, A., Chaffee-Cipich, M., Sweat, M., and Beaudoin, S., "Advances in Understanding Contact-Based Sampling for Explosives Detection," 5th Annual Trace Explosives Detection Workshop, Philadelphia, PA, April (2013)

Selected Publications

Smith, K. M., Butterbaugh, J. W., and Beaudoin, S., "Effects of Coating Thickness on Particle Adhesion in Microelectronics-Based Systems," *ECS Journal of Solid State Science and Technology,* 2(11), 448-491 (2013)

Harrison, A., Bilgili, E., Beaudoin, S., and Taylor, L., "Atomic Force Microscope Infrared Spectroscopy of Griseofulvin Nanocrystals," *Analytical Chemistry,* 85(23), 11449-11455 (2013)

Selected Conference Presentations

Schram, C., Beaudoin, S., and Taylor, L., "Polymer Inhibition of Crystal Growth for Improved Drug Solubility," AIChE Annual Meeting, San Francisco, CA, October (2013)

Thomas, M. and Beaudoin, S., "Enhanced Centrifuge-Based Approach to Powder Characterization," AIChE Annual Meeting, San Francisco, CA, October (2013)

Intellectual Property

Boudouris, B., Beaudoin, S., Cipich, M., Harrison, A., Lukow, S., Rostro, L., Schram, C., Smith, K., and Thomas, M., "Engineered Polymer Detection Swab," Provisional Patent No. 61/804,117, March (2013)

Students in the Fundamentals Laboratory

BRYAN W. BOUDOURIS

Assistant Professor

Ph.D., University of Minnesota, 2009

Teach for Tomorrow Award, 2014

Research Areas: Synthesis, Nanostructural Characterization and Device Physics of Novel Functional Homopolymers and Block Copolymers for Advance Photovoltaic, Thermoelectric, Biomedical and Homeland Security Device Applications

Selected Professional Activities

Member, American Society for Engineering Education (ASEE)
Member, American Physical Society (APS)
Focus Topic Co-organizer, "Organic Electronics and Photonics," APS Meeting, 2014
Invited Participant, National Academy of Engineering, Frontiers of Engineering, 2013

Selected Invited Lectures

"The Utilization of Radical Polymers in Next-Generation Thermoelectric Devices," Air Force Office of Scientific Research, Flexible Thermoelectrics Workshop, Santa Barbara, CA, July (2013)

"The Utilization of Radical Polymers in Next-Generation Thermoelectric Devices," United States Air Force Academy, Colorado Springs, CO, October (2013)

"Non-conjugated Radical Polymers as an Emerging Class of Transparent Conductors for Organic Photovoltaic and Thermoelectric Applications," 30th International Conference of the Polymer Processing Society (PPS-30), Cleveland, OH, June (2014)

Selected Publications

Boudouris, B. W., "Engineering Optoelectronically-active Macromolecules for Polymer-based Photovoltaic and Thermoelectric Devices," *Current Opinion in Chemical Engineering,* 2, 3445-3449 (2013)

Healey, A., Boudouris, B. W., Frisbie, C. D., Hillmyer, M. A., and Blank, D. A, "Intramolecular Exciton Diffusion in Poly(3-hexylthiophene)," *Journal of Physical Chemistry Letters,* 4, 3445-3449 (2013)

Rostro, L., Baradwaj, A. G., and Boudouris, B. W., "Controlled Radical Polymerization and Quantification of Solid State Electrical Conductivities of Macromolecules Bearing Pendant Stable Radical Groups," *ACS Applied Materials and Interfaces,* 5, 9896-9901 (2013)

Baradwaj, A. G., Rostro, L., Alam, M. A., and Boudouris, B. W., "Quantification of Solid-State Charge Mobility in a Model Radical Polymer," *Applied Physics Letters,* 104, 213306 (2014)

Rostro, L., Wong, S. H., and Boudouris B. W., "Solid State Electrical Conductivity of Radical Polymers as a Function of Pendant Group Oxidation State," *Macromolecules,* 47, 3713-3719 (2014)

Mulvenna, R. A., Weidman, J. L., Jing, B., Pople, J. A., Zhu, Y., Boudouris. B. W., and Phillip, W. A., "Tunable Nanoporous Membranes with Chemically-Tailored Pore Walls from Triblock Terpolymer Templates," *Journal of Membrane Science,* 470, 246-256 (2014)

Ray, B., Baradwaj, A. G., Boudouris, B. W., and Alam, M. A., "Defect Characterization in Organic Semiconductors: Forward Bias Capacitance Analysis," *Journal of Physical Chemistry C,* 118, 17461-17466 (2014)

Selected Conference Presentations

Oral Presentation, "Optimizing Solid State Conductivity in Radical Polymers," AIChE Annual Meeting, San Francisco, CA, November (2013)

Poster Presentation, Mulvenna, R. A., Weidman, J. L., Pople, J. A., Boudouris, B. W., and Phillip, W. A., "Nanoporous Membranes with Chemically-Tailored Pore Walls from Triblock Terpolymer Templates," APS Meeting, Denver, CO, March (2014)

Oral Presentation, Rostro, L., Baradwaj, A. G., and Boudouris, B. W., "Synthesis and Solid State Charge Transport in Radical Polymers," APS Meeting, Denver, CO, March (2014)

Oral Presentation, Boudouris, B. W., Mulvenna, R. A., Weidman, J. L., and Phillip W. A., "Controlling Solution Self-assembly and Non-Solvent Induced Microphase Separation of Triblock Terpolymers to Generate Nanofiltration Membranes with Chemically-Tailored Pore Walls," APS Meeting, Denver, CO, March (2014)

Poster Presentation, Baradwaj, A. G., Rostro, L., and Boudouris, B. W., "Quantifying the Solid State Charge Transport Characteristics of Radical Polymers," APS Meeting, Denver, CO, March (2014)

Intellectual Property

Boudouris, B. W., "Anfiro, Incorporated," Start Up Company Incorporation, February (2014)

Boudouris, B. W. and Phillip, W. A., "Functional Filtration Membranes Derived from Self-Assembled Multiblock Polymers," filed for full patent, March (2014)

JAMES M. CARUTHERS

Gerald and Sarah Skidmore Professor of Chemical Engineering

Sc. D., Massachusetts Institute of Technology, 1977

Research Areas: Non-linear Viscoelasticity of Polymer Glasses and Elastomers, Olefin Polymerization Catalysis, Epoxy Cure Kinetics, Battery Sensory Technology

Selected Professional Activities

Chair, Life Performance of Polymer Based Engineering Materials: The Interactions between Mechanics and Chemistry, NSF, 2014

Chair, Mechanics of Glassy Polymers, Society of Rheology Meeting, 2014

Selected Invited Lectures

"Linear and Nonlinear Mechanical Behavior of Carbon Black Filled Elastomers," Exxon-Mobil, Houston, TX, October (2013)

Selected Publications

Steelman, D. K., Xiong, S., Pletcher, P., Smith, E., Switzer, J., Medvedev, G. A., Delgass, W. N., Caruthers, J. M., and Abu-Omar, M., "Effects of Pendant Ligand Binding Affinity on Chain Transfer for 1-Hexene Polymerization Catalyzed by Single-Site Zirconium Amine Bis-Phenolate Complexes," *Journal of the American Chemical Society,* 135, 6280-6288 (2013)

Chemical engineering undergraduate students at the Industrial Roundtable

Kim, J. W., Medvedev, G. A., and Caruthers, J. M., "Observation of Yield in Triaxial Deformation of Glassy Polymers," *Polymer,* 54, 2821-2833 (2013)

Steelman, D. K., Xiong, S., Pletcher, P. D., Switzer, J. M., Medvedev, G. A., Delgass, W. N., Caruthers, J. M., and Abu-Omar, M., "Comparison of Selected Zirconium and Hafnium Amin Bis(pehnolate) Catalysts for 1-Hexene Polymerization," *Organometallics,* 32, 4862-4867 (2013)

Kim, J. W., Medvedev, G. A., and Caruthers, J. M., "The Response of a Glassy Polymer in a Loading/Unloading Deformation: The Stress Memory Experiment," *Polymer,* 54(21), 5933-6002 (2013)

Medvedev, G. A., Kim, J. W., and Caruthers, J. M., "Prediction of the Relationship between the Rate of Deformation and the Rate of Stress Relaxation in Glassy Polymers," *Polymer,* 54, 6599-6607 (2013)

Yadav, G. G., David, A., Yang, H., Favaloro, T., Yang, H., Shakouri, A., Caruthers, J. M., and Wu, Y., "Synthesis and the Investigation of Thermoelectric and Electrochemical Properties of Porous Ca9Co12O28 Nanowires," *Journal of Materials Chemistry,* 1, 11901-11908 (2013)

Kim, J. W., Medvedev, G. A., and Caruthers, J. M., "Mobility Evolution During Tri-axial Deformation of a Glassy Polymers," *Polymer,* in press (2014)

Xiong, S., Steelman, D. K., Medvedev, G. A., Delgass, W. N., Abu-Omar, M. M., and Caruthers, J. M., "Selected Degenerative Benzyl Group Transfer in Olefin Polymerization," *ACS-Catalysis,* in press (2014)

Selected Conference Presentations

Medvedev, G. A. and Caruthers, J. M., "Multi-step Loading/Unloading Experiments that Challenge Constitutive Models of Glassy Polymers," APS, Denver, CO, March (2014)

DAVID S. CORTI

Professor and Director of Undergraduate Studies

Ph. D., Princeton University, 1997

University Faculty Scholar, Purdue University, 2011-2016

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

Selected Professional Activities

Chair, Area 1a, Programming Committee, AIChE, 2010-2013
Editorial Board, ISRN Computational Mathematics, 2011-2014

Selected Invited Lectures

Kelkar, A. V., Franses, E. I., and Corti, D. S., "New Models of Brownian Aggregation Kinetics in Colloidal Dispersions," HP Labs, Palo Alto, CA, November (2013)

Selected Publications

Torabi, K. and Corti, D. S., "Towards a Molecular Theory of Homogeneous Bubble Nucleation. I. Equilibrium Embryo Definition," *Journal Phys. Chem. B,* 117, 12479-12490 (2013)

Torabi, K., and Corti, D. S., "Towards a Molecular Theory of Homogeneous Bubble Nucleation. II. Calculation of the Number Density of Critical Nuclei and the Rate of Nucleation," *Journal Phys. Chem. B,* 117, 12491-12504 (2013)

Uline, M. J. and Corti, D. S., "Molecular Dynamics at Constant Pressure: Allowing the System to Control Volume Fluctuations via a 'Shell' Particle," *Entropy,* 15, 3941-3969 (2013)

Kelkar, A. V., Dong, J., Franses, E. I., and Corti, D. S., "New Models and Predictions for Brownian Coagulation of Non-Interacting Spheres," *Journal of Colloid and Interface Science,* 389, 188-198 (2013)

Kelkar, A. V., Franses, E. I., and Corti, D. S., "Nonideal Diffusion Effects and Short-Range Ordering Lead to Higher Aggregation Rates in Concentrated Hard-Sphere Dispersions," *Langmuir,* 30, 3647-3657 (2014)

Heying, M. and Corti, D. S., "On the Use of Multiple Interpolation Series in Scaled Particle Theory: Limitations and Improved Predictions," *Molecular Physics, 112, 2160-2175* (2014)

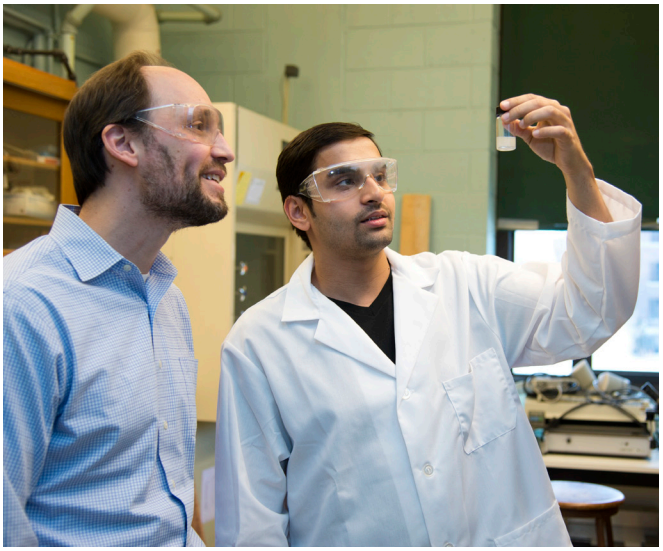
Selected Conference Presentations

Kelkar,A. V., Franses, E. I., Subramani, H. J., and Corti, D. S., "Gelation of Agglomerating Slurries as a Mechanism for Pipeline Flow Blockage," AIChE National Meeting, San Francisco, CA, November (2013)

Kelkar, A. V., Franses, E. I., and Corti, D. S., "The Importance of Non-ideal Diffusion and Entropic Packing Effects in Brownian Aggregation of Hard Spheres," AIChE National Meeting, San Francisco, CA, November (2013)

Kelkar, A. V., Franses, E. I., and Corti, D. S., "Short-Range Ordering and Non-ideal Diffusion Effects in Perikinetic Aggregation in Dispersions of Spherical Particles," 88th ACS Colloid & Surface Science Symposium, Philadelphia, PA, June (2014)

Yang, Y., Zhu, X., Bai, G., Kelkar, A. V., Ng. H. T., Franses, E. I., and Corti, D. S., "Effect of Sodium Chloride and Sodium Dodecyl Sulfate on the Stability of TiO2 Particles in Water Against Aggregation and Sedimentation," 88th ACS Colloid & Surface Science Symposium, Philadelphia, PA, June (2014)



Professor Corti with graduate student Aniruddha Kelkar

ELIAS I. FRANSES

Professor

Ph. D., Minnesota, 1979

Research Areas: Adsorption and Tension Equilbria and Dynamics of Surfactants and Proteins at Fluid/Fluid and Fluid/Solid Interfaces, Sorbents and Sorbent-Solvent-Sorbate Interactions of Chiral Molecules for Chiral Bioseparations of Enantiomers, Coloidal Stability of Aqueous Dispersions of Pigment Nanoparticles and of Hydrocarbon Hydrate Particles in Hydrocarbons

Selected Invited Lectures

"Analytical and Numerical Models of Particle Coagulation in Concentrated Liquid Dispersions," Hewlett-Packard Co, Palo Alto, CA, November (2013)

"Stability of Dispersions of Nasnoparticles Against Sedimentation," Hewlett-Packard Co, Palo Alto, CA, November (2013)

Selected Publications

Tsui, H. W., Wang, N. H. L., and Franses, E. I., "Chiral Recognition Mechanism of Acyloin-Containing Chiral Solutes by Amylose Tris[(S)-α-methylbenzylcarbamate]," *Journal Phys. Chem. B,* 117(31), 9203–9216 (2013)

Tsui, H.W., Franses, E. I., and Wang, N. H. L., "Effect of Alcohol Aggregation on the Retention Factors of Chiral Solutes with an Amylose-Based Sorbent: Modeling and Implications for the Adsorption Mechanism," *Journal of Chromatography A,* 1328, 52-65 (2014)

Selected Conference Presentations

Tsui, H. W., Franses, E. I., and Wang, N. H. L., "New Retention Models and Interaction Mechanisms of Monovalent Solutes with Amylose Tris[S)-α-methylbenzylcarbamate] Sorbent," PREP 2013 - 26th International Symposium on Preparative and Process Chromotography, Cambridge, MA, July (2013)

Tsui, H. W., Franses, E. I., and Wang, N. H. L., "Effect of Alcohol Modifier on the Retention Factors of Chiral Solutes with an Amylose-Based Sorbent: Modeling and Implications for the Interaction Mechanism," PREP 2013 - 26th International Symposium on Preparative and Process Chromotography, Cambridge, MA, July (2013)

Poster Presentation, Tsui, H. W., Franses, E. I., and Wang, N. H. L., "Chiral Recognition Mechanism of Amide-Containing Chiral Solutes by Amylose Tris[(S)-alpha-methylbenzylcarbamate] Sorbent," PREP 2013 - 26th International Symposium on Preparative and process Chromotography, Cambridge, MA, July (2013)

Dong, J., Ng, H. T., Zhao, Y., Franses, E. I., and Corti, D. S., "A New Method for Determining the Hamaker Constant of a Solid with Atomic Force Microscopy," AIChE Annual Meeting, San Francisco, CA, November (2013)

Tsui, H. W., Wang, N. H. L., and Franses, E. I., "Effects of Alcohol Modifier Aggregation and Complexation on the Retention Factors of Chiral Solutes with an Amylose-Based Sorbent," AIChE Annual Meeting, San Francisco, CA, November (2013)

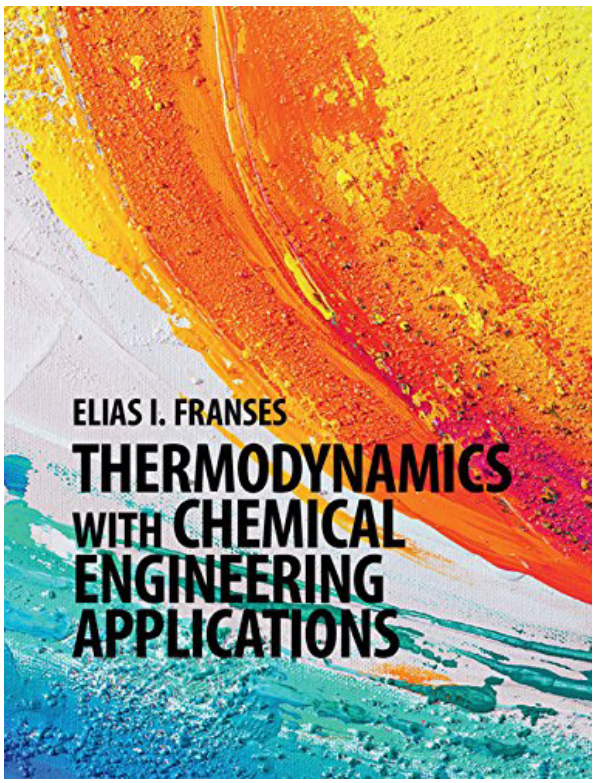
Poster Presentation, Tsui, H. W., Wang, N. H. L., and Franses, "Chiral Recognition Mechanism of Amide-Containing Chiral Solutes by Amylose Tris[(S)-alpha-methylbenzylcarbamate] Sorbent," AIChE Annual Meeting, San Francisco, CA, November (2013)

Kelkar, A. V., Franses, E. I., and Corti, D. S., "The Importance of Non-Ideal Diffusion and Entropic Packing Effects in Browian Aggregation of Hard Spheres," AIChE Annual Meeting, San Francisco, CA, November (2013)

Kelkar, A. V., Subramani, H., Franses, E. I., and Corti, D. S., "Gelation of Agglomerating Slurries as a Mechanism for Pipeline Flow Blockage," AIChE Annual Meeting, San Francisco, CA, November (2013)

Books

Franses, E. I., "Thermodynamics with Chemical Engineering Applications," Cambridge University Press, ISBN 978-1-107-06975-6, in press (2014)



RAJAMANI GOUNDER

Assistant Professor

Ph. D., University of California, Berkeley, 2011

Ralph E. Powe Junior Faculty Enhancement Award, 2014

Research Areas: Heterogeneous Catalysis and Kinetics, Inorganic Materials Synthesis, Petroleum and Shale Gas Conversion, Biomass Conversion, NOx Pollution Abatement

Selected Professional Activities

Session Chair and Organizer, Catalysis with Microporous and Mesoporous Materials, AIChE Annual Meeting, 2013
Session Chair, General Catalysis, ACS Fall Meeting, 2013

Selected Invited Lectures

"Truth, Beauty and Elegance in Catalysis Research," Truth and Beauty Seminar Series, Purdue University, West Lafayette, IN, November (2013)

Gounder, R. and Davis, M. E., "Stereospecific Sugar Rearrangements Mediated by Lewis Acidic Molecular Sieves," AIChE Annual Meeting, San Francisco, CA, November (2013)

Bates, S. A., Delgass, W. N., Ribeiro, F. H., Gounder, R., and Miller, J. T., "Methods for Brønsted Acid Site Titration in Cu-zeolites that Mediate the Selective Catalytic Reduction of NOX with NH3," ACS Meeting, Dallas, TX, March (2014)

"Confinement Effects on the Catalytic Diversity of Molecular Sieves," ACS Meeting, Dallas, TX, March (2014)

"New Insights into the Properties of and Mechanistic Roles of Brønsted Acid Sites in Cu-zeolites that Catalyze NOx SCR with NH3," DOE Cross-Cut Lean Engine Emissions Reduction Simulations (CLEERS) Workshop, Dearborn, MI, April (2014)

Selected Publications

Gounder. R. and Davis, M. E., "Aqueous-Phase Monosaccharide and Disaccharide Isomerization and Epimerization Catalysis on Hydrophobic Lewis Acid Zeolites," *Journal of Catalysis,* 308, 176-188 (2013)

Gounder, R. and Davis, M. E., "Titanium-Beta zeolites Catalyze the Stereospecific Isomerization of D-glucose to L-sorbose via Intramolecular C5-C1 Hydride Shift," *ACS Catalysis,* 3, 1469-1476 (2013)

Gounder, R. and Davis, M. E., "Beyond Shape Selective Catalysis with Zeolites: Hydrophobic Void Spaces in Zeolites Enable Catalysis in Liquid Water," *AIChE Journal,* 59, 3349-3358 (2013)

Gounder, R. and Iglesia, E., "The Catalytic Diversity of Zeolites: Confinement and Solvation Effects within Voids of Molecular Dimensions," *Chemical Communications,* 49, 3491-3509, Feature Article (2013)

Gounder, R., "Hydrophobic Microporous and Mesoporous Oxides as Brønsted and Lewis Acid Catalysts for Biomass Conversion in Liquid Water," *Catalysis Science & Technology, 4, 2877-2886 (2014)* (2014) doi: 10.1039/C4CY00712C

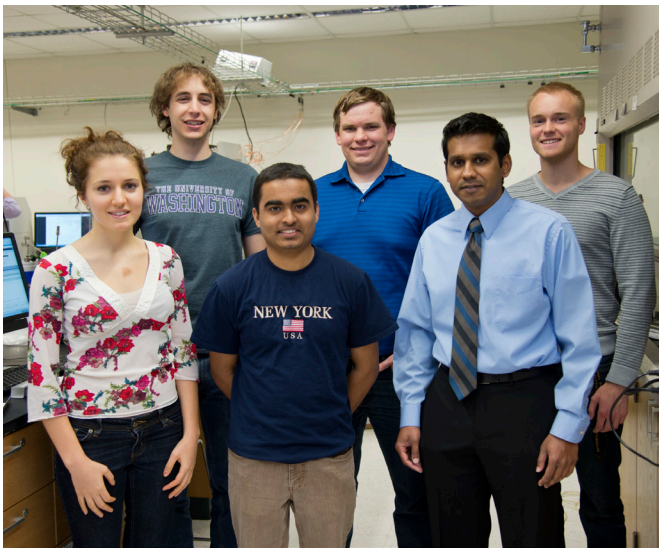
Bates, S. A., Delgass, W. N., Ribeiro, F. H., Miller, J. T., and Gounder, R., "Methods for NH3 Titration of Brønsted Acid Sites in Cu-Zeolites that Catalyze the Selective Catalytic Reduction of NOX with NH3," *Journal of Catalysis,* 312, 26-36 (2014)

Bermejo-Deval, R., Orazov, M., Gounder, R., Hwang, S. J., and Davis, M. E., "Active Sites in Sn-Beta for Glucose Isomerization to Fructose and Epimerization to Mannose," *ACS Catalysis,* 4, 2288-2297 (2014)

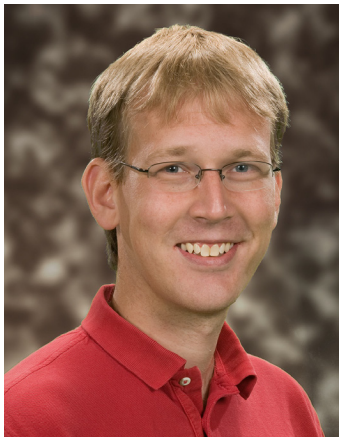
Selected Conference Presentations

Gounder, R. and Davis, M. E., "Sugar Rearrangements Mediated by Lewis Acidic Molecular Sieves in Liquid Media," ACS Fall Meeting, Indianapolis, IN, September (2013)

Poster Presentation, Bates, S. A., Verma, A. A., Delgass, W. N., Ribeiro, F. H., Miller, J. T., and Gounder, R., "New Insights into the Mechanistic Roles of Brønsted Acid Sites in Cu-zeolites for NOX Selective Catalytic Reduction," Gordon Research Conference on Catalysis, New London, NH, June (2014)



Assistant Professor Gounder with his research group, from left: Haefa Mansour (senior student), John Di Iorio (graduate student), Ravi Joshi (graduate student), Michael Cordon (graduate student), Raj Gounder, and Austin Tackaberry (senior student)



JEFFREY P. GREELEY

Associate Professor

Ph. D., University of Wisconsin-Madison, 2004

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

Selected Professional Activities

Co-organizer of Symposium, Current Topics in Electrochemistry, Fall Meeting of the American Chemical Society, 2013

Guest Editor, Surface Science Special Issue, Reactivity Concepts at Surfaces, 2014

Selected Invited Lectures

"First principles analysis of metal catalysis for hydrogen production," and "Density Functional Theory Studies of Nanoparticles in Catalysis and Energy Storage," Fall Meeting of the American Chemical Society, Indianapolis, IN, September (2013)

"First principles studies of biomass-related chemistry on metal surfaces" and "Perspective on catalyst modeling and design from first principles," Fall Meeting of the American Institute of Chemical Engineers, San Francisco, CA, October (2013)

Selected Publications

Kwon, G., Ferguson, G., Heard, C., et al., "Size-dependent Subnanometer Pd Cluster (Pd4, Pd6, and Pd17) Water Oxidation Electrocatalysis," *ACS Nano,* 7, 5808-5817 (2013)

Smerdon, J., Rankin, R., Greeley, J., et al., "Chiral Pinwheel Heterojunctions Self-Assembled from C60 and Pentacene," *ACS Nano,* 7, 3086-3094 (2013)

Yildrim, H., Greeley, J., and Sankaranarayanan, S., "Concentration-dependent Ordering of Lithiated Amorphous TiO2," *Journal of Physical Chemistry,* 117, 3834-3845 (2013)

O'Neill, B., Jackson, D., Crisci, A., et al., "Stabilization by Atomic Layer Deposition of Copper Catalysts for Liquid Phase Reactions," *Angewandte Chemie International Edition,* 125, 14053-14057 (2013)

Cheng, L., Mehmood, F., Greeley, J., et al., "Reaction Mechanism for Direct Propylene Eposidation by Alumina-Supported Silver Aggregates," *ACS Catalysis,* 4, 32-39 (2014)

Liu, B., Cheng, L., Curtiss, L., and Greeley, J., "Effects on van der Waals Density Functional Corrections on Trends in Furfural Adsorption and Hydrogenation on Close-packed Transition Metal Surfaces," *Surface Science,* 622, 51-59 (2014)

Lah, K. C., Chan, M., Curtiss, L., and Greeley, J., "Atomistic and First Principles Computational Studies of Li-O2 batteries," *Springer Series,* in press (2014)

Selected Conference Presentations

"Bifunctional Alkaline Electrocatalysts for the HOR and HER: a First Principles Study," AIChE Annual Meeting, San Francisco, CA, November (2013)

Graduate Students Frank DeVilbiss, Harshavardhan Choudhari and Ridade Sayin at a Seminar Session

MICHAEL T. HARRIS

Professor, Director of Graduate Studies, School of Chemical Engineering (July 2012 - July 2014)

Associate Dean, Undergraduate Education, College of Engineering

Ph. D., University of Tennessee-Knoxville, 1992

Research Areas: Colloids and Interfacial Phenomena, Materials Synthesis using Biotemplates, Environmental Control Technology, Transport Phenomena, Microwave Sensing of Powder Properties, Drop Printing of Pharmaceuticals

Selected Professional Activities

Member, Board of Trustees, AIChE Foundation
Fellow, AIChE
Chair, ASEE Minority Division, 2013-2014
Member, Advisory Board, Advance Grant, Rutgers University

Selected Publications

Austin, J.S., Sung, P. F., Kovacevik, M., Rodriguez, S., and Harris, M. T., "On-line Monitoring of the Bulk Density and the Moisture Content of Rapidly Flowing Microcrystalline Cellulose Using a Microwave Resonance Sensor," *Sensors-8831,* 14(3), 821-828 (2014) doi: 10.1109/JSEN.2013.2287991

Hirshfield, L., Giridhar, A., Taylor, L. S., Harris, M. T., and Reklaitis, G. V., "Dropwise Additive Manufacturing of Pharmaceutical Products for Solvent-Based Dosage Forms," *Journal of Pharmaceutical Sciences,* 103(2), 496-506 (2014)

Austin, J.S., Gupta, A., McDonnell, R., Reklaitis, G. V., and Harris, M. T., "A Novel Microwave Sensor to Determine Particulate Blend Composition On-line," *Analytica Chimica Acta,* 819, 82-93 (2014) doi: 10.1016/j.aca.2014.02.016

Selected Conference Presentations

Freer, A., Smith, J., Macino, A., and Harris, M. T., "Surface Mineralization and Controlled Deposition of Biotemplated Palladium Nanorods Onto Gold Substrates," AIChE Annual Meeting, San Francisco, CA, November (2013)

Hirschfield, L., Reklaitis, G. V., Giridhar, A., and Harris, M. T., "Drug-On-Demand: A Mini Manufacturing Method Using Drop-On Demand Technology," AIChE Annual Meeting, San Francisco, CA, November (2013)

El Hagrasy, A., Giridhar, A., Muliadi, A., Austin, J. A., Gupta, A., Louvier, M., Patterson, T. J., Geldenhuis, P., Harris, M. T., Wassgren, C., Nagy, Z. K., Reklaitis, G. V., and Litster, J. D., "Continuous Operations in Pharmaceutical Solid Dosage Form Manufacturing: Dry Granulation Case Study," AIChE Annual Meeting, San Francisco, CA, November (2013)

Hsu, H. Y. and Harris, M. T., "Effect of Double Layer Formulation on Crystallization of Naproxen/Polyethylene Glycol Dispersion System," AIChE Annual Meeting, San Francisco, CA, November (2013)

Austin, J. S., Gupta, A., Reklaitis, G. V., and Harris, M. T., "Development of a Novel Microwave Sensor for Improved Process and Quality Control," AIChE Annual Meeting, San Francisco, CA, November (2013)

Professors Neal Houze and Michael Harris

ROBERT E. HANNEMANN

Visiting Professor

M.D., Indiana University, 1959

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

Selected Teaching Activities

Fall 2013 - CHE 46100 Biomedical Engineering

R. NEAL HOUZE

Professor

Ph.D., University of Houston, 1966

Selected Professional Activities

Member, American Institute for Chemical Engineers
Fellow, 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, Journal of Engineering Education, 2004-present
Reviewer, McGraw-Hill Company, 2003-present
Reviewer, J. Wiley & Sons, 2004-present
Reviewer, Chemical Engineering Education, 2002-present

Selected Teaching Activities

Fall 2013 - CHE 37800 Heat & Mass Transfer
Fall 2013 - CHE 46300 Applications of Chemical Engineering Principles

SANGTAE KIM

Distinguished Professor

Ph.D., Princeton University, 1983

Member, National Academy of Engineering

Research Areas: Pharmaceutical Informatics and Computer-Aided Rational Drug Design, Computational Microhydrodynamics, Cyberinfrastructure, Translational Research and Entrepreneurial Ecosystems.

Selected Professional Activities

Co-Chair, Special AIChE Symposium Honoring Howard Brenner (2014)
Consulting Editor, KICHE Journal
Fellow, AIMBE
Member, External Review Committee, Communities of Excellence Program, University of Buffalo
Member, FDA Science Board Subcommittee on Global Health
Member, International Advisory Panel, National University of Singapore Graduate School
Member, International Advisory Board, Korea-Australia Rheology Journal
Member, Investment Advisory Committee, Venture Investors Early Stage Funds IV and V
Trustee, AIChE Foundation

Selected Invited Lectures

"Translational Research," University of Buffalo, Buffalo, NY, September (2013)

"Microhydrodynamics," Applied Mathematics Colloquium, University of Wisconsin-Madison, Madison, WI, February (2014)

"Microhydrodynamics," Cummins R&D Center, Stoughton, WI, May (2014)

"Ho-Am Commemorative Lecture on Cyberinfrastructure and Information Technology," Korean Minjok Leadership Academy, Hoengseong, Korea, May (2014)

Selected Publications

Kim, S., and Palaniappan, D., "Hydrodynamic Interactions between Two Slender Tori in a Viscous Fluid," AICHE Journal, 60, 1517 (2014)

Selected Books

Kim, S., and Karrila, S.J., "Microhydrodynamics: Principles and Selected Applications," Dover Publications, ISBN 978-0486442198 Kindle Edition ranked in "Top 10 in Fluid Dynamics" April (2013)

Professor Sangtae Kim, Jay Ihlenfeld (BSChE '74, OChE & DEA 2001), Professor Doraiswami Ramkrishna, School Head Arvind Varma and Professor Rakesh Agrawal

CARL LAIRD

Associate Professor

Ph.D., Carnegie Mellon University, 2006

Research Areas: Large-scale Non-linear Optimization of Chemical Process Systems, Networks and Public Health, Parallel Scientific Computing

Selected Professional Activities

Director, AIChE CAST Division (2012-present)
INFORMS Computing Society Conference Stream Chair, "Nonlinear Programming," 2013
Session Chair: Advances in Dynamic Optimization, INFORMS Computing Society, 2013
Session Chair: Nonlinear Programming Topics, INFORMS Computing Society, 2013
Session Chair: Efficient Solution of Large-Scale Nonlinear Optimization Problems, INFORMS Computing Society, 2013
International Program Committee, Foundations of Computer Aided Process Design (FOCAPD), 2014

Selected Invited Lectures

"Parallel Solution of Large-Scale Nonlinear Parameter Estimation Problems," ICCOPT, Portugal, July (2013)

"Progressive Hedging for Non-Linear Models that Arise in Paramater Estimation Problems," ICSP-SPXIII 2013, Bergamo, Italy, July (2013)

"Interior-Point Methods for Parallel Solution of Nonlinear Programming Problems," SADCO Summer School and Workshop on Optimal and Model Predictive Control, Chair of Applied Mathematics, University of Bayreuth, Bayreuth, Germany, September (2013)

"NLP Approaches for Estimation of Seasonal Transmission Parameters in Childhood Infectious Diseases," INFORMS Annual Meeting, Minneapolis, MN, October (2013)

"Nonlinear Parameter Estimation in Parallel Using Progressive Hedging," INFORMS Annual Meeting, Minneapolis, MN, October (2013)

Selected Publications

Word, D .P., Young, J. K., Cummings, D. A. T., Iamsirithaworn, S., and Laird, C. D., "Interior-Point Methods for Estimating Seasonal Parameters in Discrete-Time Infectious Disease Models," *PLOS One,* (8-10), 1-13 (2013)

Legg, S. W., Wang, C., Benavides-Serrano, A. J., and Laird, C. D., "Optimal Gas Detector Placement Under Uncertainty Considering Conditional-Value-At-Risk," *Journal of Loss Prevention in the Process Industries,* 26(3), 410-417 (2013)

Serpas, M., Hackebeil, G., Laird, C. D., and Hahn, J., "Sensor Location for Nonlinear Dynamic Systems via Observability Analysis and Max-Det Optimization," *Computers & Chemical Engineering,* 48, 105-112 (2013)

Benavides-Serrano, A., Legg, S. W., Vazquez-Roman, R., Mannan, M. S., and Laird, C. D., "A Stochastic Programming Approach for the Optimal Placement of Gas Detectors: Unavailability and Voting Strategies," *Industrial & Engineering Chemistry Research,* 53, 13; 5355-5365 (2013)

Mann, A. V., Hackebeil, G., Laird, C. D., "Explicit Water Quality Model Generation and Rapid Multi-Scenario Simulation," *Journal of Water Resources Planning and Management,* in press (2014)

Word, D. P., Kang, J., Akesson, J., and Laird, C. D., "Efficient Parallel Solution of Large-Scale Nonlinear Dynamic Optimization Problems," *Computational Optimization and Applications,* in press (2014)

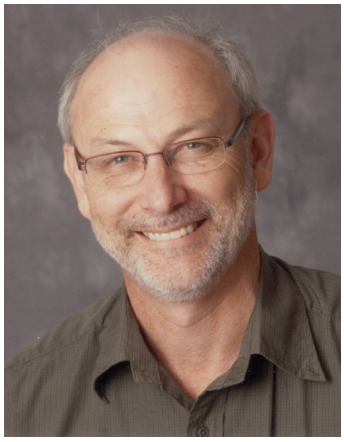
Selected Conference Presentations

Benavides-Serrano, A., Legg, S. W., Mannan, M. S., and Laird, C. D., "A Quantitative Assessment on the Placement Practices of Gas Detectors in the Process Industries," Mary Kay O'Connor Process Safety Center International Symposium, College Station, TX, October (2013)

Seth, A., McGee, S., McKenna, S., Hart, D. B., and Laird, C. D., "An Application for Real-time Response to Contamination Events in a Large-scale Public Water Network," AIChE Annual Meeting, San Francisco, CA, November (2013)

Benavides-Serrano, A., Mannan, M. S., and Laird, C. D., "Gas Detectors Layout Optimization Considering False Positive and False Negatives: A Stochastic Programming Approach and a Quantitative Assessment of the Process Industries," AIChE Annual Meeting, San Francisco, CA, November (2013)

Cao, Y., Wang, C., Pishko, M., and Laird, C. D., "Optimal Investment Strategies for Reducing Drug Shortages in the Presence and Absence of Flexible-By-Design Emergency Therapeutic Production Facilities," AIChE Annual Meeting, San Francisco, CA, November (2013)



JAMES D. LITSTER

Professor of Chemical Engineering and Industrial & Physical Pharmacy

Ph. D., University of Queensland, 1985

Professor Arun S. Mujumdar Visiting Fellowship, Institute of Chemical Technology, Mumbai
Visiting Professor, University of Sheffield, United Kingdom, 2013

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

Selected Professional Activities

International Organizing Committee, Partec 2013, Nurnberg, Germany, 2013 (and conference session chair)
External PhD Examiner: Sheffield University, University of Limerick
Fellow, Australian Academy for Technological Sciences and Engineering
Honorary Professor, The University of Queensland
Consultant, International Fine Particle Research Institute 2007-present
Powder Technology Editorial Board, 2002-present
Particle and Particulate Systems Characterisation Editorial Board, 2003-present
AAPS Pharmaceutical Science and Technology Editorial Board, 2009-present
Fellow, Institution of Chemical Engineers (UK)
Faculty Committee, National Institute of Pharmaceutical Technology and Education (NIPTE)
Awards Committee, Particle Technology Forum, AIChE

Selected Invited Lectures

"Wet Granulation - Fundamentals, Scaling and Continuous Operation," Astra Zeneca Research and Development, Macclesfield UK, October (2013)

"Research in Granulation at Purdue," BASF Research and Development, Mannheim, Germany, November (2013)

"Modeling and Optimization of Continuous Granulation," Technical University of Hamburg-Harburg, Germany, November (2013)

"Modeling and Optimization of Continuous Granulation," University of Strathclyde, Glasgow, Scotland, November (2013)

"Modeling and Optimization of Continuous Granulation," Procter and Gamble, Newcastle Research Laboratories, Newcastle University, Newcastle, UK, December (2013)

"Modeling and Optimization of Continuous Granulation," University of Leeds, West Yorkshire, England, December (2013)

"Modeling and Optimization of Continuous Granulation," Surrey University, Guildford, UK, January (2014)

Selected Publications

Barrasso, D., Oka, S., Muliadi, A., Litster, J. D., Wassgren, C., and Ramachandran, R., "Population Balance Model Validation and Prediction of CQAs for Copntinuous Milling Processes: Toward QbD in Pharmaceutical Drug Product Manufacturing," *Journal of Pharmaceutical Innovation,* doi: 10.1007/s12247-013-9115-0 (2013)

Zarate, N. V., Harrison, A. J., Litster, J. D., and Beaudoin, S. P., "Effect of Relative Humidity on Onset of Capillary Forces for Rough Surfaces," *Journal of Colloid Interface Science,* 411, 265-272 (2013)

El Hagrasy, A. and Litster, J. D., "Granulation Rate Processes in the Kneading Elements of a Twin Screw Granulator," *AIChE Journal,* 59, 4100-4115 (2013)

Dale, SA, Wassgren, C, Litster, JD, "Measuring Granule Phase Volume Distributions Using X-ray Microtomography," P*owder Technology*, 264, 550-560 (2014)

Rashid, A, White, ET, Howes, T, Litster, JD, Marziano, I, "Effect of Solvent Composition and Temperature on the Solubility of Ibuprofen in Aqueous Ethanol," Journal of Chemical & Engineering Data, 59 (9), pp 2699–2703 (2014)

Sayin, R, El Hagrasy, AS, Litster, JD., "Distributive Mixing Elements: Towards Improved Granule Attributes from a Twin Screw Granulation Processes," *Chemical Engineering Science*, DOI: 10.1016/j.ces.2014.06.040 (2014)

Selected Conference Presentations

Litster J. D., "Wet Granulation - Fundamentals, Modeling and Pharmaceutical Applications," APS PharmSci 2013, Heriot Watt University, Edinburgh, UAE, September (2013)

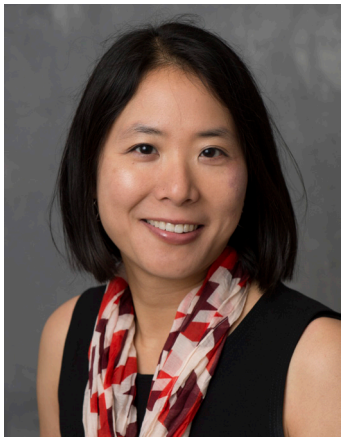
Mitra, B., Kemp, C., Hilden, J., and Litster, J. D., "Effect of Dry Granule Solid Fraction on Tablet Fracture," AAPS Annual Meeting, San Antonio, TX, November (2013)

Abbou Oucherif, K., Bermingham, S., Braido, D., Calado, F., Li, R., Sagawa, K., Shanker, R., Taylor, L. S., and Litster, J. D., "Modeling Drug Prescription from Crystallization Fundamentals Using gPROMS: An Advanced Process Modeling Tool," AAPS Annual Meeting, San Antionio, TX, November (2013)

Sayin, R., Litster, J.D., "Mechanistic Studies of Twin Screw Granulation," 7th World Congress of Particle Technology, Beijing, May (2014)

Lu, J., Nagy, Z. and Litster, J.D., "Nucleation Studies in a Gas Segmented Drop Crystallizer," 7th World Congress of Particle Technology, Beijing, May (2014)

Smith, R., David, N.J. and Litster, J.D., "Unit Cell Approach to DEM Simulations of Particle Flows," 7th World Congress of Particle Technology, Beijing, May (2014)



JULIE C. LIU

Associate Professor

Ph. D., Caltech, 2006

3M Non-Tenured Faculty Award (2011 - 2013)

Research Areas: Biomaterials, Tissue Engineering, Protein Engineering

Selected Professional Activities

Programming Chair, AIChE Engineering Fundamentals, Life Science, Area 15d/e, 2012-2013
Chair, SFB Biomaterials Education Special Interest Group, 2013-2015
Member, SFB Education & Prof Development Comm., 2014-2015
Advisory Board, Ivy Tech Biotechnology Program, 2013-present
Co-Organizer, SFB Session
Abstract Reviewer, SFB Session
Proposal Reviewer, NSF
Proposal Reviewer, AO Foundation
Proposal Reviewer, National Science Centre of Poland

Selected Invited Lectures

"Designing Protein-based Biomaterials for Medical Applications," Chemistry and Biochemistry, Andrews University, Berrien Springs, MI, October (2013)

Selected Publications

Renner, J. N. and Liu, J. C., "Investigating the Effect of Peptide Agonists on the Chondrogenic Differentiation of Human Mesenchymal Stem Cells Using Design of Experiments," *Biotechnology Progress,* 29, 1550-1557 (2013)

Su, R. S. C., Renner, J. N., and Liu, J. C., "Synthesis and Characterization of Recombinant Abductin-based Proteins," *Biomacromolecules,* 14, 4301-4308 (2013)

Galas, R. J. and Liu, J. C., "Vascular Endothelial Growth Factor Does Not Accelerate Endothelial Differentiation of Human Mesenchymal Stem Cells," *Journal of Cellular Physiology,* 229, 90-96 (2014)

Su, R. S.-C., Kim, Y., and Liu, J. C., "Resilin: Protein-based Elastomeric Biomaterials," *Acta Biomaterialia,* 10, 1601-1611 (2014)

Galas, R. J. and Liu, J. C., "Vascular Endothelial Growth Factor Does Not Accelerate Endothelial Differentiation of Human Mesenchymal Stem Cells," *Journal of Cellular Physiology,* 229, 90-96 (2014)

Kim, Y., Renner, J. N., and Liu, J. C., "Incorporating the BMP-2 Peptide in Genetically-engineered Biomaterials Accelerates Osteogenic Differentiation," *Biomaterials Science,* 2, 1110-1119 (2014)

Selected Conference Presentations

Poster Presentation, Su, R. S. C., Renner, J. N., Cherry, K. M., and Liu, J. C., "Modular Resilin-based Biomaterials with Tunable Mechanical Properties for Cartilage Engineering," Biomaterials and Tissue Engineering Gordon Research Conference, Holderness, NH, July (2013)

Poster Presentation, Kim, Y. and Liu, J. C., Modular Proteins Containing a BMP-2 Peptide Accelerate Osteogenic Differentiation," Biomaterials and Tissue Engineering Gordon Research Conference, Holderness, NH, July (2013)

Su, R. S. C., Renner, J. N., Cherry, K. M., and Liu, J. C., "Characterization of Recombinant Resilin-based Biomaterials with Tunable Mechanical Properties for Cartilage Engineering," ACS Annual Meeting, Indianapolis, IN, September (2013)

Poster Presentation, Román, J. K., Brennan, M. J., Liu, J. C., and Wilker, J. J., "Characterization and Replication of DOPA Adhesion in Peptides and Proteins," ACS Annual Meeting, Indianapolis, IN, September (2013)

Brennan, M. J., Román, J. K., Mansour, H., Renner, J. N., Lin, T., Su. R. S. C., Wilker, J. J., and Liu, J. C., "Adhesive Elastin-based Proteins as Soft Tissue Glues," Biomaterials Day, Cleveland, OH, October (2013)

Poster Presentation, Mansour, H., Brennan, M. J., Román, J. K., Wilker, J. J., and Liu, J. C., Adhesive Elastin-based Proteins," Biomaterials Day, Cleveland, OH, October (2013)

Poster, Presentation, Chen, Y., Su, R. S. C., and Liu, J. C., "Characterization of Water Content and Swelling Ration of Resilin-based Hydrogels," Biomaterials Day, Cleveland, OH, October (2013)

Brennan, M. J., Su, R. S. C., Román, J. K., Wilker, J. J., and Liu, J. C., "Adhesive Elastin-based Proteins as Soft Tissue Glues," AIChE Annual Meeting, San Francisco, CA, November (2013)

Poster Presentation, Mansour, H., Brennan, M. J., Román, J. K., Wilker, J. J., and Liu, J. C., "Adhesive Elastin-based Proteins," AIChE Annual Student Meeting, San Francisco, CA, November (2013)

Mansour, H., Brennan, M. J., Román, J. K., Wilker, J. J., and Liu, J. C., "Adhesive Elastin-based Proteins," AIChE North Central Regional Conference, East Lansing, MI, April (2014)

Poster Presentation, Su, R. S. C. and Liu, J. C., "Characterization of Resilin-based Biomaterials with Tunable Mechanical Properties for Cartilage Engineering," SFB Annual Meeting, Denver, CO, April (2014)

Poster Presentation, Kim, Y., Renner, J. N., and Liu, J. C., "Controlling Cell Differentiation with Protein-engineering Microenvironments," SFB Annual Meeting, Denver, CO, April (2014)

Poster Presentation, Mansour, H., Brennan, M. J., Román, J. K., Wilker, J. J., and Liu, J. C., "Adhesive Elastin-based Proteins," 18th Annual Posters on the Hill sponsored by the Council on Undergraduate Research, Washington, D.C., April (2014)

Brennan, M. J., Román, J. K., Mansour, H., Renner, J. N., Lin, T., Su, R. S. C., Wilker, J. J., and Liu, J. C., "Adhesive Elastin-based Proteins as Soft Tissue Glues," Bioinspired Materials Gordon Research Conference, Newry, ME, June (2014)

Kim, Y., Renner, J. N., and Liu, J. C., "Controlling Cell Differentiation with Protein-engineered Microenvironments," Bioinspired Materials Gordon Research Conference, Newry, ME, June (2014)

ENRICO MARTINEZ

Visiting Professor

Ph. D., University of Notre Dame, 1972

Member, National Academy of Engineering, México

Research Areas: Biomass Torrefaction, Biodiesel Production from Nonconventional Sources

Selected Professional Activities

National Researcher, National System of Researchers, Mexico
Secretary, National Academy of Engineering-Mexico, Chemical Engineering Division, 2012-2014
Editor in Chief, Journal of Enzyme Engineering, October 2012-present
Specialized Reviewer, Revista Ingeniería Investigación y Tecnología, Universidad Nacional Autonoma de México
Evaluator, Project Proposals, CONACYT (Mexico), Program of Stimulus to Innovation, 2014

Teaching Contributions

Fall 2013 - CHE 30600 Design of Staged Separation Processes
Fall 2013 - CHE 43500 Chemical Engineering Laboratory
Spring 2014 - CHE 348000 Chemical Reaction Engineering
Spring 2014 - CHE 43500 Chemical Engineering Laboratory

Virginia Ewing, Secretary, Melissa Laguire, Secretary, and Enrico Martinez at the Alan H. Fox Unit Operations Laboratory Dedication

JOHN A. MORGAN

Professor

Director of Graduate Studies, School of Chemical Engineering (July 2014 onward)

Ph. D., Rice, 1999

Research Areas: Metabolic Engineering, Biocatalysis

Selected Professional Activities

Programming Coordinator, Long Range, AIChE, 2012-2014
Associate Editor, Bioprocess and Biostystems Engineering
Editorial Board, Frontiers in Plant Metabolism and Chemodiversity
Editorial Board, Frontiers in Plant Systems Biology
Panel Reviewer, Department of Energy, Young Investigator Program, 2013
Panel Reviewer, Department of Energy, BES Energy Center Program, 2014
Chair, Algal Biofuls, BIT's 3rd Annual World Congress of Bioenergy, 2013

Selected Invited Lectures

"Metabolic Flux Analysis of Photosynthetic Bacteria," Department of Chemical and Biological Engineering, University of British Columbia, Canada (2013)

Selected Publications

Fernie, A. R. and Morgan, J. A., "Analysis of Metabolic Flux Using Non-steady State Dynamics of Isotopes and Metabolic Modeling," *Plant Cell and Environment,* 36, 1738-1750 (2013)

Marshall-Colon, A., Sengupta, N., Rhodes, D., and Morgan, J. A., "Simulating Labeling to Estimate Kinetic Parameters for Flux Control Analysis," *Methods in Molecular Biology,* 1090, 211-222 (2014)

Young, J. D., Allen, D. K., and Morgan, J. A., "Isoptomer Measurement Techniques in Metabolic Flux Analysis," *Methods in Molecular Biology,* 1083, 85-108 (2014)

Selected Conference Presentations

O'Grady, J. and Morgan, J. A., "Using Metabolic Modeling to Examine Differences in the Metabolism of Chlorella Protothecoides Grown on Glucose or Glycerol for the Production of Lipids for Biodiesel," AIChE Annual Conference, San Francisco, CA, November (2013)

Associate Professor Julie Liu, Professor John Morgan and Assistant Professor Bryan Boudouris in a skit at the 2014 Senior Awards Banquet

ZOLTAN K. NAGY

Professor

Ph. D., Babes-Bolyai University, Romania, 2001

Research Areas: Process Modeling, Control and Optimization, Crystallization Systems Engineering, Product and Process Engineering for Batch and Continuous Pharmaceutical Systems, Process Analytical Technologies and Process Informatics Systems, Technology Enhanced Learning & Systems Pedagogy

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

Selected Invited Lectures

"Advanced Control of Pharmaceutical Manufacturing Processes," Lilly-Purdue Technology Day, Eli Lilly, Indianapolis, IN, September (2013)

"Recent Advances in the Modeling and Control of Batch and Continuous Crystallization Systems," Brystol Myers, Squibb, New Brunswick, NJ, June (2014)

Selected Publications

Nagy, Z. K., Fevotte, G., Kramer, H., and Simon, L. L., "Recent Advances in the Monitoring, Modelling and Control of Crystallization Systems," *Chemical Engineering Research and Design,* 91(10), 1903-1922 (2013)

Kim, K. K., Shen, D. E., Nagy, Z. K., and Braatz, R. D., "Weiner's Polynomial Chaos for the Analysis and Control of Nonlinear Dynamical Systems with Probabilistic Uncertainties," *IEEE Control Systems Magazine,* 33(5), 58-67, Historical Perspective Paper (2013)

Unadkat, H., Nagy, Z. K., and Rielly, C. D., "Investigation of Turbulence Modulation in Solid-liquid Suspensions Using Parallel Competing Reactions as Probes for Micro-mixing Efficiency, *Chemical Engineering Research and Design,* 91(11), 2179-2189 (2013)

Majumder, A. and Nagy, Z. K., "Fines Removal in a Continuous Plug Flow Crystallizer by Optimal Spatial Temperature Profiles with Controlled Dissolution," *AIChE Journal,* 59(12), 4582-4594 (2013)

Sanzida, N. and Nagy, Z. K., "Iterative Learning Control for the Systematic Design of Supersaturation Controlled Batch Cooling Crystallization Processes," *Computers and Chemical Engineering,* 59, 111-121 (2013)

Ridder, B. J., Majumder, A., and Nagy, Z. K., "Population Balance Model Based Multi-objective Optimization of a Multi-segment Multi-addition (MSMA) Continuous Plug Flow Antisolvent Crystallizer," *Industrial and Engineering Chemistry Research,* 53(11), 4387-4397 (2014)

Acevedo, D. and Nagy, Z. K., "Systematic Classification of Unseeded Batch Crystallization Systems for Achievable Shape and Size Analysis," *Journal of Crystal Growth,* 394, 97-105 (2014)

Yang, Y. and Nagy, Z. K., "Model-based Systematic Design Approach for Combined Cooling and Antisolvent Crystallization (CCAC) Systems," *Crystal Growth and Design,* 14(2), 687-698 (2014)

Simone, E., Saleemi, A. N., and Nagy, Z. K., "Ramon, UV, NIR, and Mid-IR Spectroscopy with Focused Beam Reflectance Measurement in Monitoring Polymorphic Transformations," *Chemical Engineering & Technology,* 37(8), 1305-1313 (2014)

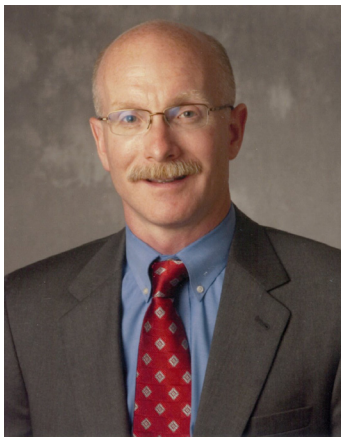
Simone, E., Saleemi, A. N., and Nagy, Z. K., "Active Polymorphic Feedback Control of Crystallization Processes Using a Combined Raman and ATR-UV/Vis Spectroscopy Approach," *Crystal Growth and Design,* 14(4), 1839-1850 (2014)

Simone, E., Saleemi, A. N., and Nagy, Z. K., "Application of Quantitative Raman Spectroscopy for the Monitoring of Polymorphic Transformation in Crystallization Processes Using a Good Calibration Practice Procedure," *Chemical Engineering Research and Design,* 92, 594-611(2014)

Ray, J., Smith, K. W., Bhaggan, K., Nagy, Z. K., and Stapley, A. G. F., "Characterization of High 1,3-Distearoyl-2-oleyl-sn-glycerol Content Stearins Produced by Acidolysis of High Oleic Sunflower Oil with Stearic and Palmitic Acids," *European Journal of Lipid Science and Technology,* 116, 532-547 (2014)

Talbat, G., Smith, K. W., Bhaggan, K., Ray, J., Nagy, Z. K., and Stapley, A. G. F., "Physical Characterization of Silica-treated Shea Stearin," *Lipid Technology,* 26(4), 83-86 (2014)

Abdulwahed, M. and Nagy, Z. K., "The Impact of Different Preparation Modes on Enhancing the Undergraduate Process Control Engineering Laboratory – a Comparative Study," *Computer Applications in Engineering Education,* 22(1), 110-119 (2014)



JOSEPH F. PEKNY

Professor

Interim Director, Burton D. Morgan Center for Entrepreneurship

Ph. D., Carnegie Mellon University, 1989

Research Areas: Systems Analysis, Combinatorial Optimization, Algorithm Engineering, Supply Chain Management, Planning and Scheduling Systems, Pharmaceutical Pipeline Management, Model-Based and Data Driven Management, Entrepreneurship and Innovation Systems, Real-Time Decision Systems

Selected Professional Activities

Interim Director of the Burton D. Morgan Center for Entrepreneurship at Discovery Park
Technical Advisor – Advanced Process Combinatorics, Inc.

Selected Invited Lectures

"Developing a 21st Century Entrepreneurial Ecosystem," 9th Forum on Innovation and Business, Medellin, Colombia, August (2014)

Selected Publications

Ye Chen, Joseph F. Pekny, and Gintaras V. Reklaitis, *"Integrated Planning and Optimization of the Clinical Trial Supply Chain System with Risk Pooling,"* Industrial and Engineering Chemistry Research, 52, 1, 152-165 (2013)

Xiaohui Liu, Eric G. O'Rear, Wallace E. Tyner, and Joseph F. Pekny, *"Purchasing versus Leasing: A Benefit-Cost Analysis of Residential Solar Panel PV Use in California,"* Renewable Energy, 66, 770-774 (2014)

Selected Conference Presentations

J. F. Pekny, "Process System Engineering", Presentation in Honor of the 70th Birthday of Professor G. V. Reklaitis, AIChE Annual Meeting, San Francisco, CA (2013)

Xiaohui Liu, James Dietz, Russell Lachance, Andrew Biaglow, Derrick Kearney, Sudheera Fernando, Ann Christine Catlin, Joseph Pekny, "A Laboratory Tool for Distributed Solar PV System Education", AIChE Annual Meeting, Atlanta, GA (2014)

Shisheng Huang, Xiaohui Liu, Lynette Cheah, Kristin Wood, James Dietz, Joseph Pekny, "The Effect of High-Penetration Renewable Energy on Electricity Prices and Emissions", AIChE Annual Meeting, Atlanta, GA (2014)

Professors John Morgan, Joe Pekny and Osman Basaran during an Industrial Advisory Council meeting

R. BYRON PIPES

John Leighton Bray Distinguished Professor
Director, Purdue Institute for Defense Innovation
Ph. D., University of Texas-Arlington, 1972

Member, National Academy of Engineering

Research Areas: Application of Nanotechnology to Engineering Disciplines including Aerospace, Composite Materials, 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, 2013-2014

Selected Publications

Goodsell , Johnathan E., Moon , Robert J., Huizar , Alionso and Pipes , R. Byron, "A Strategy for Prediction of the Elastic Properties of Epoxy-Cellulose Nanocrystal-Reinforced Fiber Networks," Nordic Pulp and Paper Research Journal, in press (2014).

Kravchenko, S., Kravchenko, O., Wortmann, M., Pietrek, M., Horst, P., Pipes, R.B, Composite Toughness Enhancement with Interlaminar Reinforcement, Composites: Part A, (2013), doi: http:// dx.doi.org/10.1016/j.compositesa.2013.07.006

Cadena, M., Misiego, R., Smith, K. C., Avia, A., Pipes, R. B., Reifenberger, R., and Raman, A., "Subsurface Imaging of Carbon Nanotube-polymer Composites Using Dynamic AFM Methods," Nanotechnology, 24, 135706 (2013)

Selected Books

Adams, D., Carlsson, L., and Pipes, R. B., "Experimental Characterization of Advanced Composite Materials," CRC Press, fourth edition (2014)

A graduate student at conducting research in a chemical engineering laboratory

VILAS POL

Associate Professor

Ph. D., University of Bar-Ilan, Israel, 2005

Brian Kelly Award, British Carbon Society, World Carbon Conference, Rio-Brazil, 2013

Research Areas: Electrochemical Engineering, Nano-Materials and Composites Technology, Colloids and Interfaces Science, Surface Chemistry, Environmental Technology, Electrochemical Energy Storage,

Selected Professional Activities

Editorial Review Board, Frontiers in Energy Research Journal, Switzerland

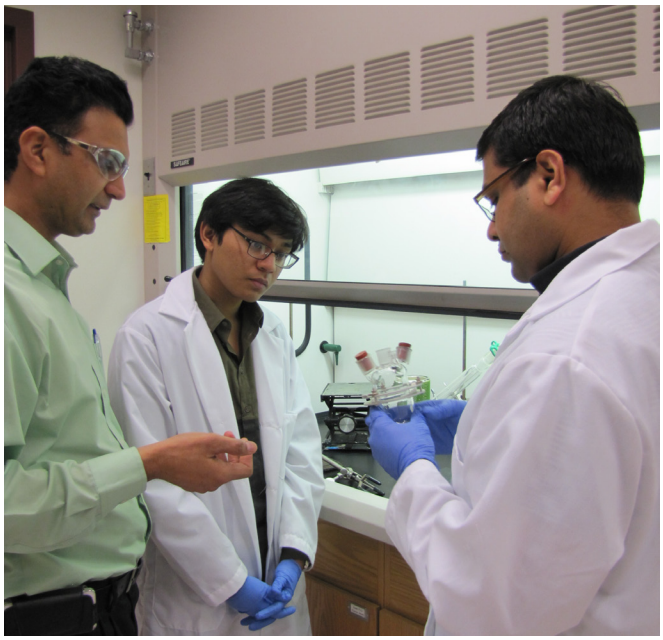
Selected Invited Lectures

"Energy Storage Materials for Rechargeable Batteries: Eminence and Prospects," International Center for Materials Nanoarchitectonics, National Institute for Materials Science (NIMS), Tskuba, Japan, November (2013)

"Sonochemically Derived Spherical Carbon Anodes: Cycle Life and Safety Characteristics," The 17th U.S. National Congress on Theoretical and Applied Mechanics, Michigan State University, East Lansing, Michigan, June (2014)

"Batteries," Duke Energy Foundation, Purdue University, West Lafayette, IN, June (2014)

"Emerging Carbon Architectures for Energy Storage Devices," Carbon 2014, World Conference on Carbon, Jeju, S. Korea, June (2014)



Associate Professor Vilas Pol with graduate student Arthur Dysart and post-doctoral research assistant Vinodkumar Etacheri

Selected Publications

Seisenbaeva, G. A., Nedelec, J. M., Daniel, G., Tiseanu, C., Parvulescu, V., Pol, V. G., Abrego, L., and Kessler, V. G., "Mesoporous Anatase TiO2Nanorods as Thermally Robust Anode Materials for Li-ion Batteries: Detailed Insight into the Formation Mechanism," *Chemistry – A European Journal,* 19, 17439, cover illustration (2013)

Pol, V. G., Yan, L., Dogan, F., Secor, E., Thackeray, M. M., and Abraham, D. P., "Pulsed Sonication for Alumina Coatings on High-Capacity Oxides: Performance in Lithium-ion Cells," *Journal Power Sources,* 258, 46-53 (2014)

Pol, V. G., Lee, E., Zhou, D., Dogan, F., Calderon-Moreno, J. M., and Johnson, C. S., "Spherical Carbon as a New High-Rate Anode for Sodium-ion Batteries," *Electrochem Acta,* 127, 61 (2014)

Deshmukh, S. A., Kamath, G., Pol, V. G., and Sankaranarayanan, S. K. R. S., "Kinetic Pathways to Control Hydrogen Evolution and Nanocarbon Allotrope Formation via Thermal Decomposition of Polyethylene," *Journal of Physical Chemistry,* 118, 9706-9714, front cover illustration (2014)

Pol, V. G. and Thackeray, M. M., "Sonochemical Deposition of Sn, SnO2 and Sb on Spherical Hard Carbon Electrodes for Li-Ion Batteries," *Journal of the Electrochemical Society,* 161, A777-A782 (2014)

Pol, V. G., Shrestha, L. K., and Ariga, K., "Tunable, Functional Carbon Spheres Derived from Rapid Synthesis of Resorcinol-formaldehyde Resins," *ACS Applied Materials and Interfaces,* 9, 10649 (2014)

Selected Conference Presentations

Pol, V. G., et al., "Structrual Evolution of Carbon Spheres Electrodes for Lithium Battery Applications," Carbon Rio 2013, Brazil, July (2013)

Intellectual Property

Pol, V. G., Thackeray, M. M., Mistry, K. K., and Erdemir, A., "Novel Materials as Additives for Advanced Lubrication," US086480819, JP2014-097002, D2014-0091, D2014-0095, patent disclousre filed on January – July (2014)

DORAISWAMI RAMKRISHNA

H. C. Peffer Distinguished Professor

Ph. D., University of Minnesota, 1965

Member, National Academy of Engineering

L. K. Doraiswamy Distinguished Lecture at ISU and NCL
2013 Sigma Xi Faculty Research Award, Purdue University

Research Areas: Applied Mathematics, Dispersed Phase Systems, Biochemical Engineering, Chemical Reaction Engineering

Selected Professional Activities

Special Editor, Special Issue of Processes

Selected Invited Lectures

"Dynamic Modeling of Metabolic Systems. The Cybernetic Approach," National Chemical Laboratory, Pune, India, September (2013)

"Metabolic Complexity. Is there Music Behind it?" Purdue University Sigma Xi Faculty Research Award Lecture, Purdue University, West Lafayette, IN, October (2013)

"Dynamic Modeling of Metabolism. The Cybernetic Approach," Department of Chemical Engineering, Ohio State University, Columbus, OH, October (2013)

Ramkrishna, D., "Towards Personalized Therapy: Biomolecular Complexitites Beyond Gene Expression," AIChE Annual Meeting, San Francisco, CA, November (2013)

Selected Publications

Shu, C. C., Ramkrishna, D., Chatterjee, A., and Hu, W. S., "Role of Intracellular Stochasticity in Biofilm Growth. Insights from Population Balance Modeling," *PLoS ONE,* November (2013), doi: 10.1371/journal.pone.0079196

Song, H. S., DeVilbiss, F., and Ramkrishna, D., "Modeling Metabolic Systems. The Need for Dynamics," *Current Opinion in Chemical Engineering,* 2, 373-382 (2013)

Song, H. S. and Ramkrishna, D., "Complex Nonlinear Behavior in Metabolic Processes," *Processess,* 1, 263-278 (2013) doi:10.3390/pr1030263

Ramkrishna, D., "The Neal Amundson Era. Rapid Evolution of Chemical Engineering Science," *AIChE Journal,* Special Issue, 59 (9) 3147–3157 (2013)

Singh, M. R. and Ramkrishna, D., "Dispersions in Crystal Nucleation and Growth Rates: Implications of Fluctuation in Supersaturation," *Chemical Engineering, Science,* 107, 102-113 (2014)

Ramkrishna, D. and Singh, M. R., "Population Balance Modeling. Current Status and Future Prospects," *Annual Reviews in Chemical and Biomolecular Engineering,* 5, 123-146 (2014)

Hwang, H., Feng Q., Yuan, C., Zhao, X., Ramkrishna, D., Liu, D., and Varma, A., "Lipase-Catalyzed Process for Biodiesel Production: Protein Engineering and Lipase Production," *Biotechnology and Bioengineering,* in press (2014)

Jayachandran, D., Ramkrishna, U., Skiles, J., Renbarger, J., and Ramkrishna, D., "Revitalizing Personalized Medicine: Respecting Biomolecular Complexities Beyond Gene Expression," *CPT: Pharmacometrics & Systems Pharmacology,* in press (2014)

Selected Conference Presentations

Parks, C., Singh, M., and Ramkrishna, D., "A Kinetic Approach Towards Polymorph Prediction. Indentifying Nucleation Kernels Specific to a Plymorph," Population Balance Modeling Conference, Bangalore, India, September (2013)

Devaraj, J. and Ramkrishna, D., "Predicting Clinical Responses for Chemotherapeutics: Population Balance Modeling for Personalized Treatment," Bangalore, India, September (2013)

Devaraj, J., Lainez, J. M., and Ramkrishna, D., "Tailoring Treatment for Individual Patients: Bayesian Modeling and Control of Chemotherapeutics," Paper #259h, AIChE Annual Meeting, San Francisco, CA, November (2013)

Singh, M. R., Parks, C., Tung, H. H., Bordawekar, S., and Ramkrishna, D., "Polymorph Prediction: A Kinetic Approach," Paper #451c, AIChE Annual Meeting, San Francisco, CA, November (2013)

DeVilbiss, F., Song, H. S., and Ramkrishna, D., "Developing and Information-Theoretic Framework for Model Selection in Systems Biology," Paper #490d, AIChE Annual Meeting, San Francisco, CA, November (2013)

Singh, M. R., Tung, H. H., Bordawekar, S., and Ramkrishna, D., "Morphology Control Through Cycles of Particle Breakage, Dissolution and Growth," Paper #536d, AIChE Annual Meeting, San Francisco, CA, November (2013)

Devaraj, J., Skiles, J., Renbarger, J., and Ramkrishna, D., "Early Prediction of Chemotherapy-Induced Toxicity: A Pharmacogenomics-Based Approach for Personalized Treatment," Paper #584ag, AIChE Annual Meeting, San Francisco, CA, November (2013)

Devaraj, J., Ghanty, T., and Ramkrishna, D., "Model-Based Decision Support Tool for Personalized Treatment of Cancer," Paper #684p, AIChE Annual Meeting, San Francisco, CA, November (2013)

Singh, M. R. and Ramkrishna, D., "Predicting Dispersions in Crystallization Process," Paper #694g, AIChE Annual Meeting, San Francisco, CA, November (2013)

GINTARAS V. "REX" REKLAITIS

Burton and Kathryn Gedge Distinguished Professor of Chemical Engineering, Deputy Director, NSF ERC on Structured Organic Particulate Solids

Ph. D., Stanford University, 1969

Member, National Academy of Engineering
Session in honor of GVR, 2013 AIChE Annual Meeting

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

Member Founding Committee & Director, AIChE , Pharmaceutical Discovery, Development & Manufacturing Forum Conference
Smart Manufacturing Leadership Coalition (non-profit), Purdue representative
Technical Advisory Committee, Foundations of Computer Aided Process Design, Cle Elun, WA, (2014)
Editorial Board Computers & Chemical Engineering, Pergamon Press/Elsevier Science
Editorial Board Computer Applications in Engineering Education
Editorial Board Journal of Pharmaceutical Innovation
Editorial Board Journal of Process Systems Engineering
Search Committee, NAE Section 3
Board Member, AIChE Foundation

Selected Invited Lectures

"Advances in Pharmaceutical Manufacturing," University of Connecticut, Department of Pharmaceutical Sciences, September (2013)

"Advances in Pharmaceutical Manufacturing," University of Iowa, College of Pharmacy, Iowa City, IA, December (2013)

"Process Systems Engineering Approach to Optimizing Drug Therapy," Carnegie Mellon University, Department of Chemical Engineering, Bayer Lecture, Pittsburgh, PA, April (2014)

Selected Publications

Chen, Y., Pekny, J., and Reklaitis, G. V., "Integrated Planning and Optimization of Clinical Trial Supply Chain System with Risk Pooling," *I&EC Research,* 52, 152-165 (2013)

Blau, G. E, Orcun, S., Lainez, J. M., Reklaitis, G. V., Suvannasankha, A., Fausel, C., and Anaissie, E. J., "Validation of a Novel Approach for Dose Individualization in Pharmacotherapy Using Gabapentin in a Proof of Principles Study," *Pharmacotherapy,* 33, 727-735 (2013)

Lainez-Aguirre, J. M. and Reklaitis, G. V., "Using a Stochastic Optimization Approach for the Design of Individualized Dosage Regimens," *AIChE Journal,* 59, 3296-3307 (2013)

Gupta, A., Giridhar, A., Venkatasubramanian, V., and Reklaitis, G. V., "Intelligent Alarm Management Applied to Continuous Pharmaceutical Tablet Manufacturing: An Integrated Approach," *I&EC Research,* 52, 12357-12368 (2013)

Austin, J., Gupta, A., McDonnell, R., Reklaitis, G.V., and Harris, M.T., "The Use of Near Infrared and Microwave Sensing to Monitor a Compaction Process," *Journal of Pharmaceutical Science,* 102(6), 1895-1904 (2013)

Blau, G. E, Orcun, S., Lainez, J. M., Reklaitis, G. V., Suvannasankha, A., Fausel, C., and Anaissie, E. J., "Comparison of an Assumption Free Bayesian Approach with Optimal Sampling Schedule to a Maximum A Posteriori Approach for Personalizing Cyclophosphamide Dosing," *Pharmacotherapy,* 34, 330-335 (2014)

Austin, j. Gupta, A., McDonnell, R., Reklaitis, G V, Harris, M T, "A Novel Microwave Sensor to determine particulate blend composition on line," Analytica Chimica Acta, 819, 82-93 (2014)

Hirshfield, L., Giridhar, A., Taylor, L. S., Harris, M. T., and Reklaitis, G. V., "Dropwise Additive Manufacturing of Pharmaceutical Products for Solvent-based Dosage Forms," *Journal of Pharmaceutical Science,* 103, 496-506 doi: 10.1002/jps.23803 (2014)

Selected Conference Presentations

"Generating Optimal Bayesian Designs for Dose Individualization," 26th European Conference on Operational Research, Rome, Italy, July (2013)

"Development of a Novel Microwave Sensor for Improved Process and Quality Control," Paper 661d, AIChE Annual Meeting, San Francisco, CA, November (2013)

"Knowledge Management in Pharmaceutical Manufacturing," Paper 710e, AIChE Annual Meeting, San Francisco, CA, November (2013)

"Real Time Process Management in a Continuous Pharmaceutical Manufacturing Process," AIChE Annual Meeting, San Francisco, CA, November (2013)

"Intelligent Alarm System for fault detection, diagnosis and mitigation," AIChE Annual Meeting, San Francisco, CA, November (2013)

"Drug-On-Demand: A Mini-Manufacturing Method Using Drop-On-Demand Technology," Paper 344b, AIChE Annual Meeting, San Francisco, CA, November (2013)

"Supervisory Control of a Drop-On-Demand Mini-Manufacturing System for the Production of Pharmaceuticals," Paper 344c, AIChE Annual Meeting, San Francisco, CA, November (2013)

"Optimized Startup and Shutdown Strategies for Continuous Pharmaceutical Manufacturing," Paper 465d, AIChE Annual Meeting, San Francisco, CA, November (2013)

"Continuous Operations in Pharmaceutical Solid Dosage Form Manufacturing: Dry Granulation Case Study," Paper 465a, AIChE Annual Meeting, San Francisco, CA, November (2013)

FABIO H. RIBEIRO

R. Norris and Eleanor Shreve Professor of Chemical Engineering

Ph. D., Stanford University, 1989

Elected AIChE Fellow, 2014

Research Areas: Surface Science and Kinetics of Heterogeneous Catalytic Reactions

Selected Professional Activities

Editor, Journal of Catalysis, 2013-2015

Director-at-large, North American Catalysis Society, 2013-2017

Selected Invited Lectures

"Water-gas Shift Catalysis Over Transition Metals Supported on Molybdenum Carbide," Symposium on Nanotechnology Applications in Energy, American Chemical Society, Division of Energy and Fuels, American Chemical Society 2013 Fall National Meeting and Exposition, Indianapolis, IN, September (2013)

"An Overview of the Heterogeneous Catalytic Kinetics for the Water-gas Shift Reaction," Department of Chemical Engineering, U. South Carolina, Columbia, SC, November (2013)

"Uma Visão Geral da Reaćão de Deslocamento Gás-água," Escola de Quimica, Univesidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil, December (2013)

Selected Publications

Lee, W. S., Akatay, C., Stach, E. A., Ribeiro, F. H., and Delgass, W. N., "Enhanced Reaction Rate for Gas Phase Epoxidation of Propylene using H2 and O2 by Cs Promotion of Au/TS-1," *Journal of Catalysis,* 308, 98-113 (2013)

Chia, M., O'Neill, B. J., Alamillo, R., Dietrich, P. J., Ribeiro, F. H., Miller, J. T., and Dumesic, J. A., "Bimetallic RhRe/C catalysts for the production of biomass-derived chemicals," *Journal of Catalysis,* 308, 226-236 (2013)

Zemlyanov, D., Klötzer, B., Gabasch, H., Smeltz, A., Ribeiro, F. H., Zafeiratos, S., Teschner, D., Schno¨rch, P., Vass, E., Ha¨vecker, M., Knop-Gericke, A., and Schlögl, R., "Kinetics of Palladium Oxidation in the mbar Pressure Range: Ambient Pressure XPS Study," *Topics in Catalysis,* 56, 885-895 (2013)

Hurt, M., Degenstein, J., Gawecki, P., Borton, D., Vinueza, N., Yang, L., Agrawal, R., Delgass, W. N., Ribeiro, F. H., and Kenttamaa, H., "On-Line Mass Spectrometric Methods for the Determination of the Primary Products of Fast Pyrolysis of Carbohydrates and for Their Gas-Phase Manipulation," *Analytical Chemistry,* 85(22), 10927-10934 (2013)

Pazmiño, J. H., Bai, C., Miller, J. T., Ribeiro, F. H., and Delgass, W. N., "Effects of Support on Sulfur Tolerance and Regeneration of Pt Catalysts Measured by Ethylene Hydrogenation and EXAFS," *Catalysis Letters,* 143, 1098-1107 (2013)

O'Neill, B. J., Jackson, D. H. K., Crisci, A. J., Farberow, C. A., Shi,F., Alba-Rubio, A. C., Lu, J., Dietrich, P. J., Gu, X., Marshall, C. L., Stair, P. C., Elam, J. W., Miller, J. T., Ribeiro, F. H., Voyles, P. M., Greeley, J., Mavrikakis, M., Scott, S. L., Kuech, T. F., and Dumesic, J. A., "Stabilization by Atomic Layer Deposition of Cu Catalysts for Liquid-Phase Reactions," *Angewandte Chemie,* 52, 13808-13812 (2013)

Venkatakrishnan, V. K., Degenstein, J. C., Smeltz, A. D., Delgass, W. N., Agrawal, R., and Ribeiro, F. H., "High-Pressure Fast-Pyrolysis, Fast-Hydropyrolysis and Catalytic Hydrodeoxygenation of Cellulose: Production of Liquid Fuel from Biomass," *Green Chemistry,* 16(2), 792-802 (2014)

Dietrich, P., Akatay, M. C., Sollberger, F., STach, E., Miller, J., Delgass, W. N., and Ribeiro, F. H., "Effects of Co Landing on Activity and Selectivity of PtCo Aqueous Phase Reforming Catalysts," *ACS Catalysis,* 4, 480-491 (2014)

Yi, J., Miller, J. T., Zemlyanov, D. Y., Zhang, R., Dietrich, P. J., Ribeiro, F. H., Suslov, S., and Abu-Omar, M. M., "Reusable Unsupported Rhenium Nanocrystalline Catalyst for Acceptorless Dehydrogenation of Alcohols via Novel y-C-H Activation," *Angewandte Chemie,* 53(3), 833-836 (2014)

Bates, S. A., Delgass, W. N., Ribeiro, F. H., Miller, J. T., and Gounder, R., "Methods for NH3 Titration of Brønsted Acid Sites in Cu-Zeolites that Catalyze the Selective Catalytic Reduction of NOx with NH3," *Journal of Catalysis,* 312, 26-36 (2014)

Bates, S. A., Verma, A. A., Paolucci, C., Parekh, A. A., Anggara, T., Yezerts, A., Schneider, W. F., Miller, J. T., Delgass, W. N., and Ribeiro, F. H., "Identification of the Active Cu Site in Standard Selective Catalytic Reduction with Ammonia on Cu-SSZ-13," *Journal of Catalysis,* 312, 87-97 (2014)

Verma, A. A., Bates, S. A., Anggara, T., Paolucci, C., Parekh, A. A., Kamasamudram, K., Yezerts, A., Miller, J. T., Delgass, W. N., Schneider, W. F., and Ribeiro, F. H., "NO Oxidation: A Probe Reaction on Cu-SSZ-13," *Journal of Catalysis,* 312, 179-190 (2014)

Selected Conference Presentations

Ribeiro, F. H., "Determination of Effect of the Oxide Support for the Water-gas Shift Reaction Over Supported Au and Pt Nanoparticles," Keynote Lecture, The Role of Oxides in Catalysis: Structure, Selectivity and Stability, American Chemical Society 2013 Fall National Meeting and Exposition, Indianapolis, IN, September (2013)

Ribeiro, F. H., "Activity Relationships Between Aqueous Phase Reforming and Water Gas Shift," Keynote Lecture, Catalysis and Catalysts for Energy and Fuels, Division of Energy and Fuel, American Chemical Society 2013 Fall National Meeting and Exposition, Indianapolis, IN, September (2013)

Yohe, S., Degenstein, J., Venkatakrishnan, V. K., Choudhari, H., Mehta, D., Hurt, M., Murria, P., Dow, A., Easton, M., Kenttämaa, H., Delgass, W. N., Agrawal, R., and Ribeiro, F. H., "Fast-Hydropyrolysis and Catalytic Hydrodeoxygenation for Conversion of Biomass to Drop-in-Fuels," Keynote Lecture, 53rd Brazilian Congress on Chemistry, Rio de Janeiro, RJ, Brazil, October (2013)

JEFFREY SIIROLA

Professor of Engineering Practice

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

Member, National Academy of Engineering

Research Areas: Chemical Process Synthesis, Computer-Aided Conceptual Process Engineering, Engineering Design Theory and Methodology, Chemical Process Development and Technology Assessment, Resource Conservation and Recovery, Sustainable Development and Growth, Carbon Management, Chemical Engineering Education

Selected Professional Activities

Board of Directors, ABET
Secretary, ABET
Executive Committee, ABET
Committee Chair, AIChE Education and Accrediation
Society Liaison, ABET AIChE
Strategic Plan Review Task Force, AIChE
Consulting Editors Board, AIChE Journal
Trustee and Conferences Chair, CACHE
Editorial Advisory Board, Computers and Chemical Engineering
External Advisory Board, Georgia Institute of Technology, School of Chemical and Biomolecular Engineering
Advisory Committee, Illinois Institute of Technology, Chemical and Biological Engineering Department
Science Fair Judge, Mother of Sorrows School, Los Angeles, CA, Engineering is Elementary Mentor, STEM Outreach
Board of Advisors, Tennessee Technological University, Chemical Engineering
Advisory Board, University of California-Los Angeles, Chemical and Biomolecular Engineering
Advisory Council, University of Delaware, Chemical Engineering
Advisory Board, University of Delaware, Energy Institute
Advisory Board, University of Delaware, Catalyst Center for Energy Innovation
Advisory Board, University of South Carolina, Chemical Engineering
Advisory Board, University of Utah, Chemical Engineering
Industrial Career Panel, National Science Foundation, Process and Reaction Engineering
Review Coordinator, National Research Council, Establishing and Promoting a Culture of Safety in Academic Laboratory Research
Search Committee, National Academy of Engineering, Chemical Engineering Section
Advisory Board, US Department of Energy Carbon Capture Simulation Initiative Industrial

Selected Invited Lectures

"Role of Process Integration in Process Synthesis," Honeywell UOP, Des Plaines, IL, March (2014)

"Synthesis of Separation Systems for Nonideal Mixtures," Honeywell UOP, Des Plaines, IL, March (2014)

"The Impact of Disruptive Change in Feedstock Price and Availability on Chemical Process Development," Center for Advanced Process Decision-making Annual Review, Carnegie Mellon University, Pittsburgh, PA, March (2014)

"The Rollercoaster Ride of Natural Gas as a Chemical Industry Fuel and Feedstock," Department of Chemical Engineering, University of California-Los Angeles, Los Angeles, CA, March (2014)

Selected Publications

Siirola, J. J., "The Impact of Shale Gas in the Chemical Industry," *AIChE Journal,* 60(3), 810-819, perspective article (2014)

Selected Conference Presentations

Siirola, J. J., "The Impact of Disruptive Change in Feedstock Price and Availability on Chemical Process Development," Council for Chemical Research Shale Gas Workshop, Pittsburgh, PA, October (2013)

Siirola, J. J., "Issues and Challenges in Teaching Chemical Process Design," AIChE Annual Meeting, San Francisco, CA, November (2013)

Lewis, R. S. and Siirola, J. J., "ABET Update," AIChE Annual Meeting, Sanfrancisco, CA, November (2013)

Siirola, J. J., "The Impact of Disruptive Change in Feedstock Price and Availability on Chemical Process Development," Keynote, Oak Ridge National Laboratory Natural Gas Workshop, Oak Ridge, TN, February (2014)

Siirola, J. J., "The Impact of Disruptive Change in Feedstock Price and Availability on Chemical Process Development," Shale Gas Monetization Workshop, Montgomery, TX, March (2014)

Teaching Contributions

Spring 2013 - CHE 450000 "Design & Analysis of Processing Systems"
Spring 2013 - CHE 59700 "Special Topics in Chemical Engineering"

KENDAL T. THOMSON

Associate Professor

Ph. D., University of Minnesota, 1999

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

Selected Invited Lectures

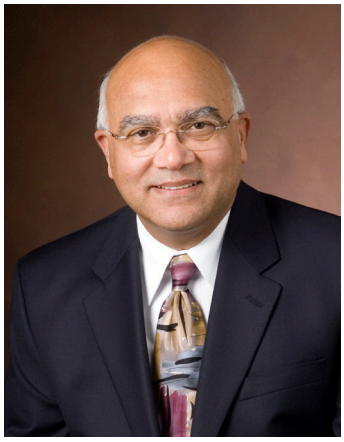
"Alkane Activation Mechanisms for Light Alkane Aromatization: Perspectives from Computational Modeling," UOP Invited Lecture, Des Plaines IL, December (2013)

"Combined Group Contribution and Structure-Activity Relations for Ga/H-[Al] ZSM-5 Catalyzed Dehydrogenation of Alkanes Using DFT," UOP Invited Lecture, Des Plaines IL, December (2013)

Selected Teaching Activities

Fall 2013 - CHE 37700 Momentum Transfer
Fall 2013 - CHE 69700 Special Topics in Chemical Engineering
Spring 2014 - Che 32000 Statistical Modeling & Quality Enhancement

Carmen Valverde-Paniagua, Yanssen Tandy (BSChE 2014) and Chemical Engineering Graduate Student Nicole Devlin, winners of the 2013 Student Soybean Product Innovation Competition, show off a 3-D printed shark made from the soy-based filament that they created



ARVIND VARMA

R. Games Slayter Distinguished Professor of Chemical Engineering
Jay and Cynthia Ihlenfeld Head of Chemical Engineering
Ph.D., University of Minnesota, 1972

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
Editorial Board, Industrial & Engineering Chemistry Research
Member, International Committee, AIChE
Member, Council of Fellows, AIChE
Chair, Awards Committee, I&EC Division, ACS
Chair, Engineering Research Council Awards Cmte, ASEE
Member, Advisory Committee, Department of Chemical and Biological Engineering, University of Colorado-Boulder
Member, Board of Judges for 2013 Kirkpatrick Award
Member, International Advisory Committee, 9th World Congress of Chemical Engineering, Seoul, Korea, August 2013
Member, International Advisory Committee, International Symposium on Self-Propagating High-Temperature Synthesis - 13, South Padre Island, TX, October 2013
Co-Organizer, Indo-US Chemical Engineering Conference on Energy, Environment and Sustainability, Mumbai, December 2013
Member, Scientific Committee, ISCRE-23, Bangkok, Thailand, September 2014

Selected Invited Lectures

"Topics In Chemical and Catalytic Reaction Engineering," The Dow Chemical Company, Freeport, TX, July (2013)

"New Methods to Generate Hydrogen from Boron Compounds and Water for Fuel Cell Applications," Korea Institute of Science & Technology, Seoul, Korea, August (2013)

"Topics In Chemical and Catalytic Reaction Engineering," 50th Anniversary Symposium, Korea University, Seoul, Korea August (2013)

"Purdue University & School of Chemical Engineering - Overview," Kazan National Research Technical Univ., Kazan, Russia, September (2013)

"Selected Topics Related to Energy and Chemicals," National Chemical Laboratory, Pune, India, January (2014)

"Selected Topics Related to Energy and Chemicals," Northwestern University, Evanston, IL, March (2014)

"Current and Recent Research in Catalysis and Reaction Engineering," UOP, Des Plaines, IL, March (2014)

Selected Publications

Xiao, Y., Xiao, G., and Varma, A., "A Universal Procedure for Crude Glycerol Purification from Different Feedstock in Biodiesel Production: Experimental and Simulation Study," *Industrial & Engineering Chemistry Research,* 52, 14291-14296 (2013)

Lee, S. B. and Varma, A., "Kinetic Study of Biphasic Aldol Condensation of n-Butyraldehyde Using Stirred Cell," *Chemical Engineering Science*, 104, 619-629 (2013)

Ghose, R., Hwang, H. T., and Varma, A., "Oxidative Coupling of Methane Using Catalysts Synthesized by Solution Combustion Method: Catalyst Optimization and Kinetic Studies," *Applied Catalysis A: General,* 472, 39-46 (2014)

Hwang, H. T., Qi, F., Yuan, C., Zhao, X., Ramkrishna, D., Liu, D., and Varma, A., "Review: Lipase-Catalyzed Process for Biodiesel Production: Protein Engineering and Lipase Production," *Biotechnology and Bioengineering,* 111, 639-653 (2014)

Honda, G., Gase, P., Hickman, D., and Varma, A., "The Hydrodynamics of Trickle Bed Reactors with Catalyst Support Particle Size Distributions," *Industrial & Engineering Chemistry Research,* 53, 9027−9034 (2014)

Hwang, H.T. and Varma, A., "Hydrogen Storage for Fuel Cell Vehicle Applications," *Current Opinion in Chemical Engineering,* 5, 42-48 (2014)

Gao, D., Schweitzer, C., Hwang, H. T., and Varma, A., "Conversion of Guaiacol on Noble Metal Catalysts: Reaction Performance and Deactivation Studies," doi: http://dx.doi.org/10.1021/ie500495z (2014)

Selected Conference Presentations

Invited: "Solution Combustion Synthesis of Advanced Materials: Principles and Applications," 9th World Congress of Chemical Engineering (WCCE-9), Seoul, Korea, August (2013)

Keynote: ""New Methods to Generate Hydrogen from Boron Compounds for Vehicle Applications," 9th World Congress of Chemical Engineering (WCCE-9), Seoul, Korea, August 2013.

"Catalytic Hydrodeoxygenation of Guaiacol," ACS Annual Meeting, Indianapolis, IN, September 2013

Invited: "Solution Combustion Synthesis of Advanced Materials: Principles and Applications," AIChE Annual Meeting, San Francisco, CA, November (2013)

"Biphasic Aldol Condensation of N-butyraldehyde: Kinetic Study Using Stirred Cell," AIChE Annual Meeting, San Francisco, CA, November (2013)

"A Universal Procedure for Crude Glycerol Purification from Different Feedstock in Biodiesel Production: Experimental and Simulation Study," AIChE Annual Meeting, San Francisco, CA, November (2013)

"Hydrodynamics of Trickle-Bed Reactors with Particle Size Distributions," AIChE Annual Meeting, San Francisco, CA, November (2013)

N.H. LINDA WANG

Professor

Ph.D., University of Minnesota, 1978

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

Professional Activities

Session Chair, "Novel Adsorbents," Interinational Symposium on Preparative and Process Chromatography (PREP) 2013

Chair, "Gerhold and Kunesh Plenary Session on Separations," 2013 AIChE Meeting

Chair, Separations Division, AIChE, 2013

Advisory Committee, AIChE Separations Division

Selected Invited Lectures

"Analysis of Dynamic Phenomena in Liquid Chromatography Systems with Reactions in the Mobile Phase," PREP, Boston, MA, July (2013)

"Simulated Moving-Bed Technologies for Multi-component Separations with High-Purity and High-Yield," 7th Sino US Conference in Chemical Engineering, Beijing, China, October (2013)

Selected Publications

Tsui, H. W., Wang, N. H. L., and Franses, E. I., "Chiral Recognition Mechanism of Acyloin-Containing Chiral Solutes by Amylose Tris[(S)-α-methylbenzylcarbamate]," *Journal of Physical Chemistry B,* 117(31), 9203–9216 (2013)

Ling, L., P. L. Chung, Youker, A., Stepinski, D. C., Vandegrift, G. F., and Wang, N. H. L., "Capture Chromatography for Mo-99 Recovery from Unranyl Sulfate Solutions: Minimum-Column-Volume Design Method," *Journal of Chromatography A,* 1309, 1-14 (2013)

Tsui, H.W., Franses, E.I., and Wang, N.H.L., "Effect of Alcohol Aggregation on the Retention Factors of Chiral Solutes with an Amylose-Based Sorbent: Modeling and Implications for the Adsorption Mechanism," *Journal of Chromatography A,* 1328, 52-65 (2014)

Soepriatna, N, Wang, N. H. L., and Wankat, P. C., "Standing Wave Design of a Four-zone Thermal SMB Fractionator and Concentrator (4-zone TSMB-FC) for Linear Systems," *Adsorption Journal,* 20, 37-52, (2014)

Selected Book Chapters

Chin, C. and Wang, N. H. L. *"Simulated Moving Bed Technology for Biorefinery Applications,"* Chapter 7,b167-202, in Separation and Purification Technologies in Biorefineries, S. Ramaswamy, H-J Huang, and B. V. Ramarao (Eds.), Wiley (2013)

Ling, L. and N.-H. L. Wang, *"Analysis of Dynamic Phenomena in Liquid Chromatography Systems with Reactions in the Mobile Phase,"* Advances in Chromatography, vol. 52, E. Grushka and N. Grinberg (Eds), CRC Press, Taylor and Francis, Boca Raton, FL (2014)

Selected Conference Presentations

Tsui, H. W., Franses, E. I., and Wang, N. H. L., "New Retention Models and Interaction Mechanisms of Monovalent Solutes with Amalyose Tris[(S)-α-methylbenzylcarbamate] Sorbent," PREP 2013 - 26th International Symposium on Preparative and Process Chromatography, Cambridge, MA, July (2013)

Poster Presentation, Tsui, H. W., Franses, E. I., and Wang, N. H. L., "Effect of Alcohol Modifier on the Retention Factors of Chiral Solutes with an Amylose-Based Sorbent: Modeling and Implications for the Interaction Mechanism," PREP 2013 - 26th International Symposium on Preparative and Process Chromatography, Cambridge, MA, July (2013)

Tsui, H. W., Wang, N. H. L., and Franses, E. I., "Chireal Recognition Mechanism of Amide-Containing Chiral Solutes by Amylose Tris[(S)-alpha-methylbenzylcarbamate] Sorbent," PREP 2013 - 26th International Symposium on Preparative and Process Chromatography, Cambridge, MA, July (2013)

Tsui, H. W., Wang, N. H. L., and Franses, E. I., "Effects of Alcohol Modifier Aggregation and Complexation on the Retention Factors of Chiral Solutes with an Amylose-Based Sorent," AIChE Annual Meeting, San Francisco, CA, November (2013)

Tsui, H. W., Wang, N. H. L., and Franses, E. I., "Chiral Recognition Mechanism of Amide-Containing Chiral Solutes by Amylose Tris[(S)-alpha-methylbenzylcarbamate] Sorbent," AIChE Annual Meeting, San Francisco, CA, November (2013)

Ling, L. and Wang, N. H. L., "Analysis of the Dynamic Phenomena in Liquid Chromatography Systems with Reactions in the Mobile phase," AIChE Annual Meeting, San Francisco, CA, November (2013)

Wang, N. H. L., "Multi-Stage Thermal SMB Concentrator; An Adsorptive Process for Wastewater Treatment and Solute Recovery," AIChE Annual Meeting, San Francisco, CA, November (2013)

Ling, L., Kao, L. W., and Wang, N. H. L., "A General Graphical Design Method for Affinity Chromatorgraphy," AIChE Annual Meeting, San Francisco, CA, November (2013)

PHILLIP C. WANKAT

Clifton L. Lovell Distinguished Professor

Ph. D., Princeton University, 1970

Research Areas: Adsorption Operations, Large-Scale Chromatography, Distillation, Engineering Education

Selected Professional Activities

Co-Editor, Chemical Engineering Education, 2014-present
Associate Editor, Chemical Engineering Education, 1995-2013
Editorial Board, Separation Science and Technology, 1977-present
Editorial Board, Adsorption, 1993-2013
Editorial Board, Separation and Purification Reviews, 1998-2014
International Editorial Advisory Board, Journal of STEM Education, 2001-present
Contributing Editor, College Teaching, 2006-present
Member, AIChE, NPC, Group 4, Education

Awards

Session 183, "Inspired by Phil Wankat," AIChE Annual Meeting, San Francisco, CA, November (2013)

Selected Invited Lectures

"Tools for Academic Success," New Faculty Seminar, University of California-Riverside, Riverside, CA, November (2013)

"Academic Careers for Effective, Efficient Grad Students & Post-Docs," Chemical & Environmental Engineering, University of California-Riverside, Riverside, CA, November (2013)

Dr. Jennifer Curtis (BSChE '83, OChE 2013) with Professor Wankat

"Improving Distillation is Not an Oxymoron: Columns with Vapor Feed," 16th Johansen-Crosby Lectures, Department of Chemical Engineering and Materials Science, Michigan State University, Lansing, MI, April (2014)

"Engineering Education: The Last Fifty Years and the Next Ten," 16th Johansen-Crosby Lectures, Dept. Chemical Engineering and Materials Science, Michigan State University, Lansing, MI, April (2014)

Selected Publications

Soepriatna, N., Wang, N. H. L, and Wankat, P. C., "Standing Wave Design of a Linear 4-Zone Thermal SMB Fractionator and Concentrator," *Adsorption,* 20, 37-52 (2014) (invited)

Wankat, P. C., "Improved Rectifying Columns," *Industrial & Engineering Chemistry Research,* 53(22), 9158-9168 (2014)

Wankat, P. C., Williams, B., and Neto, P., "Engineering Education Research in EJEE and JEE: Citation and Reference Discipline Analysis," *European Jounral of Engineering Education,* 39(1), 7-17 (2014) (invited)

Williams, B., Neto, P., and Wankat, P. C., "Taking a Snapshot: Four Bibliometric Indicators to Track Engineering Education Research Evolution," *International Journal of Engineering Pedagogy (iJEP),* in press (2014)

Selected Conference Presentations

Wankat, P. C., Williams, B., and Neto, P., "Keynote: Past, Present and Future of Engineering Education," SEFI Abstract book (complete paper included), SEFI Conference, Leuven Belgium, September (2013)

Soepriatna, N., Wang, N. H. L., and Wankat, P. C., "Multi-Stage Thermal Simulated Moving-Bed Concentrator: An Adsorptive Process for Wastewater Treatment and Solute Recovery," AIChE Meeting, San Francisco, CA, paper 601i, November (2013)

Williams, B., Neto, P., and Wankat, P. C., "Is Engineering Education Research Global? The Answer May Surprise You," Proceedings ASEE 2014 Annual Meeting, paper 8817, Indianapolis, IN, June (2014)

Books

Wankat, P. C. and Oreovicz, F. S., "Teaching Engineering, 2nd Edition," Purdue University Press, West Lafayette, IN, in press (2014)

YOU-YEON WON

Professor

Ph. D., Minnesota, 2000

Research Areas: Cancer Drug/Gene Delivery and Theragnosis/Theranosis, Interfacial Phenomena Involving Polymers, Polyelectrolytes, Block Copolymers, Colloids, Biomacromolecules

Selected Professional Activities

Organizer/Chair, KIChE US Chapter Forum, AIChE Annual Meeting, 2014
Organizer/Chair, Emerging Topics in Biochemical Engineering, US-Korea Conference (UKC), 2014
President, Korean Institute of Chemical Engineers (KIChE), US Chapter, 2014

Selected Invited Lectures

"Assisted Gene Delivery," Department of Chemical and Biomolecular Engineering, University of Illinois, Urbana-Champaign, IL, November (2014)

"A Photo-Degradable Gene Delivery System for Enhanced Nuclear Gene Transcription," Minnesota Block Polymers Symposium, Departments of Chemical Engineering and Materials Science and Chemistry, University of Minnesota, Minneapolis, MN, April (2014)

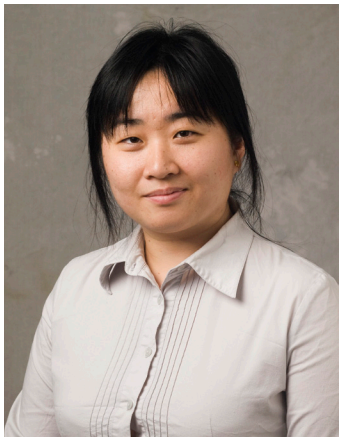
Selected Publications

Tsouris, V., Joo, M. K., Kim, S. H., Kwon, I. C., and Won, Y. Y., "Nano Carriers That Enable Co-Delivery of Chemotherapy and RNAi Agents for Treatment of Drug-Resistant Cancers," *Biotechnology Advances,* 32(5), 1037-1050 (2014)

Lee, H., Tsouris, V., Lim, Y., Mustafa, R., Choi, Y. H., Park, H. W., Meron, M., Lin, B., and Won, Y. Y., "Macroscopic Lateral Heterogeneity Observed in a Laterally-Mobile Immiscible Mixed Polyelectrolyte/Neutral Polymer Brush," *Soft Matter,* 10, 3771-3782 (2014)

Lee, H., Kim, Y., Schweickert, P. G., Konieczny, S. F., and Won, Y. Y., "A Photo-Degradable Gene Delivery System for Enhanced Nuclear Gene Transcription," *Biomaterials,* 35(3), 1040-1049 (2014)

Professor You-Yeon Won with Dr. Nicholas Peppas and Associate Professor Julie Liu



CHONGLI YUAN

Assistant Professor

Ph. D., Cornell University, 2007

Lung Cancer Concept Award, CDMRP

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

Selected Professional Activities

Session Chair, Charged and Ion-containing Polymer, AIChE, 2013
Session Co-chair, Bio-nanotechnology, AIChE, 2013
Session Co-chair, Structure and Properties in Polymers, AIChE, 2013

Awards

Lung Cancer Concept Award, CDMRP

Selected Invited Lectures

"Seeking the Critical Traits of Epigenetic Modifications for Early-Stage Disease Diagnosis," Chemical Engineering, Cornell University, Ithaca, NY, February (2014)

"Seeking the Critical Traits of Epigenetic Modifications for Early-Stage Disease Diagnosis," Department of Physics, George Washington University, Washington, D.C., April (2014)

Selected Publications

Andresen, K., Jimenez-Useche, I., Howell, S., Yuan, C., and Qiu, X., "Solution Scattering and FRET Studies on Nucleosomes Reveal DNA Unwrapping Effects of H3 and H4 Tails," *PLoS ONE,* 8(11), e78587 (2013)

Jimenez-Useche, I., Shim, D., Yu, J., and Yuan, C., "Unmethylated and Methylated CpG Dinucleotides Distinctively Regulate the Physical Properties of DNA," *Biopolymers,* 101, 517-524 (2014)

Kim, S. K., Matthew, C., and Yuan, C., "One-pot Approach for Examining the DNA Methylation Patterns Using an Engineered Methyl-probe," *Biosensors and Bioelectronics,* 58, 333-337 (2014)

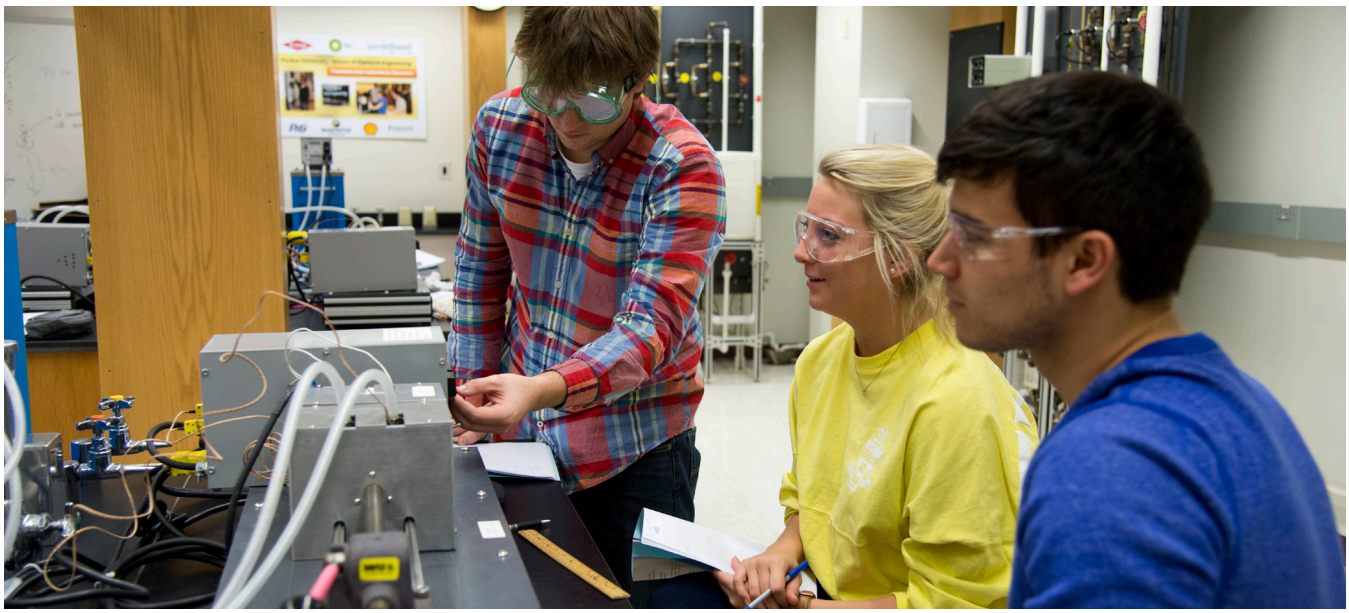
Hwang, H. T., Feng, Q., Yuan, C., Zhao, X., Ramkrishna, D., Liu, D., and Varma, A., "Lipase-catalyzed Process for Biodiesel Production: Protein Engineering and Lipase Production," *Biotechnology and Bioengineering,* 111, 639-653 (2014)

Jimenez-Useche, I., Nurse, N., Tian, Y., Kansara, B., Shim, D., and Yuan, C., "DNA Methylation Effects on Tetra-nucleosome Compaction and Aggregation," *Biophysical Journal,* in press (2014)

Selected Conference Presentations

Kim, S. and Yuan, C., "Development of a DNA Methylation Sensor Based On Fluorescence Correlation Spectroscopy," AIChE Annual Meeting, San Francisco, CA, November (2013)

Jimenez-Useche, I. and Yuan, C., ""DNA CpG methylation patterns distinctively modulate chromatin structure," AIChE Annual Meeting, San Francisco, CA, November (2013)



Undergraduate students in the Fundamentals Laboratory

GRADUATE DEGREES AWARDED

PH.D. DEGREES

August 2013

Gaik, Steven
A High Throughput Materials Discovery Approach for Investigation Solution Processed Solar Cell Absorber Layers
(Hillhouse)

Gupta, Anshu
Intelligent Alarm System Management and Value of Information Analysis Applied to Continous Pharmaceutical Manufacturing
(Reklaitis)
Air Products, Allentown, PA

Hirshfield, Laura
Development of Dropwise Additive Manufacturing of Pharmaceutical Products
(Reklaitis
Post Doc, Oregon State University, Chemical & Biological Engineering, Corvallis, OR

Kim, Jaewoo
Multi-Axial Deformation and Dynamics in Glassy Polymer and its Nonlinear Viscoelastic Properties
(Caruthers)

Lee, Hoyoung
Identification of Optimal Intracellular Location and Time for DNA Release from Polyration/DNA Complexes in Gene Transfection
(Won)
Petrochemicals & Polymers R&D, Daejeon, Korea

Sambath, Krishnaraj
Dynamics of Drop Disintegration and Coalescence with and without Electric Fields
(Basaran)
Chevron Corporation, Houston, TX

Suchomel, Mark
Direct State-of-Charge Determination for Lithium Ion Batteries
(Caruthers/Pekny)
BP America, Naperville, IL

PH.D. DEGREES

December 2013

Bates, Shane
Spectroscopic and Kinetic Study of Copper-Exchanged Zeolites for the Selective Catalytic Reduction of Nox with Ammonia
(Ribeiro)
Albemarle Corporation, Baton Rouge, LA

Ghose, Ranjita
Oxidative Coupling of Methane using Catalysts Synthesized by Solutiom Combustion Method
(Varma)
ExxonMobil Chemical Co., Baytown, TX

David, Anand
Effect of Manufacturing Conditions on the Performance of Lithium-Ion Batteries
(Caruthers)
3M Company, Maplewood, MN

Jimenz-Useche, Isabel
Effects of DNA Methylation Pattern on the Chromatin Structure
(Yuan)
Purdue University, School of Engineering Education, West Lafayette, IN

Mallapragada, Dharik
Energy Systems Analysis for a Solar Economy
(Agrawal/Delgass/Ribeiro)
Sabic, Sugar Land, TX

Ogebule, Oluwaseyi
The Effects of Composition on the Linear and Nonlinear Mechanical Properties of Particulate Filled Elastomers
(Caruthers)
Intel Corp, Rio Rancho, NM

Son, Sang Ha
Development of Quantitative FT-IR Methods for Analyzing the Cure Kinetics of Epoxy Resins
(Caruthers)
LG Chem Research Park, Daejeon, South Korea

Tsui, Huang-Wei
Elucidation of Chiral Recognition Mechanisms of Solutes by Amylose TRIS[(S)-alpha-Methylbenzylcarbamate] Sorbent
(Franses/Wang)
Post Doc, National Taiwan University

Yadav, Gautum
Design and Assembly of Nanostructured Complex Metal Oxide Materials for the Construction of Batteries and Thermoelectric Devices
(Wu)
Post Doc, CUNY, New York, NY

Yohe, Sara.
High-Pressure Vapor-Phase
(Agrawal, Delgass, Ribeiro)
ExxonMobil, Clinton, NJ

PH.D. DEGREES

May 2014

Al-Musleh, Easa
Efficient Processes for Power Generation and Energy Storage
(Agrawal/Reklaitis)
Qatar University, Doha-Qatar

Austin, John
Investigation Into the Use of Microwave Sensors to Monitor Particulate Manufacturing Processes
(Harris)
Gilead Sciences, Foster City, CA

Freer, Alex
Surface Mineralization and Characterization of Tobacco Mosaic Virus Biotemplated Nanoparticles
(Harris)
ExxonMobil, Philadelphia, PA

Park, Hye Yeon
Novel Nanoparticles Synthesis and Nano-Ink Film For Phovoltaic Applications
(Agrawal)

Smith, Kathryn
Particle Adhesion in Nano-Structured Microelectronics Systems
(Beaudoin)

Walker, Bryce
Low Cost Photovoltaics Through Nanotechnology
(Hillhouse/Agrawal)
Intel, Hillsboro, OR

M.S. DEGREES

August 2013

Bauman, Michael
(Boudouris)
Whirlpool Corporation, Benton Harbor, MI

Parekh, Atish
Mechanistic Study of NO Oxidation in Copper Zeolites
(Ribeiro/Delgass)
Continuing to Ph.D., Purdue University

Venkatakrishnan, Vinod Kumar M.S.
(Ribeiro/Agrawal)
Continuing to Ph.D., Purdue University

Verma, Anuj
(Ribeiro/Delgass) August 2013
Continuing to Ph.D., Purdue University

December 2013

Tsouris, Vasilios
A Nano-Carrier that Enables Co-Delivery of Chemotherapy and siRNA Agents
(Won)

May 2014

Adigun, Oluwamayowa
Mechanistic Study of the Hydrothermal Reduction of Palladium on the Tobacco Mosaic Virus
(Harris)
Continuing to Ph.D., Purdue University

Graeser, Brian
(Agrawal)
Continuing to Ph.D., Purdue University

Huff, Josh
(Agrawal)
Continuing to Ph.D., Purdue University

Joglekar, Chinmay
CTSSe Thin Film Solar Cells: Surface Treatment
(Agrawal)

Louvier, Matt
(Venkatasubramanian/Reklaitis)
Continuing to Ph.D., Purdue University

GRADUATE STUDENT ENROLLMENT

LAST NAME	FIRST NAME	ADVISOR(S)	UG/MS INSTITUTION	START DATE
Abbou Kaoutar	Oucherif	Litster, Taylor	Central New Mexico Community College	Spring 2010
Acevedo	David	Nagy	University of Puerto Rico	Fall 2012
Adigun	Oluwamayowa	Harris	Vanderbilt University	Fall 2012
Albarracin Caballero	Jonatan	Wu	Universidad Industrial De Santander	Fall 2013
Al-Musleh	Easa	Agrawal	Qatar University	Fall 2008
Anthony	Christopher	Harris, Basaran	University of Arizona - Tucson	Fall 2012
Austin	John	Harris	Worcester Polytechnic Institute	Fall 2010
Baradwaj	Aditya	Boudouris	Georgia Institute of Technology	Fall 2011
Bates	Shane	Ribeiro	Pennsylvania State University	Fall 2008
Bhat	Anuradha	Reklaitis	Indian Institute of Technology	Fall 2011
Boyne	Robert	Agrawal	University of Colorado	Fall 2013
Brennan	Mary	Liu	Purdue University	Fall 2010
Brew	Kevin	Agrawal	University of Delaware	Fall 2010
Bynum	Michael	Laird	Texas A&M University	Spring 2014
Cao	Yankai	Laird	Texas A&M University	Spring 2014
Carter	Nathaniel	Agrawal	Missouri University of Science & Technology	Fall 2010
Chan	Holly	Boudouris	University of Massachusetts	Fall 2012
Chen	Si	Pipes	Cornell University	Fall 2010
Choksi	Tej	Greeley	Institute of Chemical of Technology	Fall 2012
Choudhari	Harshavardhan	Agrawal, Ribeiro	University of Mumbai	Fall 2009
Chun	Hee-Joon	Greeley	Seoul National University	Fall 2012
Cordon	Michael	Gounder	University of Arizona - Tucson	Fall 2013
Crawford	Morgan	Wang	Rose-Hulman Institute	Fall 2012
Cui	Yanran	Ribeiro, Delgass	Beihang University	Fall 2011
Cybulskis	Viktor	Ribeiro, Delgass	Purdue University	Fall 2011
David	Anand	Caruthers	University of Minnesota - Twin Cities	Fall 2009
Davis	Nathan J.	Litster	Purdue University	Fall 2011
Davis	Nathan B.	Litster	Syracuse University	Fall 2011
Degenstein	John	Agrawal, Delgass, Ribeiro	University of North Dakota - Grand Forks	Fall 2011
Detwiler	Michael W	Delgass, Ribeiro	Youngstown State University	Fall 2010
Devaraj	Jayachandran	Ramkrishna	National University of Singapore	Fall 2009
DeVilbiss	Frank	Ramkrishna	Purdue University	Fall 2011
Devlin	Nicole	Harris	Georgia Institute of Technology	Fall 2011
Dietrich	Paul	Ribeiro	University of Wisconsin - Madison	Fall 2009
Di Iorio	John	Gounder	University of Washington	Fall 2013
Dysart	Arthur	Pol	NYU Polytechnic University	Fall 2013
Easton	Mckay	Ribeiro, Nash	Brigham Young University	Fall 2010
Fang	Haiyu	Wu	University of Science & Technology of China	Fall 2010
Finefrock	Scott	Wu	Case Western Reserve University	Fall 2010
Freer	Alexander	Harris	University of Notre Dame	Fall 2010

GRADUATE STUDENT ENROLLMENT

LAST NAME	FIRST NAME	ADVISOR(S)	UG/MS INSTITUTION	START DATE
Fronczak	Sean	Pol	Trinity University	Fall 2013
Gao	Danni	Varma	Tsinghua University	Fall 2009
Garg	Vishrut	Basaran	Indian Institute of Technology	Fall 2013
Gencer	Emre	Agrawal, Delgass, Ribeiro	Bogazici University	Fall 2011
Gharachorlou	Amir	Ribeiro	Amir Kabir University of Technology	Spring 2010
Ghose	Ranjita	Varma	Institute of Chemical Technology - Mumbai	Fall 2009
Graeser	Brian	Agrawal	Virginia Polytechnic Institute & State University	Fall 2011
Guerra	Omar	Reklaitis	University of Sao Paulo	Fall 2013
Gupta	Anshu	Reklaitis, Venkatasubramanian	Indian Institute of Technology	Fall 2010
Hages	Charles	Agrawal	University of California - Santa Barbara	Fall 2010
Hagmann	Christopher	Kong, Pekny, Reklaitis	Brigham Young University	Fall 2012
Harris	James	Ribeiro, Delgass	University of Virginia	Fall 2012
Harrison	Aaron	Beaudoin	Brigham Young University	Fall 2011
Hay	Martha	Boudouris	Virginia Polytechnic Institute & State University	Fall 2013
Hollingshead	Sydney	Liu	University of California - Santa Barbara	Fall 2013
Honda	Gregory	Varma	University of Connecticut	Fall 2010
Hoss	Darby	Beaudoin, Boudouris	University of Idaho	Fall 2013
Hsu	Hsin-Yun	Harris	National Tsinghua University	Fall 2010
Huff	Joshua	Agrawal	Texas A&M University	Spring 2010
Icten	Elcin	Nagy, Reklaitis	Bogazici University	Fall 2011
Jaini	Rohit	Morgan	Indian Institute of Technology	Fall 2012
Jimenz-Useche	Isabel	Yuan	University de Los Andes	Fall 2009
Joglekar	Chinmay	Agrawal	Institute of Chemical Technology - Mumbai	Fall 2011
Joshi	Ravi	Gounder	Institute of Chemical Technology - Mumbai	Fall 2013
Kamat	Pritish	Basaran	Institute of Chemical Technology - Mumbai	Fall 2012
Kelkar	Aniruddha	Franses, Corti	Institute of Chemical Technology - Mumbai	Fall 2010
Kim	Hyunchang	Caruthers, Delgass	Yonsei University	Fall 2013
Kim	Jungsuk	Won	Korea University Seoul	Fall 2013
Kim	Seong-Eun	Yuan	Korea University Seoul	Fall 2011
Kim	Yeji	Liu	Korea University Seoul	Fall 2009
Koeper	Mark	Agrawal	University of Missouri - Columbia	Fall 2012
Koswara	Andy	Varma, Chakrabarti	University of California - San Diego	Fall 2009
Kubal	Joseph	Greeley	University of Illinois at Urbana-Champaign	Fall 2013
Laster	Jennifer	Beaudoin, Boudouris	University of Florida	Fall 2013
Lee	Jaewon	Wu	Yonsei University	Fall 2012
Lee	Shinbeom	Varma	Seoul National University	Fall 2011
Lin	Charng-Yu	Liu	National Taiwan University	Fall 2013
Ling	Lei	Wang	Tsinghua University	Fall 2009
Liu	Jianfeng	Laird	Carnegie-Mellon University	Fall 2013

GRADUATE STUDENT ENROLLMENT

LAST NAME	FIRST NAME	ADVISOR(S)	UG/MS INSTITUTION	START DATE
Liu	Xiaohui	Dietz, Pekny	Tsinghua University	Fall 2011
Louvier	Matthew	Reklaitis	University of California - Los Angeles	Fall 2010
Lu	Jennifer	Litster	National Taiwan University	Fall 2012
Madenoor Ramapriya	Gautham	Agrawal, Tawarmalani	Indian Institute of Technology	Fall 2011
Majumdar	Paulami	Greeley	Jadavpur University	Fall 2013
Mallapragada	Dharik	Agrawal, Delgass, Ribeiro	Indian Institute of Technology	Fall 2008
Massa	Megan	Beaudoin	Michigan State University - East Lansing	Fall 2013
Mcleod	Steven	Agrawal	University of Florida	Fall 2011
Mehta	Dhairya	Agrawal, Ribeiro	University Of Mumbai	Fall 2009
Mendonca	Agnes	Yuan	University of Florida	Fall 2012
Miskin	Caleb	Agrawal	Brigham Young University	Fall 2011
Moreno	Mariana	Reklaitis, Nagy	Monterrey Institute of Technology	Fall 2013
Mulvenna	Ryan	Boudouris	Monash University	Fall 2011
Negash	Bethlehem	Agrawal	Jackson State University	Fall 2012
Nurse	Nathan	Yuan	North Carolina State University	Fall 2011
Ogebule	Oluwaseyi	Caruthers	Alabama Agriculture & Mechanical University	Fall 2008
Parekh	Atish	Ribeiro, Delgass	Indian Institute of Technology	Fall 2010
Park	Hye	Agrawal	Korea University Seoul	Fall 2009
Parks	Conor	Ramkrishna	University of Michigan - Ann Arbor	Fall 2012
Pena	Ramon	Nagy	Rutgers University	Fall 2013
Perrelli	Nicole	Boudouris	Villanova University	Fall 2013
Pohlman	Daniel	Litster	University of Notre Dame	Fall 2011
Pradhan	Shankali	Delgass, Ribeiro	Indian Institute of Chemical Technology	Fall 2012
Ridder	Bradley	Nagy	University of South Florida	Fall 2010
Rostro	Lizbeth	Boudouris	University of Arkansas - Fayetteville	Fall 2011
Sabnis	Kaiwalya	Ribeiro, Delgass	Institute of Chemical Technology - Mumbai	Fall 2010
Sanchez-Medina	Oscar	Yuan	Universidad Nacional de Colombia	Fall 2012
Sargent	Jessica	Boudouris	Auburn University	Fall 2013
Sayin	Ridade	Litster	Bogazici University	Fall 2012
Schram	Caitlin	Beaudoin	Johns Hopkins University of Art, Science & Engineering	Fall 2011
Seth	Arpan	Laird	Texas A&M University - College Station	Spring 2014
Sheets	Erik	Agrawal	Villanova University	Fall 2010
Shih	Arthur	Ribeiro, Gounder, Delgass	University of Michigan - Ann Arbor	Fall 2013
Son	Sang Ha	Caruthers	Yonsei University	Fall 2007
Smith	Ian	Ribeiro, Delgass	Purdue University	Fall 2012
Smith	Kathryn	Beaudoin	University of Wisconsin Madison	Fall 2008
Soepriatna	Nicholas	Wankat, Wang	University of Texas - Austin	Spring 2010
Sollberger	Fred	Delgass, Ribeiro	University of Illinois at Urbana-Champaign	Fall 2010
Su	Sheng-chuan	Liu	National Taiwan University	Fall 2009
Sung	Seung-Hyun	Boudouris	Seoul National University	Fall 2012

GRADUATE STUDENT ENROLLMENT

LAST NAME	FIRST NAME	ADVISOR(S)	UG/MS INSTITUTION	START DATE
Sweat	Melissa	Beaudoin	Mississippi State University	Fall 2010
Switzer	Jeffrey	Caruthers, Thomson	University of California - Davis	Fall 2006
Tang	Jialiang	Pol	University of Texas - Austin	Spring 2014
Thete	Sumeet	Basaran	Government College of Engineering - India	Fall 2011
Thomas	Myles	Beaudoin	Utah State University	Fall 2010
Tomlinson	Edward	Boudouris	North Carolina State University	Fall 2012
Tran	Vu	Ramkrishna	Texas A&M University - College Station	Fall 2012
Tseng	Han-Ting	Ribeiro	National Taiwan University	Fall 2013
Tsouris	Vasilios	Won	University of Pittsburgh	Fall 2011
Tsui	Huang-Wei	Franses	National Taiwan University	Fall 2009
Venkatakrishnan	Vinod	Ribeiro, Agrawal	Indian Institute of Technology - Mumbai	Fall 2009
Verma	Anuj	Delgass, Ribeiro	Institute of Chemical Technology	Fall 2010
Walker	Bryce	Agrawal	Brigham Young University	Fall 2009
Weeden	George	Wang	Purdue University	Fall 2011
Wheeler	Robin	Morgan	University of Massachusetts - Amherst	Fall 2013
Xiong	Silei	Caruthers	Tsinghua University	Fall 2009
Yadav	Gautam	Wu	University of Western Ontario	Fall 2009
Yang	Haoran	Wu	Tsinghua University	Spring 2010
Yang	Yang	Nagy	Peking University	Fall 2012
Yang	Yung-Jih	Franses, Corti	National Taiwan University	Fall 2011
Yohe	Sara	Agrawal, Delgass, Ribeiro	Concordia College	Fall 2008
Zhao	Xin	Agrawal	Tsinghua University	Fall 2012

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 11 core centers, has over 250,000 square feet research, meeting and office space to have an economic impact of $910 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 square feet, including 20,000 square feet 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.

BINDLEY MULTIDISCIPLINARY CANCER RESEARCH FACILITY

The Multidisciplinary Cancer Research Facility enhances 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 $14.9 million addition to the Bindley Bioscience Center was completed in Spring 2014. The facility has more than 15,000 square feet, including more than 11,000 square feet of laboratory space.

BIRCK NANOTECHNOLOGY CENTER

The Birck Nanotechnology Center is a 207,000 square, $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 square feet building offers central meeting places for workshops, seminars and classes, and works in conjunction with all Discovery Park centers and the Purdue Research Park.

DRUG DISCOVERY FACILITY

The Drug Discovery Facility provides state-of-the-art drug discovery research space that is modular and capable of strict environmental control. This $28.7 million facility was completed in Spring 2014 and has more than 24,000 square feet of space for laboratories, office and meetings.

2013-2014 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. These corporations provide advice, guidance and financial support for curriculum innovations, scholarships, experimental facilities enhancements, instructional computing facilities and start-up support for young faculty. The Fall meeting took place in Forney Hall, Purdue University on September 13, 2013, while the Spring meeting was held on March 28, 2014 in Des Plaines, IL, hosted by UOP/Honeywell.

- 3M
- ABBVIE
- AIR LIQUIDE
- AIR PRODUCTS AND CHEMICALS
- ANHEUSER-BUSCH
- BP
- CHEVRONPHILLIPS CHEMICAL
- COUNTRYMARK
- DOW CHEMICAL COMPANY
- DUPONT
- EASTMAN CHEMICAL COMPANY
- ELI LILLY
- EXXONMOBIL
- HONEYWELL PROCESS SOLUTIONS
- LUBRIZOL
- PFIZER
- PHILIPS 66
- PROCTER & GAMBLE
- SHELL
- UOP

FALL 2013 SEMINAR SPEAKERS

September 3, 2013

Prof. Mercouri Kanatzidis

Department of Chemistry, Northwestern University

"Panoscopic Approach to High Performance Thermoelectric Materials"

September 17, 2013

Prof. Paschalis Alexandridis

Chemical and Biological Engineering, University of Buffalo/ New York

"Nanostructured Polymers and Solvents: Opportunities in Health, Environment, and Energy Applications"

October 1, 2013

Dr. Thomas Degnan

ExxonMobil

"The Outlook for Energy: A View to 2040"

October 3, 2013 - Mellichamp Lecture

Prof. Brian Pfleger

College of Engineering, University of Wisconsin

"Sustainability via Synthetic Biology – A Growing Role for Biotechnology in the Chemical Industry"

October 15, 2013

Prof. Alan Lesser

Department of Polymer Science & Engineering University of Massachusetts

"Aspects of Physical Aging, Rejuvenation, and Work Hardening in Polymer Glasses"

October 22, 2013 - Sigma Xi Lecture

Prof. Doraiswami Ramkrishna

School of Chemical Engineering, Purdue University

"Metabolic Complexity. Is There Music Behind it?"

October 29, 2013

Prof. Richard Braatz

Department of Chemical Engineering, Massachusetts Institute of Technology

"Systems Nanotechnology: Engineering Nanomaterials for Chemical, Pharmaceutical, and Biological Applications"

October 31, 2013

Prof. Pulickel Ajayan

Department of Mechanical Engineering & Materials Science, Rice University

"Engineering of Nanostructures - Challenges and Opportunities"

November 12, 2013

Prof. Shinji Hasebe

Department of Chemical Engineering, Kyoto University, Japan

"Process Systems Engineering for Realizing Micro Chemical Plants"

November 19, 2013

Prof. Rakesh Agrawal

School of Chemical Engineering, Purdue University

"Engineering a Sustainable Energy Future"

December 3, 2013

Prof. Christodoulos A. Floudas

School of Engineering and Applied Science, Princeton University

"Discovery and Computational Characterization of Novel Materials for Shape Selective Separations: Theoretical Advances and Applications"

December 5, 2013

Prof. Stephen Z. Cheng

College of Polymer Science and Polymer Engineering, University of Akron

Giant Molecules Based on 'Nano-Atoms': A New Platform for Engineering Structures at Nanometer Feature Sizes

SPRING 2014 SEMINAR SPEAKERS

January 14, 2014

Prof. Chongli Yuan

School of Chemical Engineering, Purdue University

"Seeking the Critical Traits of Epigenetic Modifications for Early-Stage Disease Diagnosis"

March 25, 2014

Prof. Benny Freeman

University of Texas, Austin

"Materials Science Opportunities in Polymer Membranes for Water Purification"

April 1, 2015

Prof. Deborah Leckband

Department of Chemistry, University of Illinois - Champaign-Urbana

"Thermally Responsive Polymers In Biotechnology: New Perspectives On An Old Problem"

April 8, 2014

Prof. Linda Wang

School of Chemical Engineering, Purdue University

"Fundamental Advances and Applications of Chromatography"

April 10, 2014

Prof. Joona Bang

Korea University

"Design of Cross-Linkable Block Copolymers for Various Nano-Fabrications"

April 15, 2014 - Kelly Lectures

Prof. Enrique Iglesia

Department of Chemical & Biomolecular Engineering, University of California - Davis

"Chemistry & Engineering Challenges in the Catalytic Conversion of C_1 Molecules" and ***"Nanoparticles and Nanospaces: The Catalysis Toolbox"***

April 22, 2014

Prof. Howard Stone

Princeton University

"Elementary channel flows with surprising responses: (i) Biofilms and flow and (ii) Trapping of bubbles in stagnation point flows"

April 29, 2014

Prof. Fabio Ribeiro

School of Chemical Engineering, Purdue University

"Kinetics of Heterogeneous Catalytic Reactions"

PURDUE
UNIVERSITY

SCHOOL OF CHEMICAL ENGINEERING
engineering.purdue.edu/ChE
cheschool@ecn.purdue.edu
765.494.4050