

YEN-SHAN (AMY) LIU

EDUCATION

Ph.D., Chemical Engineering, December 2006
Texas A&M University, College Station, TX

B.S., Chemical Engineering, December 2001
Mississippi State University, Starkville, MS
Summa cum Laude

RESEARCH EXPERIENCE

Tenure-Track Assistant Professor, University of Louisiana at Lafayette, January 2007 – Present

- Develop handheld screening tools based on calorimetry techniques for explosive and energetic compounds to satisfy the applications in the fields of homeland security, forensic analysis, emergency response, industrial process control, and hazard analysis.
- Design engineered enzymes for biofuel production and bioremediation through computational modelling and genetic manipulation of metabolic pathways.
- Analyze root causes of refinery incidents in the world between 2000 and 2009.
- Optimized a continuous catalyst-free process for biodiesel production via a supercritical methanol reactor.

Research Assistant, Texas A&M University, Fall 2002 – Fall 2006

Dissertation Title: “Development of an Advanced Nanocalorimetry System for Rapid Material Characterizations”

- Implemented fabrication technologies of microfluidic devices.
- Developed data acquisition systems using LabVIEW.
- Analyzed chemical hazards.
- The patent of the nanocalorimeter was filed to the U.S. Patent and Trademark Office.

Invited Researcher, The National Research Institute of Fire and Disaster, Tokyo, Japan, January 2004

- Analyzed chemical reactivity of organic peroxides with a series of calorimetric experiments.
- Used a power-compensation DSC, accelerating rate calorimeter (ARC), and SETARAM Calvet C-80 calorimeter.

Laboratory and Research Assistant, Mississippi State University, May 2001 – December 2001

- Investigated and analyzed data on gas hydrates as part of a project to provide new fuel sources and to propose solutions to the greenhouse effect problem.
- Performed experiments related to “Removal of TNT from Aqueous Streams Using Reductive/Oxidative Techniques.”

PUBLICATIONS

1. Y.-S. Liu and S.R. Saraf, “Emerging Biochemicals Market.” *Soft Matter*, in preparation.
2. W.X. Wu, S. Mora, and Y.-S. Liu, “QM/MM Studies of Interaction Mode of B12-Independent Dehydratase with Glycerol.” *Physical Chemistry Review*, in preparation.
2. W.X. Xu, Y.-S. Liu, C. Sun, and S. Mora, “Phylogenetic and Substrate Docking Studies of Glycerol Dehydratases.” *Biotechnology for Biofuels*, in preparation.
3. Y.-S. Liu, V.M. Ugaz, S.W. North, W.J. Rogers, and M.S. Mannan, “Development of a Miniature Calorimeter for Identification and Detection of Explosives and Other Energetic Compounds.” *Journal of Hazardous Materials*, 142 (3), 2007, pp. 662 – 668.
4. Y.-S. Liu, W.J. Rogers, and M.S. Mannan, “Screening Reactive Chemical Hazards.” *Chemical Engineering Progress*, 102 (5), 2006, pp. 41 – 47.
5. Y.-S. Liu, V.M. Ugaz, W.J. Rogers, M.S. Mannan, and S.R. Saraf, “Development of an Advanced Nanocalorimetry System for Material Characterization.” *Journal of Loss Prevention in the Process Industries*, 18 (3), 2005, pp. 139 – 144.
6. M.S. Mannan, H.H. West, K. Krishna, A.A. Aldeeb, N. Keren, S.R. Saraf, Y.-S. Liu, and M. Gentile, “The Legacy of Bhopal: The Impact Over the Last 20 Years and Future Direction.” *Journal of Loss Prevention in the Process Industries*, 18 (4-6), 2005, pp. 218 – 224.
7. “Quantitative Subsystem Hazard Analysis of Potential for Off Site Transfer of Hydrolysate Containing VX Above Transport Detection Level,” Texas Engineering Experiment Station, College Station, TX, July 2004.

CONFERENCE PRESENTATIONS AND PAPERS

1. Y.-S. Liu and S.R. Saraf, "Emerging Biochemicals Market." Cleantech 2008 Conference, Boston, MA, June 1 – 5, 2008.
2. Y.-S. Liu, S. Mora, S.R. Saraf, Mark E. Zappi, "Recent Advances in Biofuels Production and by-Product Utilization." 30th Symposium on Biotechnology for Fuels and Chemicals, New Orleans, LA, May 4 – 7, 2008.
3. Y.-S. Liu, S.R. Saraf, Mark E. Zappi, "Current Trends and Future of Biofuels and Biomass-Derived Chemicals." AIChE 2008 Spring National Meeting, New Orleans, LA, April 6 – 10, 2008, Proceeding CD.
4. Y.-S. Liu, V.M. Ugaz, W.J. Rogers, and M.S. Mannan, "Development of an Advanced Handheld Calorimetry System for Identification and Detection of Energetic Compounds." 2007 Mid-south Area Engineering and Science Conference, Oxford, MS, May 17 – 18, 2007, Proceeding CD.
5. Y.-S. Liu, V.M. Ugaz, W.J. Rogers, and M.S. Mannan, "Development of a Miniature Calorimeter for Identification and Detection of Explosives and Other Energetic Compounds." 9th Process Plant Safety Symposium (PPSS). 3rd Global Congress on Process Safety. AIChE 2007 Spring National Meeting, Houston, TX, April 22 – 26, 2007, Proceeding CD.
6. Y.-S. Liu, V.M. Ugaz, W.J. Rogers, and M.S. Mannan, "Development of Microfabricated Calorimetry Systems for Characterization of Nanoscale Materials." Proceedings of the 8th Annual Mary Kay O'Connor Process Safety Center Symposium, College Station, Texas, October 25 – 26, 2005, pp. 23 – 31.
7. Y.-S. Liu, S.R. Saraf, V.M. Ugaz, W.J. Rogers, and M.S. Mannan, "Rapid Reactivity Screening Using a Nanocalorimeter." 39th Loss Prevention Symposium. AIChE 2005 Spring National Meeting, Atlanta, GA, April 11 –14, 2005, Proceeding CD.
8. Y.-S. Liu, "Development of an Advanced Nanocalorimetry System for Rapid Material Characterizations." Modeling of Complex Processes 2005 Symposium, College Station, TX, March 1 – 3, 2005.
9. Y.-S. Liu, W. J. Rogers, C. Wei, and M.S. Mannan, "Experimental and Computational Methods for Process Safety Research." International Conference on 'Bhopal & its Effects on Process Safety', Kanpur, India, December 1 – 3, 2004, Abstract No. L-115.
10. Y.-S. Liu, S.R. Saraf, V.M. Ugaz, W.J. Rogers, and M.S. Mannan, "Fabrication of a Novel Calorimeter to Characterize Nano-scaled Materials." Poster session. AIChE 2004 Annual Meeting, Austin, TX, November 7 – 12, 2004.
11. Y.-S. Liu, S.R. Saraf, V.M. Ugaz, W.J. Rogers, and M.S. Mannan, "Development of a Nanocalorimeter for Material Characterization." Proceedings of the 32nd North American Thermal Analysis Society (NATAS) Conference, Williamsburg, VA, October 4-6, 2004, Proceeding CD.
12. M.S. Mannan, W.J. Rogers, Y.-S. Liu, S.R. Saraf and A.A. Aldeeb, "Regulatory Initiatives in the United States With Regard to Reactive Chemicals." Proceedings of the 11th International Symposium on Loss Prevention and Safety Promotion in the Process Industries, Prague, Czech Republic, May 31 – June 3, 2004, pp.1287 – 1294.
13. W.J. Rogers, Y.-S. Liu, M.S. Mannan, "Experimental and Computational Methods for Process Safety Research." Proceedings of the 3rd International NRIFD Symposium, Mitaka, Tokyo, Japan, March 10 – 12, 2004, pp. 55 – 66.

INDUSTRIAL PROJECTS

Preliminary Assessment and Optimization of a Continuous Catalyst-Free Process for Biodiesel Production, April – July 2007

- Funding agency: The Manufacturing Extension Partnership of Louisiana.
- Amount: \$9,722.
- Evaluated and optimized a novel biodiesel production by supercritical methanol treatment using Aspen.
- Principal investigator.

Accelerated VX Destruction Program: Project Speedy Neutralization, February 2004 – July 2004

- Funding agency: Department of Defense / Parsons.
- Amount: \$1,078,000.
- Optimized safety and efficiency of the plant through fault tree analysis using CAFTA.

Emergency Management Planning, May 2003 – August 2003

- Funding agency: SRA International.
- Amount: \$52,000.
- Assisted officials in Dallas area counties to revise their emergency plans to comply with state regulations.

GRANT PROPOSALS SUBMITTED

1. Defense EPSCoR: "Development of a Nanocalorimeter for Identification and Detection of Explosives": November 2008, \$350,000, Principal Investigator.

2. LONI, "A Hybrid Quantum Mechanical (QM)/Molecular Mechanical (MM) Study of Two Key Enzymes in 1,3-Propanediol Production from Glycerol": October 2008, \$25,000, Principal Investigator.
3. The Camille and Henry Dreyfus Foundation, Special Grant Program in the Chemical Sciences: "Course Development at University of Louisiana at Lafayette: Applications of Computational Chemistry in Biofuels": June 2008, \$50,000, Principal Investigator.
4. NSF, Planning Grant for I/UCRC (Industry & University Cooperative Research Program): "I/UCRC Center for Visual Decision Informatics": March 2008, \$10,000 (funded), collaborator: Oregon State University.
5. Louisiana Board of Regents, Research Competitiveness Subprogram: "Development of a Novel Nanocalorimetry System for Rapid Material Characterization": November 2007, \$111,776 (funded), Principal Investigator.
6. Louisiana Board of Regents, Traditional and Undergraduate Enhancement Program: "Integrated Environmental Engineering, Chemical Engineering and Environmental Science, and Mercury Emissions Control Laboratory": October 2007, \$147,120.
7. NSF, IGERT (Integrative Graduate Education and Research Traineeship): "Innovative Photonics Program": April 2007, \$200,000.
8. Louisiana Governor's Information Technology Initiative: "Bioinformatics Development: A Quantum Mechanical (QM)/Molecular Mechanical (MM) Study of Two Key Enzymes in 1,3-Propanediol Production from Glycerol": March 2007, \$117,450 (funded), Principal Investigator.
9. The Manufacturing Extension Partnership of Louisiana (MEPoL): "Preliminary Assessment and Optimization of a Continuous Catalyst-Free Process for Biodiesel Production": March 2007, \$9,722 (funded), Principal Investigator.
10. Louisiana Board of Regents' Post-Katrina Support Fund Initiative: "Developing a New Paradigm for Establishing a Competitive Biofuels Industry Within Louisiana": March 2007, \$2,000,000.
11. NSF, Small Business Technology Transfer (STTR): "Nanocalorimeter Development for Energetic Material Characterization": June 2005, \$100,000.
12. "Guidelines for Sustainable Waste Management in Qatar": November 2004, \$250,000.
13. NSF, Major Research Instrumentation (MRI): "Development of an Advanced Nanocalorimetry System for Rapid Characterization of Energetic Materials": October 2004, \$415,000.
14. NSF, Chemistry Research Instrumentation and Facilities (CRIF): "Development of a New Nanocalorimeter to Characterize Energetic Material": March 2004, \$564,762.

REGISTRATION

Professional Engineer, Louisiana, No. 34317

TEACHING EXPERIENCE

Assistant Professor, University of Louisiana at Lafayette, January 2007 – Present

- Courses taught: Process Control, Computer-aided Process Design, Introduction to Chemical Engineering, Engineering Registration Studies, Graduate Seminar, and Transport Phenomena (graduate level).

Teaching Assistant and Grader, Texas A&M University, Spring 2003 – Fall 2004

- Assisted instructors in teaching Process Safety Engineering (undergraduate/graduate levels), Numerical Analysis, and Introduction to Engineering for four successive semesters.

COMPUTER SKILLS

Systems: PC, Macintosh, Unix Workstation

Languages: LabVIEW, FORTRAN, C, C++, HTML

Software: Microsoft Office, Visio, Illustrator, COMSOL Multiphysics, L-Edit, ClusterW, SYBYL, Gaussian, CAFTA, AutoCAD, Aspen, ChemCAD, ChemOffice, Matlab, Maple, Mathematica, Polymath, SAS, MAX+Plus II

HONORS

Research and Presentation Grant

Spring 2005

Swalm Chemical Engineering Scholarship

Fall 1999 – December 2001

White Junior Engineering Scholarship

Spring 1999

Biological Engineering Premedical Scholarship

Fall 1998

ACTIVITIES

Safety Coordinator, Chemical Engineering Department

Spring 2008 – Present

Engineering Judge, Louisiana Region VI Science Fair

Spring 2007, Spring 2008

Member, International Society of Pharmaceutical Engineering (ISPE)

Spring 2007 – Present

Member, American Institute of Chemical Engineers (AIChE)
Member, North American Thermal Analysis Society (NATAS)
Lifetime Member, Golden Key International Honor Society

Spring 1999 – Present
Summer 2004 – Present
Fall 1999 – Present

PERSONAL DATA

Permanent resident