

Bin Zhang

Mary Kay O'Connor Process Safety Center

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Education

Ph.D. in Chemical Engineering, Texas A&M University, USA (GPA 3.5/4.0)	Expected: 05/2015
M.S. in Chemical Engineering, Zhejiang University, China (GPA 3.7/4.0)	06/2010
B.S. in Bio-Chemical Engineering, Dalian University of Technology, China (GPA 3.9/4.0)	06/2007

Professional Experience

Research Assistant at Texas A&M University 01/2011 - present

Research Topic: **High Expansion Foam Application for LNG Vapor and Pool Fire Hazards Mitigation**

Advisor: **Dr. M. Sam Mannan**

- Experimentally and theoretically enhance the understanding on the heat transfer of high expansion foam and LNG system in the vapor dispersion scenario. The research includes the construction of a self-designed foam generator and foam test apparatus, and the setup of data acquisition system to gather information from multiple sensors, *e.g.*, thermocouple, oxygen sensor and scale
- Design, conduct and analyze a big scale LNG pool fire field test with the foam application to determine the mitigation effect in terms of thermal radiation, fire control time, mass burning rate, temperature profile above the LNG pool and flame geometry

Research Associate at Texas A&M University at Qatar 02/2012 - 07/2012

Project: **LNG Safety Research on Source Term of LNG Spill Using Liquid Nitrogen, LN₂**

- Study the heat transfer mechanisms that contribute to the vaporization of a LNG pool on land. Both polystyrene and concrete were investigated as the materials of pits containing LN₂. The tests were conducted in the field and in a wind tunnel with forced convection and radiation provided by a fan and bulbs panel

Major Academic and Industrial Projects

Study the bund overtopping in case of a catastrophic LNG tank failure. 02/2014 - present

- Design and construct the apparatus for lab scale tests and large scale field tests at Brayton Fire Training Field, conduct the tests and develop correlations based on experimental results, which leads to a conference paper. A journal paper is prepared

Response to Request for Information on potential revisions to OSHA PSM 03/2014 - 07/2014

- Economic analysis on resuming enforcement of the PSM standard for oil and gas production facilities
- Clarifying paragraph (l) of the PSM standard with an explicit requirement that employers manage organizational change

Risk screening on H₂S radius of exposure for an oil and gas company 02/2014 - 07/2014

- Conduct the simulation on steady state and instantaneous radius of exposure using Phast. Develop correlations of radius of exposure for various operation conditions of enhanced oil recovery, *e.g.*, temperature, pressure and composition

Technical service for a state agency 05/2013 - present

- The project requires the development of several programs to ensure the integrity of offshore oil and gas production facilities. I led to develop an *Incident Data Repository Plan and Management Systems Assessment Program*, which involves a review of existing incident data reporting systems of agencies, PSM requirements of OSHA, EPA and BSEE, and industry practice of PSM. The final deliverables are reports with findings and recommendations

Jet fire visual detection and radiation level determination through field tests 10/2013 - 02/2014

- Lead a team to design and set up the data acquisition system to gather information from flow meters, thermocouples and radiometers, manage the weather station, and analyze the data, which has resulted in two conference papers, one poster. Three journal papers are prepared

Gas leak detection through field tests for an oil and gas company 08/2013 - 11/2013

- Lead to design and set up the data acquisition system to gather information from gas detectors, flow meters, thermocouples and manage the weather station, which aims to help select proper gas leak detection techniques, *e.g.*, cameras and sensors

Book writing of *Multi-scale Model in Process Safety* 08/2013 - 10/2013

- Write *Chapter 7 Application of modeling for industrial hygiene and toxicological issues*, which is about chemical hazards prediction using Quantitative Structure–Activity Relationship

Mercury mapping dispersion study for an oil and gas consulting company 06/2013 - 09/2013

- Review the hazards of mercury and hazards management methods for offshore process. Provide leadership to execute hazard identification, emission modeling techniques, design mitigation, active detection and personnel protection in the report

Book revision of *Lees' Loss Prevention in the Process Industries, Fourth Edition* 03/2011 - 02/2012

- Review and update *Chapter 8 Hazard Identification, Chapter 37 Metrics and Performance Measurement and Chapter 39 Liquefied Natural Gas*

Report on effects of fracking process on Pavillion area groundwater quality based on the investigation conducted by EPA 11/2011

Process safety audit of a chemical facility in USA 05/2011 - 08/2011

- Audit the OSHA PSM elements, and my focus was highly hazardous chemicals based on 29 CFR 1910.119

Teaching Experience

Teaching Assistant in the Department of Chemical Engineering, Texas A&M University

- Unit Operations Laboratory (CSTR, Gas Separation, Double Effect Evaporation and Distillation). Mentor students on safety, technical problems and communication
- Gas & Petroleum Processing

Advanced Training and Workshop

- FLACS Software Training – GexCon
- Gas Explosion Hazards on Offshore Facilities – GexCon and MKOPSC
- Phast Software Training – DNV·GL
- Fluidyn-PANACHE Software Training – Fluidyn
- Canary Software Training – Quest Consultants Inc.
- Training of Pressure Relief System Design Best Practice – Siemens Energy, Inc
- Process Safety Management – Fundamentals
- Layer of Protection Analysis
- Safety Integrity Level Verification
- Shale Gas Monetization: Potential Opportunities in the US and Lessons Learned from the Qatari Experience with Natural Gas

Advanced Skills

- Computational Fluid Dynamics (CFD): Fluent, GexCon FLACS, Fluidyn-PANACHE, COMSOL
- Other software: Phast, Canary, ProMax, MATLAB, Maple, AgenaRisk, DaqView
- Risk Analysis: Fault Tree, Event Tree, Bow-tie Analysis and PHA

Leadership

- Member of Silver Tongue Toastmasters Club in College Station 2011 - 2012
- Vice president for education of Toastmasters Club in Zhejiang University 2009 - 2010
- Director of Public Affairs Center of Graduate Students Union in Zhejiang University 2007 - 2008
- Director of Student Affairs in Dalian University of Technology 2003 - 2004

Awards

- **Best paper award** for the 2014 AIChE spring meeting
- **1st Place Award** for Outstanding Course Project and Presentation Sponsored by BP in Process Safety Engineering Class

Conference and Publication

- Zhang, B., Harding, B., Liu, Y., Mannan, M.S., "Mitigation Effect of High Expansion Foam on LNG Vapor Hazard", *accepted in 2015 AIChE Spring Meeting, Austin, TX, USA*
- Zhang, B., Liu, Y., Laboureur, D., Mannan, M.S., "Experimental Study on Propane Jet Fire Hazards: Thermal Radiation", *accepted in 2015 AIChE Spring Meeting, Austin, TX, USA*
- Liu, Y., Gopaldaswami, N., Zhu, W., Zhang, B., Mannan, M.S., "Experimental Study and CFD Simulation on Bund Overtopping in Case of a Catastrophic Failure of Tanks Containing Water/Liquid Nitrogen/LNG", *accepted in 2015 AIChE Spring Meeting, Austin, TX, USA*
- Zhang, B., Liu, Y., Laboureur, D., Mannan, M.S., "Experimental Study on Propane Jet Fire Hazards: Thermal Radiation", *In 2014 Mary Kay O'Connor Process Safety Center International Symposium, College Station, TX, USA*
- Laboureur, D., Zhang, B., Liu, Y., Gopaldaswami, N., Mannan, M.S., "Experimental Study on Propane Jet Fire Hazards: 1. Assessment of the Main Geometrical Features of Horizontal Jet Flames", *In 2014 Mary Kay O'Connor Process Safety Center International Symposium, College Station, TX, USA*
- Liu, Y., Gopaldaswami, N., Laboureur, D., Zhang, B., Mannan, M.S., "Experimental Study on Propane Jet Fire Hazards: 2. Comparison on Geometrical Features between Experiments and Empirical Models", *In 2014 Mary Kay O'Connor Process Safety Center International Symposium, College Station, TX, USA*
- Gopaldaswami, N., Liu, Y., Laboureur, D., Zhang, B., Mannan, M.S., "Experimental Study on Propane Jet Fires", *In 2nd International Conference on Safety 2014, Ahmedabad, India*
- Zhang, B., Liu, Y., Olewski, T., Vechot, L., Mannan, M.S., "Blanketing Effect of Expansion Foam on Liquefied Natural Gas (LNG) Spillage Pool", *Journal of Hazardous Materials (2014)*
- Zhang, B., Liu, Y., Olewski, T., Vechot, L., Mannan, M.S., "Effects of Expansion Foam on Controlling LNG Vaporization Rate", *in proceedings of 2014 AIChE Spring Meeting, New Orleans, LA, USA*
- Zhang, B., Li, X.R., Mannan, M.S., "Theoretical Study of Expansion Foam Application on LNG Pool Using Computational Fluid Dynamics", *in proceedings of 2012 AIChE Spring Meeting, Houston, TX, USA*
- Zhang, B., Mannan, M.S., "LNG Vapor Dispersion with Application of High Expansion Foam", *in 2012 Qatar Process Safety Symposium, Doha, Qatar*
- Kim, B.K., Ruiz, R., Zhang, B., Nayak, S., Mentzer, R., Mannan, M.S., "Recent Progress in LNG Safety and Spill Emergency Response Research", *in proceedings of HAZARD XXIII 2012, North West, UK*

Language Proficiency

- Chinese (Native)
- English (Proficient)

Work Eligibility

- Eligible for Practical Training in USA
- Visa Status: F1