The 2014 International Symposium of the Mary Kay O’Connor Process Safety Center will be held at the College Station Hilton Conference Center on October 28-30, 2014.

Mr. Brian Salerno, Director of the Bureau of Safety and Environmental Enforcement, US Department of Interior, will present the Frank P. Lees Memorial Lecture on the first day of the symposium. The keynote speakers will include Professor Ian Cameron, University of Queensland, Australia, and Mr. Dwight Johnston, Shell Oil Company.

The complete program will be made available online at: http://psc.tamu.edu/symposia/2014-sym

New Transatlantic Process Safety Alliance

The Institution of Chemical Engineers (IChemE) and Texas A&M Engineering Experiment Station, have signed an agreement paving the way for a suite of new process safety products and services. The Memorandum of Understanding (MOU) will see both organizations commit to collaboration in process safety education, CPD products and strategic leadership and direction.

The Texas A&M Engineering Experiment Station is home to the Mary Kay O'Connor Process Safety Center, which houses one of the world's biggest process safety libraries and is regarded as a leader in process safety education.

The MOU was signed at the American Institute of Chemical Engineers 2014 Spring Meeting in New Orleans by IChemE chief executive David Brown and Dr. Sam Mannan, director of the Mary Kay O'Connor Process Safety Center.

Dr. Mannan said: “This is good news for IChemE and good news for Texas A&M, but, importantly, this is good news for chemical and process engineers with an interest in process safety.”

David Brown commented: “Texas A&M and IChemE are both recognized as international leaders in the provision of process safety products and services. This new agreement will help us to share information more freely and cooperate on a range of new projects.”

The collaboration’s projects and priorities were further discussed at IChemE’s Hazards 24. Hazards, which is widely recognized as the world’s leading process safety conference, was held on 7-9 May 2014 at Scotland’s Edinburgh International Conference Centre.
Director’s Corner

As the Ocean Energy Safety Institute (OESI) Principal Investigator, I am pleased to announce that former Navy Captain James Pettigrew has been selected to be the Director of Operations. OESI provides a forum for dialogue, shared learning and cooperative research among academia, government, industry and other non-government organizations in offshore-related technologies and activities that help ensure environmentally safe and responsible offshore operations. Jim is retired from the Navy and assumed his new position on May 12.

Jim has extensive experience, including three decades of worldwide maritime operations, risk assessment, and program management. I believe Jim has the drive and leadership abilities to develop and mature OESI and strive toward environmentally safe and responsible offshore operations. He will be a great asset to the OESI team and our partners.

In the Navy, Jim worked predominantly in operational oceanography, surface warfare, and information systems management. He served most recently as Chief of Staff for the Commander of Naval Meteorology and Oceanography. There he was responsible for the direction and leadership of a team of 150 people, executing a $300 million annual budget, the operations of 4,000 personnel worldwide, the nation's Master Clock, two world-class supercomputing facilities, and six military Oceanographic Survey Ships.

Jim received his Master’s of Science from the Naval Postgraduate School and received his Bachelor’s of Science from Texas A&M University. He is the recipient of numerous military awards.

We look forward to collaborating and developing OESI with Jim.

This year also saw several other changes with regard to the Mary Kay O’Connor Process Safety Center personnel. Both Donna Startz (after a 17-year career with the Center) and Tricia Hasan (after a 3-year stint) left for new opportunities elsewhere. We also recently had the opportunity to have Alanna Scheinerman join the Center. Please join me in wishing Donna and Tricia well in their new careers and welcoming Alanna to the Center.

M. Sam Mannan
Spring, 2014
The Center held the 7th Annual Alumni Reunion, sponsored by Shell E&P, on April 19, 2014. More than 160 past and present students, staff, researchers, and family members were in attendance. Current graduate student Logan Hatanaka was Master of Ceremonies and Dr. Naz Karim, Head of the Artie McFerrin Department of Chemical Engineering at Texas A&M, welcomed everyone. Current students gave presentations on their recent internships, including experiences at Huntsman, TAMU Qatar, and Gexcon. Alumni speakers who discussed their post-Center lives included Carmen Osorio, Fuman Zhao, and Sumit Anand. The day included a tour of the Center’s research labs, library, computer lab, and offices, a “Comparison of Safety in the Process Industry to Safety in Other Industries” Pamphlet Competition, dinner, and student-featured entertainment. Student groups included the Fade to Black Street Dance Ensemble, Percussion Studio, Dance Art Studio, and Indian Classical Dance.
The 69th Annual Instrumentation Symposium for the Process Industries was held on January 21-23, 2014, in the Memorial Student Center (MSC) at Texas A&M University. The symposium was hosted by the Mary Kay O’Connor Process Safety Center and the Artie McFerrin Department of Chemical Engineering. This was the second year in the MSC, solidifying a venue tradition as the symposium moves forward. The exhibit hall space was increased by 50% over what was offered in 2013, and there was a sizable increase in the number of booths present. For the second year in a row, the symposium saw an increase in the number of papers presented by utilizing a dual-track program.

The Instrumentation Symposium has had the third consecutive year of record attendance since 2010. While the 2012 and 2013 symposia showed a steady increase of attendees, the 2014 symposium saw a pronounced increase of attendees. This indicates a trend that will likely continue to grow in the coming years. Keeping up with the latest software, knowledge, and regulations as they affect the instrumentation world is what continues to bring professionals, students, and faculty together each January. This long-standing symposium provides a forum for technical presentations, workshops, networking, and exhibits offering the latest technology for the industry.

Again in 2014, the Instrumentation Symposium featured the 2nd Annual Instrument Reliability Network Symposium, which was presented jointly to raise awareness and provide an opportunity for knowledge exchange and networking. The Instrument Reliability Network’s (IRN) mission is to share historical information and lessons learned in order to minimize environmental harm, improve industry safety, maximize asset performance, and reduce maintenance costs through better lifecycle management of instrumentation and controls applied in the process industry. The IRN is a natural addition to the Instrumentation Symposium due to the connections to instrumentation and the process industry. This year, the second track of papers for two of the days was focused solely on the IRN and its growth potential.

In keeping with the number of relevant topics discussed at the symposium, this year featured three Keynote speakers. The first keynote address was given by Richard Meserole, Vice President of Construction for the Energy & Chemicals division at Fluor. His presentation discussed the current and projected markets in oil, gas, and chemicals and some of the strategies that instrumentation companies are looking to use as the market grows and changes. The second keynote address was given by Amr El-Bakry, Senior Optimization Advisor for ExxonMobil Production Company. He presented on the topic of the importance of asset management in instrumentation with a presentation titled, “Asset Management: Data-to-Action.” A third keynote address, specifically tailored to the IRN portion of the symposium, was given by Gregory Morales, Site Reliability Director for Dow Texas Operations. His presentation was titled, “Reliability is a Culture,” and focused on how to incorporate reliability into behavior and the challenging paradigms to do so.

Along with the three keynote speakers, the symposium included 26 papers and 15 workshops over three days. The exhibit hall featured 38 companies showcasing their software products, instrumentation goods, and
safety instrumented systems. The exhibits provided an opportunity for managers, operators, students, and instrumentation personnel to network with colleagues and seek out new trends and technology that is available to them in their respective areas.

The 70th Annual Instrumentation and Automation Symposium for the Process Industries is scheduled for January 20-22, 2015 at the MSC at Texas A&M University. The Call for Papers will be solicited through May 31, 2014; information can be found here: http://instrumentation-symposium.che.tamu.edu/.

For more information on the Instrumentation and Automation Symposium for the Process Industries, contact Alanna Scheinerman, symposium coordinator, at 979-845-5981 or ascheinerman@tamu.edu.

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**RISK FORUM**

**OESI**

**OCEAN ENERGY SAFETY INSTITUTE**

**Monday-Tuesday, May 12-13, 2014**

On May 12-13, 2014, a two-day forum entitled: “Risk Awareness, Risk Perception and using the Awareness and Perception in Making Operational Decisions on a Continuing Basis,” was held in Houston. The objective of this forum was to promote dialogue and shared learning among academia, government, industry, and other non-governmental organizations on topics such as risk-informed decision making, QRA methodology, aspects of operation concerned with risk-based decision making, case histories of decision making, risk-informed decision making on design phase vs. day-to-day basis, failure rate and other data needs, and how risk assessment can be best used in regulation. For more photos from the Risk Forum, visit oesi.tamu.edu.
Recent Publications


MKO Welcomes Alanna Scheinerman to Center Staff

In April, Alanna Scheinerman joined the Center as a Program Assistant. She graduated from the University of Rochester in 2013 with a degree in Environmental Studies and American Sign Language. Since graduation she worked at UR’s Recycling Office and the Connecticut Center for Advanced Technology. We welcome Alanna to the Center and look forward to working with her.

Student News

Alberto Benavides-Serrano has been selected as one of the two recipients for a Conoco Phillips fellowship. He receives a one-year fellowship for $10,000.

Liyan Liu, Amira Chowdhury, Zhe Han, Jiaojun Jiang, Yan-Ru Li, and Guido Lamus had work presented at the 10th Global Congress on Process Safety in New Orleans.

Camilo Rosas presented a poster at the ChEGSA Symposium and a paper accepted to the JLPPI in March.

Nirupama Gopalaswami, Jiaojun Jiang, and Ruochen Liu had work presented at the Hazards 24 Symposium in Edinburgh, UK.

Sonny Sachdeva won the poster award at the Texas A&M Chemical Engineering Research Symposium.

Jiaojun Jiang had “A correlation of the lower flammability limit for hybrid mixtures” featured at the 24th IChemE Hazards Symposium in Edinburgh, UK.

Edna Mendez’s poster “CFD modeling for prediction and prevention of runaway reaction” was featured at the 10th Global Congress on Process Safety in New Orleans, LA.

Bin Zhang’s paper “Effects on Expansion Foam on Controlling LNG Vaporization Rate” was featured in the proceedings of the 2014 AIChE Spring Meeting in New Orleans, LA.

Jeremy Nelson presented “For want of a nail, the kingdom was lost: Process safety management of gaskets and flanged connections” at the 10th Global Congress on Process Safety in New Orleans, LA.

Jiaqi Zhang’s paper “Agglomeration effect on combustion and explosion properties of nanoparticles” was presented at the 10th Global Congress on Process Safety in New Orleans, LA, USA. It will also be published in AIChE’s Process Safety Progress Journal.

Monir Ahammad’s poster was featured at the 10th Global Congress on Process Safety in New Orleans, LA, USA.

Jin Sek Kim received the Harry West Graduate Fellowship from the MKOPSC.

Tony Rocha’s paper “Assessing Integrity of the Gas-Lift Valves by Analyzing Annular-Pressure-Transient Response” will be presented at the SPE Artificial Lift Conference and Exhibition - North America in Houston, Texas.

Olga Reyes had a poster featured at the 10th Global Congress of Process Safety and at the 2014 Research Symposium ChEGSA at Texas A&M University, where it won an award.

Zhe Han’s paper “Study of Ammonium Nitrate Fertilizer Explosion Hazards” has been accepted to the X ISHPMIE Conference in Bergen, Norway.
Visitors to the Center

Cameron Fisher, Wing Yee, Mohammad Murtaza, and Leonard Gomes from BHP Billiton visited on January 13.

Andy Furlong, Director of Policy and Communication for Institution of Chemical Engineers visited on January 28.

Tim Shanahan, Director of the Energy and Minerals Institute at the University of West Australia, visited on January 29.

Dr. Hans Pasman visited the center from February 15—March 15.

Julie Halliday, a General Engineer from the United States Department of Transportation visited on February 18.

Dr. Robin Pitblado and other representatives from DNV visited on February 21.

Dr. Simon Waldram visited from March 1—28.

John Bresland visited from March 3—7.

Greg Kusinski and Sandi Fury from Chevron visited on April 16.

Roy Sanders visited from April 22—26.

Arafat M. Aloqaily, Mohammed Dossary, and Mohammed Nashwan from Saudi Aramco visited and toured the laboratories on May 2.

Professor Yi Liu visited from May 5—9.

A.W. Armstrong from Kestrel Management visited on May 16.
Case History— Qingdao Pipeline Explosions  
Presented by Tony Rocha at the January 16 Steering Committee Meeting

This case study discussed the explosion that occurred in Qingdao, China on November 22, 2013. An oil and gas pipeline that was under repair near Qingdao exploded killing 62 people and hospitalizing 136 others. Because of the proximity to urban areas, the consequences from this explosion were devastating. This incident raises the question of whether process safety and safety culture are being developed as fast as urbanization projects in China. Poor planning, poor management and a lack of cooperation between industries, local and federal governments appear to be contributing factors in this event.

Case History— Explosion in Nihon Dempo Kogyo (NDK) Crystal Inc.  
Presented by Jiaqi Zhang at the January 16 Steering Committee Meeting

On December 7, 2009, a 50-foot high-pressure vessel ruptured at NDK Crystal Inc., in Belvidere, Illinois. As a result of the explosion, there were several projectiles. This incident caused one public fatality, one public injury and significant property damage to NDK and an adjacent business. Stress corrosion cracking (SCC) was identified as the failure mechanism that caused the cracks. The low alloy steel, the corrosive liquid at high temperature and the significantly high pressure inside the vessel are the three elements needed for the occurrence of SCC. Based on the operating conditions, the incident was identified as a Boiling Liquid Expanding Vapor Explosion (BLEVE). Energy released from the BLEVE is calculated and it is equal to the energy released from 2565 Kg TNT. The software “PHAST” is used to simulate the overpressure. The minimum safety distance is about 1000 ft. The minimum safety distance for blast fragments is estimated as 5000 ft. Correspondingly, an overall PSA for the facility (especially for the vessel design and facility siting) is strongly recommended as well as improved safety culture and safety management.
On April 8, 2011, an explosion and fire occurred at “A-21” magazine located at Waikele Self Storage in Waipahu, Hawaii, that was leased and used by Donaldson Enterprises, Inc. (DEI) for seized fireworks storage and disposal-related activities. The consequences of the incident include projectiles such as steel hand trucks. Five DEI personnel in the magazine at the time of the incident were killed and one outside the magazine received injuries. Before the explosion, the workers were outside the magazine entrance, disassembling fireworks. When it started raining, the workers moved materials involved in the disassembly process inside the magazine entrance, including tools, chairs, and boxes containing aerial shells, black powder, and partially disassembled firework tubes. The root causes of the incident have not been identified. However, it was probably caused by friction generated during transportation. The direct causes include multiple possible ignition sources, large accumulated amount of black powder, and rainy weather. This case study introduces how fireworks work, the thermal decomposition of black powder, calculation of TNT equivalent mass, the energy released by the incident, the potential hazardous distances from the explosion source. Also, safe separation distances from the magazine have been recommended; regulation gaps in the US have been identified; similar incidents have been summarized and compared with this incident. To avoid similar incidents from happening again, measures could be taken such as using inherently safer methods, minimizing the ignition sources, limiting the amount of explosives accumulated, performing PHA or MOC related activities, improving location selection and worker’s knowledge level, expanding regulation coverage on the disposal of fireworks, and improving federal subcontractor selection and oversight.

AL Solutions recycles titanium and zirconium raw materials for use as alloying additives by aluminum producers. The company currently operates facilities located in New Cumberland and Weirton, W. Va.; Burgettsstown, Pa.; and Washington, Mo. In December 2010, three employees who had been handling zirconium powder at the company’s former plant in New Cumberland, W. Va. died following an explosion. Debris from the explosion, which destroyed the production area of the facility, was scattered into the yards of local residents. The presentation attempted to identify the root cause based on information from press releases of OSHA, EPA and CSB. In the presentation the general causes of combustible dust explosions, the gaps in regulations and some recommendations are provided.
A storage tank farm fire and explosion was chosen as a case study. Firstly, a general description on the storage tank farm profile and its surrounding environment was given. The consequences and incident scenario were displayed. Secondly, to find the root causes, the incident was analyzed from three aspects: oxygen, fuels and ignition sources. Based on safety guides such as API 2003 and NFPA, lagging points in this storage tank farm were identified. Finally, from safety theory, a simple semi-quantitative method to conduct safety inspection in order to reduce the likelihood of unexpected incidents was presented.

The case study presentation focused on the July 2011 explosion at the Evangelos Florakis naval base in the Mediterranean nation of Cyprus. The explosion killed 13 people, including several first responders, injured 60 and caused severe damage to nearby critical infrastructure. The presentation provided general details on the events that lead to a stockpile of seized explosives coming to be held at the naval base, information on the hazards associated with storing those materials, and detailed the political and economic consequences of the blast. The blast resulted in the deaths of top navy officials and the resignation of certain key ministers in the government who were subsequently charged with manslaughter on the basis of criminal negligence. Damage to a nearby power station forced the implementation of rolling blackouts across the country for six months, causing economic hardship, social turmoil, protests, riots, and a loss of confidence in the country’s economy and government. Recommendations were made with regard to the proper storage of explosives and explosive materials including that the UN security council, when authorizing the seizure of munitions, should have a plan in place for the disposition and disposal of those materials.
Beyond Regulatory Compliance, Making Safety Second Nature

2014 INTERNATIONAL SYMPOSIUM

October 28-30, 2014
Hilton Conference Center • College Station, Texas

Topics:
- Offshore Exploration and Production - Deep Water and Arctic
- Pipelines - Natural Gas, Hydrocarbon Liquids and HazMat, Leak Prevention and Detection
- Abnormal Situation Management
- Process Safety Career Development and Education
- Engineering for Resilience
- Case Studies – Histories, Lessons Learned, Databases
- Inherently Safer Processes – New Processes, Existing Plants, Man – Machine Interface
- Human Factors – Engineering, Behavioral Safety, Human Error
- Management for Process Safety – PS Engineering, PSM components, PSM with limited resources, Innovative strategies for improvement
- Safety Culture – Relationship to high consequence/low probability events
- Facility Siting
- LNG – Design, Experiment Evaluation, Consequence Analysis, Mitigation, Research needs, Regulations
- Control Systems – Unusual Situation Mgmt., Safety Instrumented Systems, Integrity Levels, Reliability analysis, Reliance on SIS, Alarm Management
- Risk Assessment, Analysis and Management
- Reactive Chemistry – Predicting Reactivity, Role of Contaminants, Catalysts and Inhibitors, Case Histories, Experimental Methods
- Equipment Integrity – Design for Maintenance, Maintenance Hazard Analysis, Monitoring

or email: ascheinerman@tamu.edu
Call for Papers
70TH Annual Instrumentation and Automation Symposium
for the Process Industries

January 20-22, 2015

Special Focus Areas:

- Partial Stroke Device
- Safety Instrumented Systems
- Asset Management Systems
- Project Management
- Security
- Instrument Mechanical Integrity and Reliability
- Control Valve Sizing
- Enterprise Integration
- Cyber Security
- What’s New in Standards?
- LOPA
- Control Systems
- Safety Systems
- Inferential Sensors
- New Technology
- Back to Basics (for Students)

Abstracts are due by May 31, 2014

Upload abstracts to: http://psc.tamu.edu/IS-phUploader15.php
Password: 2015InstrSym

For more information, please contact: ascheinerman@tamu.edu
Or see: http://instrumentation-symposium.che.tamu.edu/
Distance Learning Objectives

These courses may be taken for either continuing education credit or academic credit. Continuing Education programs provide focused training in specialized areas of technology. These courses can be of value to satisfy current job skills requirements and professional and governmental certification requirements. Where needed, we can provide CEU (Continuing Education Unit) certifications for these programs. You do not need to apply to the university to gain a certificate. However, if you wish to take these courses for academic credit, please contact us.

SENG 310/680: Industrial Hygiene Engineering
Instructor: Dr. Alim Dewan
Application of scientific and engineering principles in the selection and design of control systems related to chemical, physical, and ergonomic exposures in the process and manufacturing industries, relationships of criteria, analysis and specifications for the assessment and control of occupational related illnesses.

SENG 321/670: Industrial Safety Engineering
Instructor: Dr. Ray Mentzer
Concepts of designing, operating, and maintaining optimally safe systems, risk management, economic impact, legislation, performance measurement, and accident investigation and analysis, principles and practices in Industrial Hygiene Engineering, Fire Protection Engineering, and Introduction to Systems Safety Engineering.

SENG 422/677: Fire Protection Engineering
Instructors: Mr. Jason Loyd and Mr. Jason Moats
Fire protection design concepts and considerations for chemical, petrochemical, and hydrocarbon processing facilities. Special attention is given to fire hazard analysis, fire risk assessment, fire protection features, and emergency response. Specific fire protection design considerations are studied for the various types of facilities and processes. Prerequisite: Instructor approval.

SENG 430: Risk Analysis Safety Engineering
Instructor: Dr. William Rogers
Concepts of risk and risk assessment, which uses all available information to provide a foundation for risk-informed and cost-effective engineering practices. Examples and exercises are drawn from a variety of engineering areas.

SENG 455/655 – CHEN 455/655: Process Safety Engineering
Instructor: Dr. M. Sam Mannan
Applications of engineering principles to process safety and hazards analysis, mitigation, and prevention, with special emphasis on the chemical process industries, including source modeling for leakage rates, dispersion analysis, relief valve sizing, fire and explosion damage analysis, hazards identification, risk analysis, and accident investigations.

Online registration
http://psc.tamu.edu/education/schedule-of-classes-registration#DLReg

For questions, contact:
Valerie Green  •  Phone: 979-845-3489  •  E-mail: val-green@tamu.edu
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Valerie Green, Associate Director
Phone: 979/845-6884 • Email: val-green@tamu.edu
Calendar of Events

Short Courses

3111 – Reactive Chemical Hazards Assessment
Instructor: Dr. Bill Rogers
Date: August 13, 2014
Time: 8:30am – 4:30pm
Credit: 0.7 CEUs/7 PDHs
Location: Phoenix Contact – Customer Technology Center, Houston, TX

4072—Gas Explosion Course
Instructors: Dr. Scott Davis, Dr. Kees van Wingerden and M. Sc. Are Bratteteig
August 19—20, 2014
Time: 8:30am—4:30pm
Credit: 1.4 CEUs/14 PDHs
Location: Jack E Brown Building, Texas A&M University

(For more info see: http://psc.tamu.edu/education/continuing-education)

Symposia

October 28-30, 2014
Mary Kay O’Connor Process Safety Center
17th Annual International Symposium
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Memorial Student Center
Texas A&M University
College Station, Texas

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