

# **Purdue Process Safety & Assurance Center - P2SAC**

**Ray A. Mentzer**  
**Visiting Professor**  
**Associate Director, P2SAC**

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Purdue University

*May 7, 2019*

## P2SAC Formed in 2014



Process Safety a challenging quantitative / technical discipline; scope not widely recognized

Conduct process safety related research focusing on fundamental science

Teach rigorous process safety ChE core course (*+180 UG and Grad students enrolled Fall '18*)

Engage UG & Professional MS students in process safety research

Source of expertise for industry and other stakeholders regarding process safety related standards & best practices

Focus on oil & gas industry, chemicals, pharmaceuticals, agriculture, consumer products and manufacturing

Research projects solicited from industry sponsors, as well as other stakeholders such as academia & government labs

Enhance education experience of all Purdue ChE graduates

# Process Safety Challenges in the Pharmaceutical Industry - May 7

**Purpose:** Sharing of pharmaceutical industry's:

- process safety & flow assurance related learnings & challenges,
- on-going related research at Purdue, and
- joint understanding of opportunities for collaboration to address key challenges.

**Desired Outcomes:**

- establish dialog / contacts / relationships,
- understand status quo of process safety in pharma industry, and
- opportunities to address key hazards & risks.

# Process Safety Conference Held Each Semester

*Attendees – May 7, 2019 Conference*

## Sponsors

AMGEN

BP

Chevron

Dow

Fauske & Associates

GSK

Honeywell

Kenexis

Lilly

Phillips 66

Pfizer

Shell

3M

## Guests

- Abbvie\*
- aeSolutions
- Alkermes\*
- American Chem Soc\*
- Americas Styrenics\*
- AMRI
- Biogen\*
- CDC-NIOSH
- Cook Biotech\*
- Corteva Agrosience
- Endress+Hauser
- Evonik
- FujiFilm Dimatix\*
- Gexcon\*
- ICASE
- Johnson Matthey\*
- Merck\*
- Occidental Oil & Gas
- Purdue GMP Center\*
- Scale-Up Systems\*
- Vertex Pharmaceuticals\*

*\* denotes 1<sup>st</sup> meeting*

On-going dialog with other Depts:  
AAE, ABE, CHEM, IE, IPPH, ME & CV

# Agenda – May 7

7:30-8:00 Coffee, tea & pastries

8:00-8:15 **Ray Mentzer** (Visiting Professor of ChE and Executive Director of P2SAC): Welcome & agenda

8:15-8:45 **Paul McKenzie** (Executive Vice President, Biogen): Process Safety at Biogen & the Pharmaceutical Industry

8:45-9:15 **Suresh Garimella** (Executive Vice President Research & Partnerships, Purdue): Discovery Park and Multi-Disciplinary Research at Purdue

9:15-9:45 **Jeff Sperry** (Pfizer): 2M Borane-THF Boiling Liquid Expanding Vapor Explosion (BLEVE)

9:45-10:15 **Zoltan Nagy** (Professor of ChE, Purdue): Upstream Challenges of Continuous Processing of Particulates

10:15-10:30 Break: Coffee & tea

10:30-11:00 **Rex Reklaitis** (Professor of ChE, Purdue): Downstream Challenges of Continuous Processing of Particulates

11:00-11:30 **Ravi Shankar** (Endress+Hauser): Pharma Process Safety - Instrumentation Assets: Health & Performance Monitoring

11:30-12:00 **Ayman Allian** (Amgen): Pharmaceutical Companies Working Together to Make Their Facilities and the World a Safer Place

12:00-1:00 Lunch at Purdue Memorial Union; East & West Faculty Lounge

## Agenda - May 7 – cont'd

1:00-1:25 **Ray Mentzer** (Visiting Professor of ChE and Executive Director of P2SAC): Pharma Related P2SAC Research

1:25-1:50 **Carl Laird** (Professor of ChE Purdue): Efficient Computational Methods for Safe Operation & Design of Detector Systems

1:50-2:15 **Stan Kolis** (Lilly): Use of Ab Initio Calculations for Assessment of Pharmaceutical Process Safety

2:15-2:40 **Carl Wassgren** (Professor of ME, Purdue): Powder Handling & Flow Assurance

2:40-2:55 Break: Coffee & soft drinks

2:55-3:20 **Roy Flanagan** (GSK): Process Safety Considerations for Outsourcing

3:20-3:40 **Sopuru Ezenwa** (Purdue, PhD student): Academic & Industrial Lab Safety Project

3:40-4:05 **Eric Munson** (Professor & Head of Industrial & Physical Pharmacy, Purdue): Formulation Challenges of Continuous Manufacturing of Particulates

4:05-4:30 **Li-Jen Ping** (Johnson Matthey): Managing Heat Accumulation @ Scale Using a Kinetic Model

4:30-4:55 **Brett Savoie** (Assistant Professor ChE, Purdue): Quantum Molecular Modeling to Extend Property Prediction Using Benson Groups and CHETAH

4:55-5:20 **Michael Toth** (Merck): Partial Inertion as Basis of Safety for Pharmaceutical Operations Involving Highly Ignition Sensitive Powders and Modeling Combustion Properties as a Function of Oxygen Conc

5:20 **Ray Mentzer**: Closing & follow up

6:30 Cocktails, followed by 7:15 Dinner at Purdue Memorial Union; East & West Faculty Lounge