

AIChE Process Development Division

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Spring 2014



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New Orleans - DID YOU KNOW?

- New Orleans is where opera was first performed in the U.S., back in 1796.
- The first Mardi Gras parade took place on Shrove Tuesday 1838 in New Orleans.
- New Orleans is the largest port on the Gulf of Mexico, the second largest in the U.S. and the third largest in the world in volume of cargo handled.
- The name "Uncle Sam" was coined on the wharfs of New Orleans before Louisiana was a U.S. territory — goods labeled "U.S." were said to be from "Uncle Sam."
- Poker was invented in New Orleans in the 1700s.
- When individual states had their own currency, the Louisiana dix (French for 10) was a favored currency for trade. In English they became known as "dixies" and the term "Dixieland" was coined.
- New Orleans is the birthplace of jazz.

Message from the Chair

Welcome to the Spring 2014 edition of the AIChE Process Development Division (PDD) Newsletter. I was chair of the division back in 2006-08 and am delighted to return as chair for the 2014-16 term. I've remained very active with the division over the past 15 years. It is a great forum for chemical engineers with careers and interests in process development across all industries to meet, network, and learn together. Here are some highlights for 2014.

This year's AIChE Spring Meeting will be held March 30 – April 3, 2014 at the New Orleans Hilton Riverside in New Orleans, LA.

(Continued on p.2)

Message from the Chair (Cont.)

And if you are thinking about becoming involved in the leadership of the Division, we would love for you to join us! Please come to the Process Development Leadership Meeting on Sunday March 30 from 5:00 – 6:00. It will be held in the Trafalgar Room in the Hilton Riverside,

If you will be attending the AIChE Spring Meeting please join us at the Process Development Division Dinner. The dinner will be at Bourbon House, www.bourbonhouse.com, 144 Bourbon St, New Orleans on Tuesday, April 1 from 6:30 to 9:00 PM. The cost is \$55 per person. Registration for the dinner can be made on-site at the conference on Sunday and Monday.

This year's Fall Annual Meeting will be held November 16-21, 2014 at the Atlanta Marriott Marquis and Hilton Atlanta in Atlanta, GA. This is the premier educational forum for chemical engineers interested in innovation and professional growth, so please submit a paper, share your knowledge, and connect with your peers. The call for papers will be open until May 12th.

Thanks to all for your interest and support of the Division. Although I cannot personally be in New Orleans for the Spring meeting, our Division chair-elect, Bill Hollar, will host the various division meetings. I hope to see many of you at the Fall meeting in Atlanta.

Best regards,

John Peragine

Process Development Division Chair



AWARDS RECIPIENTS AT FALL 2013 ANNUAL MEETING

Mr. Ron Leng

Research Fellow,
The Dow Chemical
Company
Process Development
Practice Award
(sponsored by Zeton)

Mr. Meedesh Singh

Student at Purdue
University
Process Development
Division Student Paper
Award
(sponsored by Lilly)

**Interested in
nominating yourself
or a colleague?**

**Please fill out the
Nomination form at**

www.pd-aiche.com



2014 Process Development Symposium

Solving Today's Global Challenges

June 10-12, 2014

Philadelphia, PA



WHY PDS 2014?

Solving today's global challenges for a planet and civilization that are constantly changing is complex. Over time, new and more complex challenges emerge requiring innovative, sustainable solutions to stay pace with these changes. Process development, the core of chemical engineering, plays a critical role in developing solutions to these challenges.

This year's Process Development Symposium has lined up a select group of speakers, including users, suppliers, consultants, and R&D specialists to present strategic and tactical concepts that will examine critical aspects of the challenge the industry faces in the development and scale-up of chemical processes. Talks will include many case studies to illustrate these topics and more.

The symposium will cover a comprehensive range of key industry topics:

- Critical unit operations
- Emerging technologies
- Sustainable processing
- Common problems encountered upon scale up
- Selecting batch or continuous processes
- Modeling and computational approaches to process development

Keynote Speaker: Henry T. Kohlbrand

Henry (Hank) Kohlbrand is a chemical industry management and technology consultant. He recently retired from a 36-year career at The Dow Chemical Company where he worked in a variety of senior leadership roles in R&D; Manufacturing; Environmental, Health & Safety; and Sustainability. Kohlbrand is a Past President of AIChE and helped to launch AIChE's Process Development Division.



Who should attend?

- Engineers and Managers Working on Product and Process Development
- Process Engineers
- Process Improvement Managers
- Researchers and Development Specialists
- Consultants

The Technical Program includes the following topics:

- Modeling and Computations
- Unit Operations – Real World Applications
- Process Do's and Don'ts
- War Stories: An Interactive Discussion
- Batch vs. Continuous
- Sustainable Processing
- Emerging Technologies
- Beyond Technical Knowledge – The Art of Soft Skills

Register by Friday, April 18th to save!

The PDS Registration Includes: breakfasts, lunches, evening receptions, meeting refreshments, and conference proceedings.

Spring Meeting – What you need to know

Process Development Division (PDD) Dinner

The Process Development Division Dinner provides an excellent opportunity for networking. Plan to attend and become more engaged in the Division!

When: Tuesday April 1, 2014

Time: 6:30 – 9:00 PM

Where: Bourbon House

Address: 144 Bourbon St,
New Orleans, LA 70130

Phone: (504) 522-0111

Contact: dedwards@zeton.com for details



Bring a Young Colleague

Are you looking for one more good reason to register for the 2014 AIChE Spring Meeting?

Here's one: you can bring a young colleague with you for half price.

Simply invite a co-worker, friend or industry newcomer to join you at the Meeting. Your colleague can attend for 50% off the registration fee. That's a savings of \$300 or more.

You are welcome to bring any colleague who passes this simple "test":

- Your colleague is 35 or under
- Has never before attended the Spring Meeting
- And would benefit from attending the year's premier event for chemical engineers and the learning, networking

AIChE Spring Meeting's Student Program March 30-31, 2014

The Spring Meeting's Student Program will focus on networking, career information and social events. Students will celebrate the Chemical Engineering profession with young professionals, AIChE leaders and industry professionals.

Featuring:

Round Table Discussion 2:30 – 4:30PM (Sunday)

Young Professionals from both industry and academia will provide insight on topics including resume review, interview preparation, graduate school, internships, and leadership.

Student Networking Session 4:30 – 6:30 (Sunday)

Dow Plant Tour (Registration: \$5) 11:00 – 2:00 (Monday)

New Orleans Highlights

- The first Shale Gas and Tight Oil Topical Conference
- Panel session on Light Tight Oil and Shale Gas Rapid Growth and Development
- Two Networking Lunches for Spring Meeting Attendees
- Dual-Format Poster Session that includes electronic presentations of select posters
- Spring Meeting Student Program
- 10th Global Congress on Process Safety Banquet

New Orleans Topicals at a Glance

- 2nd International Conference on Upstream Engineering and Flow Assurance
- Shale Gas and Light/Tight Oil
- Manufacturing in the 21st Century
- Emerging Technologies in Clean Energy for the 21st Century
- Distillation Symposium

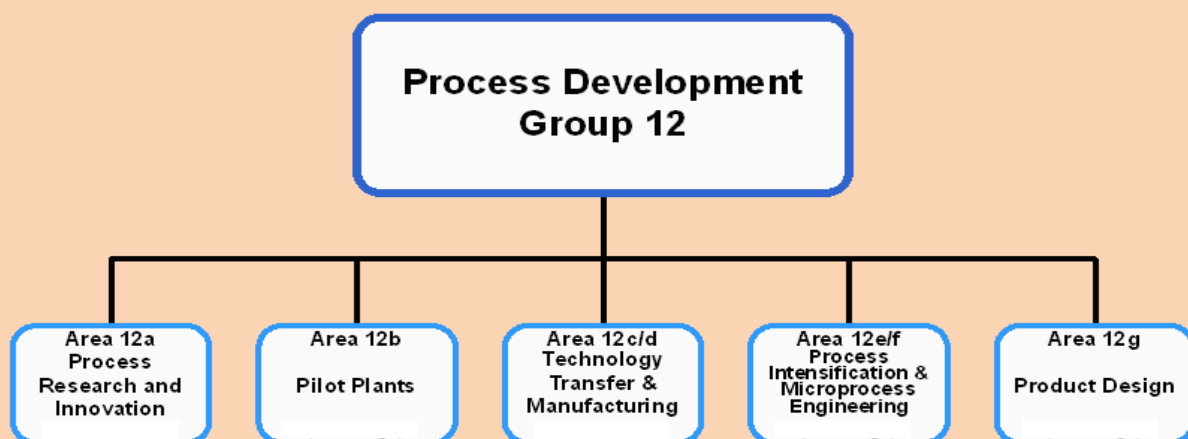


SPRING MEETING – WHY??

New Orleans will be a great opportunity to network with industry and academy. Spring meeting attendance has been growing, in part due to resurgence of chemical engineering and expansion of manufacturing and energy sector employment in North America, due to the Shale Gas revolution. If you attend be sure to look for the Process Development division meeting and dinner in addition to the programming sessions offered. These events offer excellent opportunities for networking and expanding your career participation and visibility.

PDD Financial Highlights

- Balance of \$44,912 as of Dec 31, 13 (per latest PDD accounts from AIChE)
- 466 paid up members as of Dec 31, 13 (down from 474 on Dec 31, 12)



THINGS TO DO WHILE IN NEW ORLEANS ...

Jackson Square

Neighborhood: **French Quarter**

Originally known as the Place d'Armes, Jackson Square has served as a public square since New Orleans was founded in the early 1700s. Today it still serves as the de facto center of the French Quarter and is one of the city's main landmarks.

Bourbon Street

Neighborhood: **French Quarter**

Okay, so Bourbon Street lives up to its stereotype: it's rowdy, raunchy, wild and sometimes tacky. But to come to New Orleans and not at least take a walk down Bourbon at night would almost be a crime. On any given night, thousands of people party into the wee hours of the morning. There are dozens of bars and clubs, ranging from quiet classy establishments to rowdy, frat house-style dance clubs.

Streetcars

Neighborhood: **Uptown/Central Business District**

Since they started service in 1835, the streetcars of New Orleans have been an integral part of the city. There are lines on Carrollton Avenue, Canal Street, St. Charles Avenue and along the Mississippi River. The most scenic route is the St. Charles Avenue line which runs from Canal Street in the Central Business District down St. Charles Avenue through Uptown.



PDD Spring 2014 Programming

Monday, March 31, 2014:

#1 - Spring Meeting Keynote Address

8:00 AM

(1a) Possible vs. Practical: Engineers Must Lead the Development of Practical Technologies

William Banholzer, retired CTO of The Dow Chemical Company

Sponsor: Keynotes and Plenaries

Co-Sponsor(s):

Separations Division (02), Education (04), Management Division (05), Transport and Energy Processes (07), Environmental Division (09), Process Development Division (12), Fuels and Petrochemicals Division (16), Research and New Technology Committee (18J), Young Professionals Committee (YPC) (18C), Sustainable Engineering Forum (23), Chemical Engineering & the Law Forum (24), Upstream Engineering and Flow Assurance Forum (25), 16th Process Plant Safety Symposium (PPSS) (T1A), 29th Center for Chemical Process Safety International Conference (CCPS) (T1B), 3rd Process Safety Management Mentoring (PSM2) Forum (T1D), 48th Annual Loss Prevention Symposium (LPS) (T1C), Global Congress on Process Safety (T1), Process Safety Spotlights (T1E), Shale Gas and Tight Oil (T2), Manufacturing for the 21st Century (T3), Topical Five: Emerging Technologies in Clean Energy for the Twenty-First Century (T5), Topical 6: 14th Topical Conference on Gas Utilization (T6A), Topical 7: 17th Topical on Refinery Processing (T7), Topical 8: Distillation Topical Conference (T8), 2nd International Conference on Upstream Engineering and Flow Assurance (T9)

#7 - Process Development Division Plenary

9:45 AM

(7a) Improving the Speed and Representation of Physical Properties Regression

(7b) Shale Gas and the History of C1 Chemistry

(7c) Using the Patterns of Invention in the Patent Literature to Predict Disruption

(7d) Mitsubishi Advanced Technology for On-Purpose Butadiene Production

#26 – Challenges in Process Scale-up

1:30 PM

(26a) Thinking Like Sherlock Holmes for Process Filtration Technology Selection

(26b) Managing Process Safety in Pilot Plants and Bench Scale Units

(26c) Mechanism-Free Chemical Engineering Kinetics

(26d) Dynamic Kinetic Test Unit for Determination of Kinetic Parameters Under Prototype Conditions

(26e) Rapid Process Scale-up through Innovative Design Methodologies

PDD Spring 2014 Programming Continued (1)

#31 - Process Research and Development for Industrial Sustainability 2:00 PM

1:30 PM

(31a) Energy Systems Model: Development of a Discrete-Event Simulation Tool to Facilitate Operating Decisions

(31b) Oxygenated Compounds as Reducing Agent for NO_x Removal in a Selective Non-Catalytic Reduction (SNCR) System

(31c) Flare Emission and Greenhouse Gas Reduction Study during an Ethylene Plant Startup on Recycle through Dynamic Simulation and Process Optimization

(31d) Chemical Plant Startup Simulations for Flare Emission Reduction

(31e) Dynamic Simulation for Flare Minimization Strategy in an Ethylene Plant Shutdown

(31f) Assessing the Use of Ceramic Membrane Bioreactor for Anaerobic Treatment of High-Load Food Wastewater at Bench Scale and Pilot Scale

#38 – Steam traps / Water Quality

2:00 PM

(38a) Common Issues that Can Limit Steam Trap Performance

(38b) Overview of Steam Trap Types and Their Operation

(38c) A Practical Approach to Feedwater Quality Requirements in Boiler Systems

(38d) Steam Traps: Audience Survey of Operation and Maintenance

#48 – Spring Meeting Poster Session and Networking Reception

5:00 PM

Grand Salons 19-24 (Hilton New Orleans Riverside)

Description:

This year's poster session will be a different format than in the past. In addition to posters, we will be using digital screens where poster presenters will be able to display a few slides. Presenters will give a short talk about their digital "poster".

Sponsor:

Keynotes and Plenaries

Co-Sponsor(s):

Separations Division (02), Education (04), Management Division (05), Transport and Energy Processes (07), Environmental Division (09), Computing Systems and Technology Division (10), Process Development Division (12), Fuels and Petrochemicals Division (16), Research and New Technology Committee (18J), Young Professionals Committee (YPC) (18C), Sustainable Engineering Forum (23), Chemical Engineering & the Law Forum (24), Upstream Engineering and Flow Assurance Forum (25), Shale Gas and Tight Oil (T2), Manufacturing for the 21st Century (T3), Topical Five: Emerging Technologies in Clean Energy for the Twenty-First Century (T5), Topical 6: 14th Topical Conference on Gas Utilization (T6A), Topical 7: 17th Topical on Refinery Processing (T7), Topical 8: Distillation Topical Conference (T8), 2nd International Conference on Upstream Engineering and Flow Assurance (T9)

PDD Spring 2014 Programming Continued (2)

Tuesday, April 1, 2014:

#52 - Light Tight Oil and Shale Gas Rapid Growth and Development - Panel Session

8:00 AM

#60 – Process Research & Innovation

8:30 AM

(60a) A Study on Exergy-Based Thermodynamic Analysis and Process Synthesis of Mixed-Refrigerant Systems for Ethylene Plants

(60b) Plant-Wide Simulation of Ethanol Oxidation Process for Acetic Acid Production

(60c) Dynamic Modeling and Optimization of Ring Opening Polymerization: Modeling Challenges and Computation Improvements

(60d) Polymerization in a Spray Dryer – Designing a Pre-Reaction before Atomization to Boost the Reaction in the Spray

(60e) Utilization and Benefits of a Nanoparticle Extraction Process in a Drop Column for Production of High Quality Organosols

#62 - Challenges in Scaling Multiphase Contactors Part I

8:30 AM

(62a) Dimensional Analysis of Gas Flow Through Packed Columns

(62b) Project “Multi-Phase” – a Combined Effort of Industry and Academia to Investigate Bubble Column Hydrodynamics

(62c) Scaling Solid Resuspension and Sorption for the Small Column Ion Exchange (SCIX) Processing Tank

(62d) Project “Multi-Phase” – Gas Holdup of Bubble Columns in a Multidimensional Space

#84 - Challenges in Scaling Multiphase Contactors Part II

1:30 PM

(84a) Time-Series Analysis of Optical Measurements in Gas-Liquid Stirred Tanks

(84b) Liquid Phase Back Mixing in Bubble Columns

(84c) Use of Dimensional Analysis to Design Packed-Bed, Gas-Liquid Extraction Columns

#88 - Reactive / Intensified Distillation

1:30 PM

(88a) Development of a Reactive Distillation where the Reactor is the Reboiler

(88b) Heat Integrated Reactive Distillation Using External Side Reactors for Synthesis of Tri-Ethyl Citrate

(88c) Reactive Distillation Process of Methyl Acetate Hydrolysis Directly Intensified by Auxiliary Reaction of Methanol Dehydration

(88d) Simulation and Optimization of Different Extractive Distillation Schemes for Aromatics Recovery from Pyrolysis Gasoline

(88e) A Reactive Distillation Column with Two Reaction Zones for the Cyclohexanol Production from Cyclohexene

PDD Spring 2014 Programming Continued (3)

#83 – Careers in Management

1:30 PM

Description:

Invited presenters will discuss aspects of various types of careers in management and the different skills required. The session will be targeted at young professionals contemplating a management pathway or who are just embarked on such a course. The session will conclude with a panel of speakers to field questions from the attendees or other panelists.

(83a) A Recipe to Excel: Beyond Technical Competency

(83b) Managing Careers in Consulting and Engineering

(83c) Management Careers in an Industrial Setting

(83d) Managing Through Extreme Change

(83e) You Can Have it All, But Not at the Same Time

(83f) Managing Volunteers is a Little Like Herding Cats

(83g) Panel of Careers in Management Participants

#105 – Emerging Technologies in Clean Energy Keynote

5:00 PM

(105a) New Learning Curves for Industrial Biotechnology: Liquid Fuels from Bioconversion of Methane and Bioelectrosynthesis

Ramon Gonzalez

Wednesday, April 2, 2014:

#116 - Process Intensification By Process Integration

8:00 AM

(116a) Scaling up of Compact Heat Exchanger Reactors

(116c) Combination of Photocatalytic and Photo-Fenton Oxidations Using Visible Light-Activated Photocatalyst for Decomposing Synthetic Chemical in Water

(116d) Hybrid Separations Including Organic Solvent Nanofiltration: Process Intensification for the Purification of Iso-Butylbenzene

(116e) Optimization of Floating Liquefied Natural Gas Process with Process Knowledge and Boxline Method

#117 – Six Sigma Process Development

8:00 AM

(117a) Chemical Process Development - a Lean Six Sigma Perspective

(117b) Using Six Sigma and Experimental Design in Process Development

(117c) Lean Six Sigma Methods in Xerox Corporation

(117d) Development of Continuous Improvement Network in Xerox Manufacturing

(117e) Use of Six Sigma Tools in the Commercial Scale-up of a Novel PPE Copolymer

PDD Spring 2014 Programming Continued (4)

#120 – Advanced Technologies for Reduction of Atmospheric Emissions in the Petrochemical and Refining Industries I

8:00 AM

(120a) Achieving Environmental Compliance through Proper Destruction Efficiency of Multi-Tip Low-Profile (MTLP) Flare Systems

(120b) A Multi-Period Process Integration to the Management of Process Flares with Consideration of Fuel Substitution and Cogeneration Systems

(120c) Real Time Remote Monitoring of Flare Combustion Efficiency

(120d) Flameless Thermal Oxidation

(120e) Modeling of the Dynamic Interaction in an LDPE Closed System Purge Bins-Regenerative Thermal Oxidizer (RTO) for Ethylene Emission Mitigation

(120f) Air Quality Impact of the Startup of a Single Olefin Plant

#136 – Shale Oil & Gas Development - Innovative Technological Contributions

1:30 PM

(136a) A Qualitative in Field Test to Characterize Oil-Shale Reservoirs

(136b) Pressure Regulation and Kick Attenuation with Wired Pipe Technology in Managed Pressure Drilling

(136c) Risks from Unconventional Wells Gasification

(136d) Supercritical CO₂ / Brine / Hydrocarbon Interactions in Shale Rock Fracture: A Geo-Microfluidics Approach

(136e) Model Shale Gas Properties from a Statistical Mechanical Perturbed Hard-Sphere Chain Cubic Equation of State

#137 – Advanced Technologies for Reduction of Atmospheric Emissions in the Petrochemical and Refining Industries II

1:30 PM

(137a) Solid Fuel to Natural Gas Conversions for Existing Boiler Applications

(137b) Vapor Intrusion - Models and Their Value

(137c) Synthesis, Fine Structural Characterization, and CO₂ Adsorption Capacity of Cobalt and Nickel-Based Metal Organic Framework-74

(137d) Treatment of Flowback Water from Hydraulic Fracturing with Biochar

(137e) Hazards Management for Building Locations through Air Dispersion Modeling

(137f) H₂S Removal from Biogas Using an Ionic Liquid as Physical Absorbent

#138 – Best Senior Design Competition

1:30 PM

(138a) U of H Senior Design Project: Steam-Methane Reforming Hydrogen Generation Plant

(138b) Grass-Roots Design of an Ethylene Oxide Manufacturing Facility

(138c) Economic Optimization and Hazard Analysis of a Hydrofluoric Acid Catalyzed Alkylation Process

#144 – You may be Liable

1:30 PM

(144e) Determining the Liability of a Fire Starting Product

(144a) The Growth of Idea Ownership: Patent Infringement and Risk Management within the Chemical Process Industries

(144b) Chemical Engineering & the Law --Case Examples in Industrial Litigation

(144c) Mission-Critical Chemical Facilities: Initial Findings and Policy Implications

(144d) Economically Critical Chemical Facilities: Findings and Policy Implications

2014 Annual Meeting

November 16 - 21, 2014

Atlanta Marriott Marquis & Hilton Atlanta, Atlanta

PDD Tentative Sessions:

12000 Division Plenary: Process Development

Process Research and Innovation (12A)

12A00 Process Innovation and Optimization for Agile Manufacturing

12A01 Bioprocessing of Biomass to Biofuels and Value-Added Bioproducts

12A02 Process Reengineering for Increased Energy Saving and Improved Environment Protection

12A03 Industrial Process Automation Review and Challenges

12A04 Crystallization Process Development

12A05 Product and Process Development for Sustainability

12A06 Separation/Reaction Technologies for Bioactive Industries

Pilot Plants (12B)

12B00 Pharmaceutical Process Development and Pilot Plants

12B01 Challenges in Small-Scale Synthesis - Pilot Plants

12B02 Advances in on-Line Tools for Pilot Plants

12B03 Ensuring Safe Process Scale-Up

Technology Transfer and Manufacturing (12C)

12C00 Case Studies in Process Intensification and Microprocess Engineering

12C01 Reducing Risk during Technology Transfer

12C02 On-Line Instrumentation for Smart / Sustainable Manufacturing

Process Intensification & Microprocess Engineering (12E)

12E00 Advances in Process Intensification

12E01 Process Intensification By Process Integration

12E02 Process Intensification by Miniaturization

12E03 Structured Apparatuses for Process Intensification

12E04 Innovative Solvents in Process Applications

12E05 Process Intensification by Novel Reaction Routes

12E06 Process Intensification by Enhanced Mass and Heat Transfer

Product Design (12G)

12G00 Product Formulation Management and Design

12G01 Tools for Chemical Product Design

12G02 Physical Properties for Chemical Product Design

12G03 Biodegradable Material in Products



Call for Papers Closes May 12, 2014!

Process Development Area Leadership

	Chair	Chair Elect	Area Coordinator
12a Process Research & Innovation pd-aiche.com/area12a	Qiang Xu ChE Dept Lamar University 409-880-7818 qiang.xu@lamar.edu	Tom Enright Xerox Research 905-823-7091 x345 tom.enright@xerox.com	Open
12b Pilot Plants pd-aiche.com/area12b	Kiran Gupte BP 630- 420-4390 kiran.gupte@bp.com	Oliver Orrell Zeton Inc. 905-632-3123 x264 oorrell@zeton.com	Open
12c/d Technology Transfer & Manufacturing pd-aiche.com/area12c	Jon Worstell jonathanworstell@aol.com	Ahmed A. Youssef SABIC, Innovative Plastics T: 812.831.4121 Email: ahmed.youssef@sabicip.com	Open
12e/f Process Intensification pd-aiche.com/area12e	Hannsjoerg Freund Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) T: +49 (0)9131 85-27424 E-Mail: hannsjoerg.freund@crt.cbi.uni-erlangen.de	Pankaj Gautam SABIC, Innovative Plastics T: 812 589 9495 Email: Pankaj.gautam@sabic-ip.com	Derek Griffin Lanza Tech 630-439-3054 Derek@lanzatech.com
12g Product Design pd-aiche.com/area12g	Ken Cox Rice University 713- 348-3529 krcox@rice.edu	Mosha Zhao ExxonMobil Chemical Company 281-834-2626	Open

Process Development Division Leadership (2014-2016)

Chair	John F. Peragine Bristol-Myers Squibb Phone: (732) 227-5688 E-Mail: John.Peragine@bms.com	Chair Elect 	Willian Hollar SABIC Technical Center – Engineering Thermoplastics Phone: 812-831-4751 William.hollar@sabic-ip.com
Program Chair 	Joseph W. Schroer ClearWaterBay Technology Inc., Phone: (909) 595-8928 E-mail: jschroer@cwbbtech.com	Membership Chair 	Kevin Joback Molecular Knowledge Systems, Inc. Phone: 603-472-5315 kevin@molknow.com
Assistant Program Chair 	Santiago Faucher Hatch 905-403-4001 Sfaucher@hatch.ca	CTOC Liaison 	Joseph Powell Royal Dutch Shell Group Phone: 281-544-8976 Joe.Powell@Shell.com
Treasurer 	David Edwards Zeton Inc. Phone: (905) 632-3123 Email: dedwards@zeton.com	Awards Chair 	Jay Miller LyondellBasell Industries Phone: (610) 359-2092 Email: j.miller@lyondellbasell.com
Newsletter Editor 	Ahmed A. Youssef SABIC, Innovative Plastics T: 812.831.4121 Email: ahmed.youssef@sabic-ip.com	Past Chair 	Michael Hill Columbia University 212-854-1095 Email: mhill@columbia.edu
Webmaster	Joseph W. Schroer ClearWaterBay Technology Inc. Phone: (909) 595-8928 E-mail: jschroer@cwbbtech.com		