



2016

Center for Energy Initiatives

November 13-18, 2016

Hilton San Francisco Union Square, San Francisco, CA

Letter from the Chair

Dear Energy Professional,

Welcome to the program of the Center for Energy Initiatives at the 2016 AIChE Annual Conference at the Hilton San Francisco in San Francisco, CA. This program will focus on recent developments that will be instrumental to a better understanding of the technologies and the research and development that will stimulate innovative thinking to advance energy systems. The conference will address critical issues across eight key topics:

- Biorefinery Technologies for Forest Based Lignocellulosic Biomass
- Solar Energy for Power Generation and Chemical Processing
- Hydrogen Production and Storage
- Alternative Energy & Enabling Technologies
- BioFuels
- Fossil Fuels & CCS
- Transport and Energy Processes
- Alternate Fuels and New Technology

The program also includes sessions from the International Congress on Energy (ICE) 2016. The International Congress on Energy represents one of the largest technical conferences on energy that cover a wide variety of energy related topics.



Dale L. Keairns

Chair, Center for Energy Initiatives
An AIChE Technological Community
Deloitte Consulting LLP

Center for Energy Initiatives Executive Committee

- **Bond Calloway**, Savannah River National Laboratory
- **Dale Keairns**, CEI Chair, Deloitte
- **Haroon Kheshgi**, ExxonMobil
- **Ah-Hyung (Alissa) Park**, Columbia University
- **Darlene Schuster**, CEI Executive Director
- **Gregory Stephanopoulos**, Massachusetts Institute of Technology
- **June Wispelwey**, AIChE Executive Director

Featured events include:

Critical Public Policy Issues for Every ChemE (Invited Talks)

Leaders of AIChE's Public Affairs & Information Committee and invited topical experts will discuss three critical public policy issues impacting our profession: (a) the energy/water/food nexus, (b) safety in the process industries, and (c) advanced manufacturing

Date: Sunday, November 13, 2016: 3:30 PM-6:00 PM

Location: Continental 2 (Hilton San Francisco Union Square)

Chairs:

Phillip R. Westmoreland, North Carolina State University
Nada Marie Anid, New York Institute of Technology

World Café: Food-Energy-Water Nexus (Invited Talks)

The affordable production, security, and safety of Food, Energy, and Water resources (the FEW Nexus) can no longer be addressed in isolation. The complicated world structure and global connections result in a complex system problem with the search to balance local needs and complex global connections. New frameworks, methodologies, and tools that account for diverse stakeholders are needed to manage the Nexus. Chemical engineers bring important understanding, skills, and gifts to address this problem. This plenary session, a continuing AIChE / IChemE collaboration on the Nexus, leads a topical conference on the Nexus that is being established to provide a forum for exchanging research, case studies, and ideas.

Date: Monday, November 14, 2016: 8:00 AM-10:30 AM

Location: Union Square 15 & 16 (Hilton San Francisco Union Square)

Chairs:

Dale Keairns, Deloitte Strategy & Operations
Henry T. (Hank) Kohlbrand, HT Consulting
Richard C. Darton, University of Oxford

Program

Biorefinery Technologies for Forest Based Lignocellulosic Biomass					
Day	Time	Session #	Session Title	Property	Room
Sunday	3:30 PM	47	Process Development for Sustainable Food and Biochemical Production*	Hilton San Francisco Union Square	Continental 9
Sunday	3:30 PM	48	Reaction Engineering of Biomass and Hydrocarbons in Supercritical Water*	Hilton San Francisco Union Square	Franciscan B
Sunday	3:30 PM	56	Value-Added Coproducts from Biorefineries*	Hilton San Francisco Union Square	Lombard
Monday	8:00 AM	91	Lignin-Based Materials*	Hilton San Francisco Union Square	Lombard
Monday	12:30 PM	139	Cellulose-Based Materials*	Hilton San Francisco Union Square	Lombard
Monday	3:15 PM	193	Advanced Energy Technologies: Biomass Conversion, Steam Reforming, Partial Oxidation, and Auto-Thermal Reforming*	Hilton San Francisco Union Square	Mason
Monday	3:15 PM	214	Functional and Bioinspired Cellulosic Materials*	Hilton San Francisco Union Square	Lombard
Monday	3:15 PM	225	Particle Surface Effects in Solids Handling*	Hotel Nikko San Francisco	Monterey II
Monday	3:15 PM	235	Reaction Kinetics and Transport Fundamentals for Biomass Conversion: Chemical and Catalytic*	Hilton San Francisco Union Square	Union Square 14
Monday	6:00 PM	261	Poster Session: Novel Products from Forest and Plant Biomass*	Hilton San Francisco Union Square	Grand Ballroom B
Tuesday	8:30 AM	275	Biological Conversions and Processes for Renewable Feedstocks*	Hilton San Francisco Union Square	Union Square 19 & 20
Tuesday	8:30 AM	276	Biomass Characterization, Pretreatment, and Fractionation	Hilton San Francisco Union Square	Lombard
Tuesday	8:30 AM	288	Efficient Processing of Lignin to Bioproducts and Biofuels *	Hilton San Francisco Union Square	Union Square 21
Tuesday	12:30 PM	373	Plenary Session: Sustainable Biorefineries (Invited Talks)*	Hilton San Francisco Union Square	Union Square 19 & 20

Tuesday	12:30 PM	379	Sustainable Fuel from Renewable Resources*	Hilton San Francisco Union Square	Union Square 13
Tuesday	12:30 PM	380	Thermochemical Conversion of Biomass I	Hilton San Francisco Union Square	Lombard
Tuesday	3:15 PM	403	Distributed Bioprocessing for Integrated Biorefineries*	Hilton San Francisco Union Square	Union Square 19 & 20
Tuesday	3:15 PM	408	Fluidization and Fluid-Particle Systems for Energy and Environmental Applications I*	Hotel Nikko San Francisco	Peninsula
Tuesday	3:15 PM	432	Pyrolysis of Biomass*	Hilton San Francisco Union Square	Franciscan B
Tuesday	3:15 PM	440	Thermochemical Conversion of Biomass II	Hilton San Francisco Union Square	Lombard
Tuesday	3:15 PM	444	Value-Added Co-Products from Biorefineries*	Hilton San Francisco Union Square	Union Square 14
Wednesday	8:30 AM	459	Biobased Fuels and Chemicals II: Enzymatic Conversion of Recalcitrant Feedstocks*	Hilton San Francisco Union Square	Continental 9
Wednesday	8:30 AM	473	Fluidization and Fluid-Particle Systems for Energy and Environmental Applications II*	Hotel Nikko San Francisco	Peninsula
Wednesday	8:30 AM	496	Reaction Engineering for Biomass Conversion*	Hilton San Francisco Union Square	Franciscan B
Wednesday	8:30 AM	504	USA-China Progress in Biomass Conversion Technologies I	Hilton San Francisco Union Square	Lombard
Wednesday	12:30 PM	516	Biobased Fuels and Chemicals I: Biosynthetic Pathway Engineering*	Hilton San Francisco Union Square	Continental 9
Wednesday	12:30 PM	534	Integrated Thermochemical and Biochemical Processing for Renewable Fuels and Chemicals*	Hilton San Francisco Union Square	Union Square 19 & 20
Wednesday	12:30 PM	558	USA-China Progress in Biomass Conversion Technologies II and Biochemical Conversion of Plant Biomass II	Hilton San Francisco Union Square	Lombard
Wednesday	3:15 PM	567	Biochemical Conversion Processes in Forest/Plant Biomass Biorefineries	Hilton San Francisco Union Square	Lombard
Wednesday	3:15 PM	574	Catalysis with Microporous and Mesoporous Materials I: Lewis Acid Zeolites and Biomass Conversion*	Hilton San Francisco Union Square	Imperial B
Wednesday	3:15 PM	580	Design of Integrated Biorefineries I*	Hotel Nikko San Francisco	Carmel I

Wednesday	3:15 PM	589	Integrating Municipal and Industrial Waste into Biorefineries*	Hilton San Francisco Union Square	Union Square 17 & 18
Wednesday	6:00 PM	619	Poster Session: Sustainability and Sustainable Biorefineries*	Hilton San Francisco Union Square	Grand Ballroom B
Thursday	8:30 AM	622	Biobased Materials*	Hilton San Francisco Union Square	Continental 9
Thursday	8:30 AM	628	Catalytic Biomass Conversion to Chemicals I*	Hilton San Francisco Union Square	Taylor
Thursday	8:30 AM	632	Chemical Conversion Processes in Forest/Plant Biorefineries	Hilton San Francisco Union Square	Lombard
Thursday	8:30 AM	636	Design of Integrated Biorefineries II*	Hotel Nikko San Francisco	Carmel I
Thursday	12:30 PM	668	Advances in Algae Based Biorefineries: Algae Biomass Cultivation, Harvesting, and Characterization	Hilton San Francisco Union Square	Lombard
Thursday	12:30 PM	675	Catalytic Biomass Conversion to Chemicals II*	Hilton San Francisco Union Square	Taylor
Thursday	12:30 PM	679	Conversion of Biomass Based Renewable Resources to Synthesis Gases and Pyrolysis Oils I*	Hilton San Francisco Union Square	Union Square 19 & 20
Thursday	12:30 PM	710	Recalcitrance of Woody Biomass	Hilton San Francisco Union Square	Mason
Thursday	3:15 PM	729	Conversion of Biomass Based Renewable Resources to Synthesis Gases and Pyrolysis Oils II*	Hilton San Francisco Union Square	Union Square 19 & 20
Thursday	3:15 PM	731	Developments in the Pretreatment of Lignocellulosics for Bioconversion*	Hilton San Francisco Union Square	Union Square 17 & 18
Thursday	3:15 PM	748	Separation Processes in Biorefineries	Hilton San Francisco Union Square	Lombard
Friday	8:30 AM	758	Advances in Algal Biorefineries I*	Hilton San Francisco Union Square	Golden Gate 7
Friday	12:30 PM	772	Advances in Algal Biorefineries II*	Hilton San Francisco Union Square	Golden Gate 7
Friday	12:30 PM	783	Reactor Engineering for Biomass Feedstocks*	Hilton San Francisco Union Square	Golden Gate 8

Solar Energy for Power Generation and Chemical Processing

Day	Time	Session #	Session Title	Property	Room
Sunday	3:30 PM	40	Nanomaterials for Thermal-to-Electric Conversion*	Hilton San Francisco Union Square	Golden Gate 8
Monday	8:00 AM	98	Nanomaterials for Light Harvesting and Novel Photophysical Phenomenon*	Hilton San Francisco Union Square	Golden Gate 8
Monday	8:00 AM	99	Nanostructured/Thin Film Photovoltaics*	Hilton San Francisco Union Square	Golden Gate 5
Monday	12:30 PM	167	Nanomaterials for Photovoltaics*	Hilton San Francisco Union Square	Golden Gate 8
Monday	12:30 PM	176	Plenary Session: Emerging Energy Applications of Nanoscale Science and Engineering*	Hilton San Francisco Union Square	Golden Gate 7
Monday	3:15 PM	193	Advanced Energy Technologies: Biomass Conversion, Steam Reforming, Partial Oxidation, and Auto-Thermal Reforming*	Hilton San Francisco Union Square	Mason
Monday	3:15 PM	240	Sustainable Electricity: Generation and Storage *	Hilton San Francisco Union Square	Union Square 19 & 20
Tuesday	12:30 PM	348	Electrocatalysis and Photoelectrocatalysis V: Electrolysis and Solar Fuels*	Hilton San Francisco Union Square	Franciscan C
Tuesday	12:30 PM	353	Fuels from Sun I: Nanomaterials for Water Splitting, Artificial Photosynthesis, and Other Photocatalytic and Photoelectrochemical Reactions*	Hilton San Francisco Union Square	Golden Gate 8
Tuesday	12:30 PM	371	Novel Nanoparticles and Nanostructured Materials for Energy and Environmental Applications I*	Hotel Nikko San Francisco	Peninsula
Tuesday	3:15 PM	415	Materials and Processes for Thermo-, Electro- and Photo-Chemical Energy Storage*	Hilton San Francisco Union Square	Union Square 21
Tuesday	3:15 PM	421	Novel Nanoparticles and Nanostructured Materials for Energy and Environmental Applications II*	Hotel Nikko San Francisco	Golden Gate
Wednesday	8:30 AM	498	Solar Thermochemical Energy Storage	Hilton San Francisco Union Square	Powell
Wednesday	12:30 PM	557	Solar Thermal Power Generation	Hilton San Francisco Union Square	Powell
Wednesday	3:15 PM	609	Solar Thermochemical Fuels I	Hilton San Francisco Union Square	Powell

Thursday	8:30 AM	664	Solar Thermochemical Fuels II	Hilton San Francisco Union Square	Powell
Thursday	12:30 PM	712	Solar Thermochemical Processing	Hilton San Francisco Union Square	Powell
Thursday	3:15 PM	753	Techniques in Solar Energy	Hilton San Francisco Union Square	Powell

Hydrogen Production and Storage					
Day	Time	Session #	Session Title	Property	Room
Sunday	3:30 PM	23	Catalysts for Fuel Cells, Electrolyzers, and Electrochemical Devices*	Hilton San Francisco Union Square	Powell
Monday	12:30 PM	140	Chemical Looping Processes I*	Hilton San Francisco Union Square	Union Square 21
Monday	12:30 PM	145	Electrocatalysis and Photoelectrocatalysis II: HER/HOR*	Hilton San Francisco Union Square	Franciscan C
Monday	3:15 PM	208	Chemical Looping Processes II*	Hilton San Francisco Union Square	Union Square 21
Monday	3:15 PM	213	Fuel Cell Membranes*	Hilton San Francisco Union Square	Plaza B
Tuesday	12:30 PM	353	Fuels from Sun I: Nanomaterials for Water Splitting, Artificial Photosynthesis, and Other Photocatalytic and Photoelectrochemical Reactions*	Hilton San Francisco Union Square	Golden Gate 8
Tuesday	12:30 PM	365	Materials for Electrochemical Energy Conversion*	Hilton San Francisco Union Square	Golden Gate 4
Tuesday	12:30 PM	379	Sustainable Fuel from Renewable Resources*	Hilton San Francisco Union Square	Union Square 13
Tuesday	3:15 PM	408	Fluidization and Fluid-Particle Systems for Energy and Environmental Applications I*	Hotel Nikko San Francisco	Peninsula
Tuesday	3:15 PM	409	Fuel Processing for Hydrogen Production*	Hilton San Francisco Union Square	Van Ness
Tuesday	3:15 PM	420	Novel Hydrogen Generation and Advanced Storage Technologies*	Hilton San Francisco Union Square	Powell
Tuesday	3:15 PM	443	Unconventionals: Hydrogen and Fuel Cells I*	Hilton San Francisco Union Square	Taylor

Wednesday	8:30 AM	473	Fluidization and Fluid-Particle Systems for Energy and Environmental Applications II*	Hotel Nikko San Francisco	Peninsula
Wednesday	8:30 AM	491	Nanomaterials for Energy Storage I*	Hilton San Francisco Union Square	Continental 1
Wednesday	8:30 AM	503	Unconventionals: Hydrogen and Fuel Cells II*	Hilton San Francisco Union Square	Taylor
Wednesday	12:30 PM	536	Interfacial Phenomena in Electrochemical Systems*	Hilton San Francisco Union Square	Union Square 25
Wednesday	3:15 PM	599	Nanomaterials for Hydrogen Production and Fuel Cells*	Hilton San Francisco Union Square	Continental 1
Wednesday	3:15 PM	603	Polymers for Energy Storage and Conversion*	Hilton San Francisco Union Square	Imperial A
Thursday	8:30 AM	629	Catalytic Hydrogen Generation*	Hilton San Francisco Union Square	Franciscan B
Thursday	8:30 AM	645	Materials for Electrochemical Energy Storage I*	Hilton San Francisco Union Square	Golden Gate 5
Thursday	12:30 PM	693	Materials for Electrochemical Energy Storage II*	Hilton San Francisco Union Square	Golden Gate 5
Thursday	3:15 PM	719	Alternative Fuels*	Hilton San Francisco Union Square	Franciscan B

Alternative Energy & Enabling Technologies					
Day	Time	Session #	Session Title	Property	Room
Sunday	3:30 PM	25	Conversion of Solid Wastes to Energy and/or Product*	Hilton San Francisco Union Square	Union Square 21
Sunday	3:30 PM	27	Design of CO ₂ Capture and Utilization Systems*	Hotel Nikko San Francisco	Carmel I
Sunday	3:30 PM	40	Nanomaterials for Thermal-to-Electric Conversion*	Hilton San Francisco Union Square	Golden Gate 8
Monday	8:00 AM	66	Biofuels Production: Design, Simulation, and Economic Analysis I*	Hilton San Francisco Union Square	Union Square 17 & 18

Monday	8:00 AM	70	Breakthroughs in C ₁ to Chemicals and Processing Engineering*	Hilton San Francisco Union Square	Union Square 21
Monday	8:00 AM	72	Catalytic Processing of Fossil and Biorenewable Feedstocks I: C-O Bond Activation*	Hilton San Francisco Union Square	Franciscan B
Monday	8:00 AM	79	Electrocatalysis and Photoelectrocatalysis I: CO ₂ Reduction*	Hilton San Francisco Union Square	Franciscan C
Monday	8:00 AM	99	Nanostructured/Thin Film Photovoltaics*	Hilton San Francisco Union Square	Golden Gate 5
Monday	8:00 AM	100	Nanostructured Thin Films*	Hilton San Francisco Union Square	Golden Gate 4
Monday	8:00 AM	106	Sustainable Energy from Renewable Resources*	Hilton San Francisco Union Square	Union Square 19 & 20
Monday	12:30 PM	138	Catalytic Processing of Fossil and Biorenewable Feedstocks II: Biomass-Derived Aromatics*	Hilton San Francisco Union Square	Franciscan B
Monday	12:30 PM	145	Electrocatalysis and Photoelectrocatalysis II: HER/HOR*	Hilton San Francisco Union Square	Franciscan C
Monday	12:30 PM	167	Nanomaterials for Photovoltaics*	Hilton San Francisco Union Square	Golden Gate 8
Monday	12:30 PM	180	Solid Oxide Fuel Cells (SOFC) and Electrolyzers*	Hilton San Francisco Union Square	Powell
Monday	3:15 PM	193	Advanced Energy Technologies: Biomass Conversion, Steam Reforming, Partial Oxidation, and Auto-Thermal Reforming*	Hilton San Francisco Union Square	Mason
Monday	3:15 PM	201	Battery and Energy Storage Technologies*	Hilton San Francisco Union Square	Powell
Monday	3:15 PM	202	Biofuels Production: Design, Simulation, and Economic Analysis II*	Hilton San Francisco Union Square	Union Square 17 & 18
Monday	3:15 PM	205	Catalytic Processing of Fossil and Biorenewable Feedstocks III: Sugars, Furan Derivatives, and Related*	Hilton San Francisco Union Square	Franciscan B
Monday	3:15 PM	212	Electrocatalysis and Photoelectrocatalysis III: Fuel Oxidation and Chemical Transformations*	Hilton San Francisco Union Square	Franciscan C

Monday	3:15 PM	240	Sustainable Electricity: Generation and Storage *	Hilton San Francisco Union Square	Union Square 19 & 20
Tuesday	8:30 AM	275	Biological Conversions and Processes for Renewable Feedstocks*	Hilton San Francisco Union Square	Union Square 19 & 20
Tuesday	8:30 AM	281	Catalytic Processing of Fossil and Biorenewable Feedstocks IV: Ethanol and Other Bio-Derived Feedstocks*	Hilton San Francisco Union Square	Franciscan B
Tuesday	8:30 AM	288	Efficient Processing of Lignin to Bioproducts and Biofuels *	Hilton San Francisco Union Square	Union Square 21
Tuesday	8:30 AM	289	Electrocatalysis and Photoelectrocatalysis IV: ORR/Oer*	Hilton San Francisco Union Square	Franciscan C
Tuesday	8:30 AM	310	Physical Properties for Chemical Process and Product Design*	Hilton San Francisco Union Square	Union Square 3 & 4
Tuesday	8:30 AM	312	Rechargeable / Secondary Battery Technologies for Energy Storage*	Hilton San Francisco Union Square	Powell
Tuesday	12:30 PM	337	Catalytic Processing of Fossil and Biorenewable Feedstocks V: Acids and Polyols*	Hilton San Francisco Union Square	Franciscan B
Tuesday	12:30 PM	343	CO ₂ Capture, Utilization, and Disposal: Key to Clean Energy Production*	Hilton San Francisco Union Square	Powell
Tuesday	12:30 PM	348	Electrocatalysis and Photoelectrocatalysis V: Electrolysis and Solar Fuels*	Hilton San Francisco Union Square	Franciscan C
Tuesday	12:30 PM	379	Sustainable Fuel from Renewable Resources*	Hilton San Francisco Union Square	Union Square 13
Tuesday	12:30 PM	380	Thermochemical Conversion of Biomass I*	Hilton San Francisco Union Square	Lombard
Tuesday	3:15 PM	403	Distributed Bioprocessing for Integrated Biorefineries*	Hilton San Francisco Union Square	Union Square 19 & 20
Tuesday	3:15 PM	409	Fuel Processing for Hydrogen Production*	Hilton San Francisco Union Square	Van Ness
Tuesday	3:15 PM	439	Sustainability in the Analysis, Synthesis, and Design of Chemical Engineering Processes*	Hilton San Francisco Union Square	Union Square 17 & 18
Tuesday	3:15 PM	440	Thermochemical Conversion of Biomass II*	Hilton San Francisco Union Square	Lombard

Wednesday	8:30 AM	457	Algorithms, Modeling and Simulation in Nuclear/Chemical Engineering*	Hilton San Francisco Union Square	Sutter
Wednesday	8:30 AM	459	Biobased Fuels and Chemicals II: Enzymatic Conversion of Recalcitrant Feedstocks*	Hilton San Francisco Union Square	Continental 9
Wednesday	8:30 AM	460	Biotechnology for Energy, Chemicals, and Materials (Invited Industrial Talks)*	Hilton San Francisco Union Square	Continental 6
Wednesday	8:30 AM	460	Biotechnology for Energy, Chemicals, and Materials (Invited Industrial Talks)*	Hilton San Francisco Union Square	Continental 6
Wednesday	8:30 AM	471	Energy Systems Design and Operations I*	Hotel Nikko San Francisco	Carmel I
Wednesday	8:30 AM	492	Novel Approaches to CO ₂ Utilization I*	Hilton San Francisco Union Square	Van Ness
Wednesday	8:30 AM	496	Reaction Engineering for Biomass Conversion*	Hilton San Francisco Union Square	Franciscan B
Wednesday	8:30 AM	504	USA-China Progress in Biomass Conversion Technologies I*	Hilton San Francisco Union Square	Lombard
Wednesday	12:30 PM	516	Biobased Fuels and Chemicals I: Biosynthetic Pathway Engineering*	Hilton San Francisco Union Square	Continental 9
Wednesday	12:30 PM	524	Distributed Chemical and Energy Processes for Sustainability*	Hilton San Francisco Union Square	Union Square 17 & 18
Wednesday	12:30 PM	527	Energy Systems Design and Operations II*	Hotel Nikko San Francisco	Carmel I
Wednesday	12:30 PM	534	Integrated Thermochemical and Biochemical Processing for Renewable Fuels and Chemicals*	Hilton San Francisco Union Square	Union Square 19 & 20
Wednesday	12:30 PM	545	Novel Approaches to CO ₂ Utilization II*	Hilton San Francisco Union Square	Van Ness
Wednesday	12:30 PM	555	Reaction Engineering for Combustion and Pyrolysis*	Hilton San Francisco Union Square	Franciscan B
Wednesday	3:15 PM	572	Carbon Dioxide Capture Technologies and Their Use*	Hilton San Francisco Union Square	Union Square 13
Wednesday	3:15 PM	576	Chemical and Catalytic Conversions and Processes for Renewable Feedstocks I*	Hilton San Francisco Union Square	Union Square 19 & 20
Wednesday	3:15 PM	603	Polymers for Energy Storage and Conversion*	Hilton San Francisco Union Square	Imperial A

Thursday	8:30 AM	629	Catalytic Hydrogen Generation*	Hilton San Francisco Union Square	Franciscan B
Thursday	8:30 AM	631	Chemical and Catalytic Conversions and Processes for Renewable Feedstocks II*	Hilton San Francisco Union Square	Union Square 19 & 20
Thursday	12:30 PM	679	Conversion of Biomass Based Renewable Resources to Synthesis Gases and Pyrolysis Oils I*	Hilton San Francisco Union Square	Union Square 19 & 20
Thursday	3:15 PM	719	Alternative Fuels*	Hilton San Francisco Union Square	Franciscan B
Thursday	3:15 PM	729	Conversion of Biomass Based Renewable Resources to Synthesis Gases and Pyrolysis Oils II*	Hilton San Francisco Union Square	Union Square 19 & 20
Friday	12:30 PM	783	Reactor Engineering for Biomass Feedstocks*	Hilton San Francisco Union Square	Golden Gate 8

BioFuels					
Day	Time	Session #	Session Title	Property	Room
Sunday	3:30 PM	25	Conversion of Solid Wastes to Energy and/or Product*	Hilton San Francisco Union Square	Union Square 21
Sunday	3:30 PM	35	Life Cycle Analysis of Bio-Based Fuels, Energy, and Chemicals*	Hilton San Francisco Union Square	Union Square 19 & 20
Monday	8:00 AM	66	Biofuels Production: Design, Simulation, and Economic Analysis I*	Hilton San Francisco Union Square	Union Square 17 & 18
Monday	8:00 AM	72	Catalytic Processing of Fossil and Biorenewable Feedstocks I: C-O Bond Activation*	Hilton San Francisco Union Square	Franciscan B
Monday	12:30 PM	138	Catalytic Processing of Fossil and Biorenewable Feedstocks II: Biomass-Derived Aromatics*	Hilton San Francisco Union Square	Franciscan B
Monday	3:15 PM	193	Advanced Energy Technologies: Biomass Conversion, Steam Reforming, Partial Oxidation, and Auto-Thermal Reforming*	Hilton San Francisco Union Square	Mason
Monday	3:15 PM	202	Biofuels Production: Design, Simulation, and Economic Analysis II*	Hilton San Francisco Union Square	Union Square 17 & 18
Monday	3:15 PM	205	Catalytic Processing of Fossil and Biorenewable Feedstocks III: Sugars, Furan Derivatives, and Related*	Hilton San Francisco Union Square	Franciscan B
Tuesday	8:30 AM	275	Biological Conversions and Processes for Renewable Feedstocks*	Hilton San Francisco Union Square	Union Square 19 & 20

Tuesday	8:30 AM	276	Biomass Characterization, Pretreatment, and Fractionation*	Hilton San Francisco Union Square	Lombard
Tuesday	8:30 AM	281	Catalytic Processing of Fossil and Biorenewable Feedstocks IV: Ethanol and Other Bio-Derived Feedstocks*	Hilton San Francisco Union Square	Franciscan B
Tuesday	8:30 AM	288	Efficient Processing of Lignin to Bioproducts and Biofuels *	Hilton San Francisco Union Square	Union Square 21
Tuesday	12:30 PM	337	Catalytic Processing of Fossil and Biorenewable Feedstocks V: Acids and Polyols*	Hilton San Francisco Union Square	Franciscan B
Tuesday	12:30 PM	379	Sustainable Fuel from Renewable Resources*	Hilton San Francisco Union Square	Union Square 13
Tuesday	12:30 PM	380	Thermochemical Conversion of Biomass I*	Hilton San Francisco Union Square	Lombard
Wednesday	8:30 AM	459	Biobased Fuels and Chemicals II: Enzymatic Conversion of Recalcitrant Feedstocks*	Hilton San Francisco Union Square	Continental 9
Wednesday	8:30 AM	460	Biotechnology for Energy, Chemicals, and Materials (Invited Industrial Talks)*	Hilton San Francisco Union Square	Continental 6
Wednesday	8:30 AM	460	Biotechnology for Energy, Chemicals, and Materials (Invited Industrial Talks)*	Hilton San Francisco Union Square	Continental 6
Wednesday	8:30 AM	462	Cell Culture Engineering*	Hilton San Francisco Union Square	Continental 7
Wednesday	8:30 AM	472	Extractions in Bioprocessing*	Parc 55 San Francisco	Mission II & III
Wednesday	8:30 AM	504	USA-China Progress in Biomass Conversion Technologies I*	Hilton San Francisco Union Square	Lombard
Wednesday	12:30 PM	515	Alternative Fuels and Enabling Technologies I*	Hilton San Francisco Union Square	Taylor
Wednesday	12:30 PM	516	Biobased Fuels and Chemicals I: Biosynthetic Pathway Engineering*	Hilton San Francisco Union Square	Continental 9
Wednesday	12:30 PM	534	Integrated Thermochemical and Biochemical Processing for Renewable Fuels and Chemicals*	Hilton San Francisco Union Square	Union Square 19 & 20
Wednesday	12:30 PM	536	Interfacial Phenomena in Electrochemical Systems*	Hilton San Francisco Union Square	Union Square 25
Wednesday	12:30 PM	558	USA-China Progress in Biomass Conversion Technologies II and Biochemical Conversion of Plant Biomass II*	Hilton San Francisco Union Square	Lombard

Wednesday	3:15 PM	564	Alternative Fuels and Enabling Technologies II*	Hilton San Francisco Union Square	Taylor
Wednesday	3:15 PM	567	Biochemical Conversion Processes in Forest/Plant Biomass Biorefineries*	Hilton San Francisco Union Square	Lombard
Wednesday	3:15 PM	589	Integrating Municipal and Industrial Waste into Biorefineries*	Hilton San Francisco Union Square	Union Square 17 & 18
Thursday	8:30 AM	622	Biobased Materials*	Hilton San Francisco Union Square	Continental 9
Thursday	8:30 AM	632	Chemical Conversion Processes in Forest/Plant Biorefineries*	Hilton San Francisco Union Square	Lombard
Thursday	8:30 AM	650	Nanoscale Science and Engineering in Biomolecular Catalysis*	Hilton San Francisco Union Square	Golden Gate 6
Thursday	12:30 PM	668	Advances in Algae Based Biorefineries: Algae Biomass Cultivation, Harvesting, and Characterization*	Hilton San Francisco Union Square	Lombard
Thursday	12:30 PM	695	Membrane Formation *	Hilton San Francisco Union Square	Plaza A
Thursday	3:15 PM	719	Alternative Fuels*	Hilton San Francisco Union Square	Franciscan B
Thursday	3:15 PM	723	Catalytic Biofuels Refining*	Hilton San Francisco Union Square	Taylor
Thursday	3:15 PM	752	Sustainable Microbial Process for Food, Feeds, Energy, and Environment*	Hilton San Francisco Union Square	Union Square 21
Friday	8:30 AM	764	International Forum: Biotechnology in China *	Hilton San Francisco Union Square	Continental 9
Friday	12:30 PM	773	Advances in Metabolic Engineering of Photosynthetic/Non-Model Organisms*	Hilton San Francisco Union Square	Continental 7

Fossil Fuels & CCS					
Day	Time	Session #	Session Title	Property	Room
Sunday	3:30 PM	27	Design of CO ₂ Capture and Utilization Systems*	Hotel Nikko San Francisco	Carmel I
Sunday	3:30 PM	35	Life Cycle Analysis of Bio-Based Fuels, Energy, and Chemicals*	Hilton San Francisco Union Square	Union Square 19 & 20

Monday	8:00 AM	71	Carbon Dioxide Capture from Power Generation I*	Hilton San Francisco Union Square	Van Ness
Monday	12:30 PM	137	Carbon Dioxide Capture from Power Generation II*	Hilton San Francisco Union Square	Van Ness
Monday	12:30 PM	140	Chemical Looping Processes I*	Hilton San Francisco Union Square	Union Square 21
Monday	12:30 PM	148	Environmental Catalysis: Air Pollution Control*	Hilton San Francisco Union Square	Franciscan D
Monday	12:30 PM	183	Unconventionals: Shale Oil, Oil Sands and Other Heavy Fuels I*	Hilton San Francisco Union Square	Taylor
Monday	3:15 PM	208	Chemical Looping Processes II*	Hilton San Francisco Union Square	Union Square 21
Monday	3:15 PM	209	Combustion Kinetics and Emissions*	Hilton San Francisco Union Square	Franciscan D
Monday	3:15 PM	211	Design and Optimization of Environmentally Sustainable Advanced Fossil Energy Systems*	Hilton San Francisco Union Square	Van Ness
Monday	3:15 PM	216	Future Automotive Catalysis: Automotive Emissions Control*	Hilton San Francisco Union Square	Franciscan A
Monday	3:15 PM	242	Unconventionals: Shale Oil, Oil Sands and Other Heavy Fuels II*	Hilton San Francisco Union Square	Taylor
Tuesday	8:30 AM	319	The Food-Energy-Water Nexus*	Hilton San Francisco Union Square	Union Square 15 & 16
Tuesday	8:30 AM	319	The Food-Energy-Water Nexus*	Hilton San Francisco Union Square	Union Square 15 & 16
Tuesday	12:30 PM	371	Novel Nanoparticles and Nanostructured Materials for Energy and Environmental Applications I*	Hotel Nikko San Francisco	Peninsula
Tuesday	12:30 PM	386	Unconventionals: Shale Gas, LNG, CNG, and LPG*	Hilton San Francisco Union Square	Taylor
Tuesday	3:15 PM	409	Fuel Processing for Hydrogen Production*	Hilton San Francisco Union Square	Van Ness
Tuesday	3:15 PM	421	Novel Nanoparticles and Nanostructured Materials for Energy and Environmental Applications II*	Hotel Nikko San Francisco	Golden Gate
Wednesday	8:30 AM	492	Novel Approaches to CO ₂ Utilization I*	Hilton San Francisco Union Square	Van Ness

Wednesday	12:30 PM	540	Modeling and Computation in Energy and Environment*	Hotel Nikko San Francisco	Monterey II
Wednesday	12:30 PM	545	Novel Approaches to CO ₂ Utilization II*	Hilton San Francisco Union Square	Van Ness
Wednesday	12:30 PM	553	Process Research and Development for Industrial Sustainability *	Hilton San Francisco Union Square	Union Square 3 & 4
Wednesday	3:15 PM	572	Carbon Dioxide Capture Technologies and Their Use*	Hilton San Francisco Union Square	Union Square 13
Thursday	8:30 AM	630	CCS: Technoeconomics and LCA*	Hilton San Francisco Union Square	Union Square 15 & 16
Thursday	8:30 AM	638	Engineering Geologic Carbon Dioxide Storage Systems I*	Hilton San Francisco Union Square	Van Ness
Thursday	8:30 AM	653	Novel Materials and Processes for Air Pollution Control*	Hilton San Francisco Union Square	Union Square 21
Thursday	12:30 PM	677	CCS: Utilization of CO ₂ to Products*	Hilton San Francisco Union Square	Union Square 15 & 16
Thursday	12:30 PM	685	Engineering Geologic Carbon Dioxide Storage Systems II*	Hilton San Francisco Union Square	Van Ness
Thursday	3:15 PM	724	CCS: Modeling and Simulation*	Hilton San Francisco Union Square	Union Square 15 & 16
Friday	8:30 AM	771	Unconventional Technologies for CO ₂ Capture, Conversion and Utilization*	Hilton San Francisco Union Square	Continental 3

Transport and Energy Processes					
Day	Time	Session #	Session Title	Property	Room
Sunday	1:00 PM	18	Poster Session: Meet the Faculty Candidate - Transport & Energy Processes*	Hilton San Francisco Union Square	Continental 4 & 5
Sunday	3:30 PM	23	Catalysts for Fuel Cells, Electrolyzers, and Electrochemical Devices	Hilton San Francisco Union Square	Powell
Sunday	3:30 PM	30	Experimental, Theoretical, and Numerical Analysis of Transport Processes in Flow Reactors	Hilton San Francisco Union Square	Mason
Monday	8:00 AM	92	Membrane and Direct Methanol Fuel Cells	Hilton San Francisco Union Square	Powell

Monday	8:00 AM	96	Modeling, Economics, and Technologies for Sustainable Energy and Advanced Systems I	Hilton San Francisco Union Square	Mason
Monday	12:30 PM	166	Modeling, Economics, and Technologies for Sustainable Energy and Advanced Systems II	Hilton San Francisco Union Square	Mason
Monday	12:30 PM	180	Solid Oxide Fuel Cells (SOFC) and Electrolyzers	Hilton San Francisco Union Square	Powell
Monday	3:15 PM	193	Advanced Energy Technologies: Biomass Conversion, Steam Reforming, Partial Oxidation, and Auto-Thermal Reforming	Hilton San Francisco Union Square	Mason
Monday	3:15 PM	201	Battery and Energy Storage Technologies	Hilton San Francisco Union Square	Powell
Tuesday	8:30 AM	312	Rechargeable / Secondary Battery Technologies for Energy Storage	Hilton San Francisco Union Square	Powell
Tuesday	12:30 PM	343	CO ₂ Capture, Utilization, and Disposal: Key to Clean Energy Production	Hilton San Francisco Union Square	Powell
Tuesday	3:15 PM	420	Novel Hydrogen Generation and Advanced Storage Technologies	Hilton San Francisco Union Square	Powell
Tuesday	6:00 PM	450	Poster Session: Transport and Energy Processes	Hilton San Francisco Union Square	Grand Ballroom B
Wednesday	8:30 AM	498	Solar Thermochemical Energy Storage*	Hilton San Francisco Union Square	Powell
Wednesday	12:30 PM	557	Solar Thermal Power Generation*	Hilton San Francisco Union Square	Powell
Wednesday	3:15 PM	609	Solar Thermochemical Fuels I*	Hilton San Francisco Union Square	Powell
Thursday	8:30 AM	664	Solar Thermochemical Fuels II*	Hilton San Francisco Union Square	Powell
Thursday	12:30 PM	712	Solar Thermochemical Processing*	Hilton San Francisco Union Square	Powell
Thursday	3:15 PM	753	Techniques in Solar Energy*	Hilton San Francisco Union Square	Powell

Alternate Fuels and New Technology					
Day	Time	Session #	Session Title	Property	Room
Monday	12:30 PM	183	Unconventionals: Shale Oil, Oil Sands and Other Heavy Fuels I	Hilton San Francisco Union Square	Taylor
Monday	3:15 PM	242	Unconventionals: Shale Oil, Oil Sands and Other Heavy Fuels II	Hilton San Francisco Union Square	Taylor
Tuesday	12:30 PM	386	Unconventionals: Shale Gas, LNG, CNG, and LPG	Hilton San Francisco Union Square	Taylor
Tuesday	3:15 PM	443	Unconventionals: Hydrogen and Fuel Cells I	Hilton San Francisco Union Square	Taylor
Wednesday	8:30 AM	503	Unconventionals: Hydrogen and Fuel Cells II	Hilton San Francisco Union Square	Taylor
Wednesday	12:30 PM	515	Alternative Fuels and Enabling Technologies I	Hilton San Francisco Union Square	Taylor
Wednesday	3:15 PM	564	Alternative Fuels and Enabling Technologies II	Hilton San Francisco Union Square	Taylor

* This session is co-sponsored by one or more programming groups

International Congress on Energy (ICE) 2016					
Day	Time	Session #	Session Title	Property	Room
Monday	8:30 AM	110	Overview of U.S. DOE Environmental and Waste Cleanup Programs (Invited Talks)*	Hilton San Francisco Union Square	Sutter
Monday	8:30 AM	110	Overview of U.S. DOE Environmental and Waste Cleanup Programs (Invited Talks)*	Hilton San Francisco Union Square	Sutter
Tuesday	8:30 AM	319	The Food-Energy-Water Nexus*	Hilton San Francisco Union Square	Union Square 15 & 16
Tuesday	8:30 AM	319	The Food-Energy-Water Nexus*	Hilton San Francisco Union Square	Union Square 15 & 16
Tuesday	12:30 PM	355	Fundamentals of Sustainability Science and Engineering*	Hilton San Francisco Union Square	Union Square 14
Wednesday	8:30 AM	455	Advances in Life Cycle Optimization for Process Development*	Hilton San Francisco Union Square	Union Square 13
Thursday	12:30 PM	690	Going to a Decision Point in Sustainability Analysis*	Hilton San Francisco Union Square	Union Square 3 & 4
Thursday	3:15 PM	751	Sustainability Metrics at the Process and Product Level*	Hilton San Francisco Union Square	Union Square 3 & 4

* This session is co-sponsored by one or more programming groups

Center for Energy Initiatives: An AIChE Technological Community

AIChE's Center for Energy Initiatives. Because of its importance to energy, the Technical Divisions and Forums of AIChE came together to work on leveraging projects in energy. The chair of CEI, Dale L. Keairns said, "Members are already working on energy-related issues from multiple perspectives. The Center helps us network and 'cross-fertilize' and integrate ideas that can advance energy efforts across the board."

Divisions and Forums whose members are in the CEI include the Catalysis and Reaction Engineering Division; the Computational Molecular Science and Engineering Forum; the Education Division; the Environmental Division; the Food, Pharmaceutical and Bioengineering Division; the Forest Bioproducts Division; the Fuels and Petrochemical Division; the Nanoscale Science and Engineering Forum; the North American Mixing Forum; the Nuclear Engineering Division; the Particle Technology Forum; the Process Development Division; the Separations Division; the Sustainable Engineering Forum; the Transport and Energy Processes Division. Other AIChE entities in CEI include the Institute for Sustainability, the Society for Biological Engineering, the Public Affairs and Information Committee, the Research and New Technology Committee, and the Executive Board of the National Program Committee.

CEI identifies, launches, and incubates energy initiatives and new projects that cross the boundaries of existing AIChE entities working in the energy area. CEI serves as a means to leverage breadth of work carried out and to enable integrated analysis of multi-disciplinary and multi-functional projects.

The CEI grew out of the work of AIChE's Energy Advisory Board, which was formed in 2005 and has already undertaken a number of energy related research and education projects. It has coordinated a project on carbon management for a group of leading engineering societies, made awards for K-12 energy education projects, and developed a "Speakers Academy" of energy experts. Work is currently underway on an inter-society, inter-disciplinary project to develop energy metrics that will allow for consistent comparison of diverse energy options.

CEI is also developing energy education modules for the undergraduate chemical engineering curriculum. Periodic CEI newsletters about energy issues are e-mailed to the members of each entity. CEI also has a website that will provide more information about energy issues and important links:www.aiche.org/cei.

One of CEI's functions is to highlight and promote energy programming at AIChE meetings and to develop joint energy meetings with other organizations. These are areas where participation by Divisions and Forums is especially needed.

To become a CEI member, just join one of the above Division and Forums of AIChE. You will not only become a member of CEI, you will also enjoy the full benefits of the Division or Forum that you join.

For more information and to subscribe to the energy newsletter, contact energy@aiiche.org.