Symposium on Thermal and Catalytic Sciences for Biofuels and Biobased Products

Technical Agenda

Tuesday, November 1—Day 1

8:00–10:00	**Continental Breakfast** (Friday Center)	**Registration/Poster Setup** (Friday Center)
10:00–10:15	**Welcome** (Auditorium) David Dayton, *RTI International*	
10:15–10:45	**Opening Remarks** (Auditorium) Wayne Holden and Terri Lomax, *RTI International*	
10:45–12:00	**Plenary Session** (Auditorium) Session Chair: David Dayton, *RTI International*	
10:45–11:30	**Keynote Presentation: Overview of the U.S. Department of Energy's Bioenergy Technologies Office** Jonathan Male, *DOE Bioenergy Technologies Office*	
11:30–12:00	**Techno-economic and Sustainability Analysis for Co-processing Fast Pyrolysis Oil with Vacuum Gas Oil in an FCC for Second Generation Fuel Production** Mike Talmadge, *NREL*	
12:00–1:00	**Lunch**	
1:00–3:00	**Session 1.1: Techno-economic Analysis (TEA)** Session Chair: Mark Wright, *Iowa State University*	**Session 1.2: Pyrolysis I** Session Chair: Darren Daugaard, *Cool Planet*
1:00–1:30	**Screw Pyrolysis of Sewage Sludge: A Techno-economic Analysis** Marco Tomasi Morgano, *Karlsruhe Institute of Technology*	**Catalytic Biomass Pyrolysis Studies at Pilot-Scale** Ofei D. Mante, *RTI International*
1:30–2:00	**Techno-economic Analysis of Phenolic Compounds Extraction from Pyrolysis Bio-Oil as Drop-In Fuels for Diesel Engines** Sunkyu Park, *NC State University*	**Determination of Impact of Feedstock Composition on Fast Pyrolysis Oil Yield and Quality Using Multiple Linear Regression Modeling** Tyler Westover, *INL*
2:00–2:30	**Techno-economic (TEA) and Life Cycle Analysis (LCA) of the Pyrolysis-Bioenergy-Biochar Pathway for Carbon-Negative Energy** Wenqin Li, *Iowa State University*	**Ex-situ Catalytic Fast Pyrolysis in a DCR—Effect of Pyrolysis Conditions** Mark Jarvis, *NREL*
2:30–3:00	**Finished Fuel Blending Models for Assessing Integration of Biomass-Derived Products with Petroleum Refinery Products** Michael Talmadge, *NREL*	**Process Intensification of a Fluidized Bed Pyrolyzer via Autothermal Operation** Joseph P. Polin, *Iowa State University, Bioeconomy Institute*
3:00–3:30	**Break**	

Tuesday, November 1—Day 1 *(continued)*

3:30–5:30	**Session 1.3: ThermoChemistry** Session Chair: Mark Nimlos, *NREL*	**Session 1.4: Pyrolysis II** Session Chair: Sunkyu Park, *NC State University*
3:30–4:00	**Establishing Elementary Reactions of Hemicellulose Torrefaction** Charles McGill, *NC State University*	**Biomass Pyrolysis Vapor Deoxygenation over Mo_2C to Produce Paraffinic and Aromatic Molecules: The Deactivation and Reactivation of Mo_2C** Calvin Mukarakate, *NREL*
4:00–4:30	**Effect of Torrefaction Temperature on Lignin Macromolecule and Product Distribution from Fast Pyrolysis** Ravishankar Mahadevan, *Auburn University*	**Ex-situ Catalytic Fast Pyrolysis in a DCR—Catalyst Effects** Jessica Olstad, *NREL*
4:30–5:00	**Formate-Assisted Pyrolysis of Biomass** William J. DeSisto, *University of Maine*	**Reactive Catalytic Fast Pyrolysis of Biomass into Hydrocarbon-Rich Bio-crude** Kaige Wang, *RTI International*
5:00–5:30	**Chemical Activation of Fast Pyrolysis Biochar for the Production of Electrically Conductive Carbon** Seunghyun Yoo, *NC State University*	**Co-pyrolysis of Biomass and Polyethylene over HZSM-5: Effects of Plastic Addition on Coke Formation and Catalyst Deactivation** Charles A. Mullen, *USDA-ARS Eastern Regional Research Center*
5:30–6:00	**Break**	
6:00–8:00	**Opening Reception/Posters**	

Wednesday, November 2—Day 2

7:30–8:30	**Continental Breakfast** (Friday Center)
8:30–10:15	**Plenary Session** (Auditorium) Session Chair: Abolghasem Shahbazi, *NC A&T State University*
8:30–9:15	**Keynote Presentation: On-Farm Pyrolysis Biorefining at the USDA** Kwesi Boateng, *USDA-ARS Eastern Regional Research Center*
9:15–9:45	**Drop-In Potential of Upgraded Fuels Produced at Pilot Scale via Hydrothermal Liquefaction of Different Biomass Feedstocks** Patrick Biller, *Aarhus University*
9:45–10:15	**Highly Selective FT Synthesis for Production of JP-8 Jet Fuel from Biomass, Coal, or Coal/Biomass Mixtures** Andrew Lucero, *Southern Research*
10:15–10:30	**Break**

Wednesday, November 2—Day 2 *(continued)*

10:30–12:00	**Session 2.1: Future Technology Development** Session Chair: Craig Brown, *NREL*	**Session 2.2: Pyrolysis (Analytical)** Session Chair: Ofei Mante, *RTI International*
10:30–11:00	**Preparing for Scale: IH²® Technology** Alan Del Paggio, *CRI Catalyst Company*	**Functionality and Molecular Weight Distribution of Red Oak Lignin before and after Pyrolysis and Hydrogenation** Daniel J. McClelland, *University of Wisconsin–Madison*
11:00–11:30	**Biomass—Future Source of Renewable Hydrogen or Carbon?** Tim Schulzke, *Fraunhofer UMSICHT*	**Characterization and Upgrading of Catalytic Flash Pyrolysis Oils from Pine Trees** Sylvain Verdier, *Haldor Topsøe*
11:30–12:00	**Low-Temperature Catalyst for Biomass Tars Decomposition and Conversion in Fuel Gas** Hans Leibold, *Karlsruhe Institute of Technology*	**Standardization of Chemical Analytical Techniques for Pyrolysis Bio-Oil** Jack R. Ferrell, *NREL*
12:00–1:00	**Lunch**	
1:00–3:30	**Session 2.3: Gasification** Session Chair: Sushil Adhikari, *Auburn University*	**Session 2.4: Reactor Modeling** Session Chair: Thomas Foust, *NREL*
1:00–1:30	**Influence of Co-gasification Agents on Fluidized Bed Steam Gasification of Biomass for Biofuel Production** Felix Fischer, *Technical University of Munich*	**Towards a Multi-scale Modeling Framework for Fluidized Bed Reactor Simulation** Addison K. Stark, *DOE/ARPA-E*
1:30–2:00	**Research on Small-Scale Biomass Gasification in Entrained Flow and Fluidized Bed Technology for Biofuel Production** Sebastian Fendt, *Technical University of Munich*	**Micro-Ratcheted Surfaces for a Heat Engine Biomass Conveyor** Saurabh Maduskar, *Universtiy of Minnesota*
2:00–2:30	**Ru Promoted Mono-and Bi-metallic Fe-Cu, Fe-Co and Cu-Co Nano-Catalysts, Coated in Microchannel Si-Microreactor for Biosyngas Conversion to Fuels** Tim Davis, *NC A&T State University*	**Computational Study on Biomass Fast Pyrolysis Oil Yield, Effects of the Bubbling-to-Slugging Transition in a Laboratory-Scale Fluidized Bed** Emilio Ramirez, *ORNL*
2:30–3:00	**Detailed Measurement of Sulfur Compounds in Producer Gas from Fluidized-Bed Gasifier** Reinhard Seiser, *University of California–San Diego*	**Thermal DEM Simulation of Particle Heat Transfer in a Lab-Scale Double Screw Reactor** Fenglei Qi, *Iowa State University*
3:00–3:30	**Sustainable Production of Renewable Hydrogen in Biorefinery via Integrated Bioelectrochemical Systems** Abhijeet P. Borole, *ORNL*	**Modeling the Impact of Biomass Particle Size Distribution and Shape on Heating Behavior During Fast Pyrolysis** Gavin Wiggins, *ORNL*
3:30–5:30	**Poster Session**	
6:00–9:30	**Conference Dinner**	

Technical Agenda

Thursday, November 3—Day 3

7:30–8:30	**Continental Breakfast** (Friday Center)	
8:30–10:15	**Plenary Session** (Auditorium) Session Chair: Robert Brown, *Iowa State University*	
8:30–9:15	**Keynote Presentation: Commodity Chemicals from Biomass: Catalytic Conversion of Biomass into α,ω-diols** George Huber, *University of Wisconsin–Madison*	
9:15–9:45	**Elucidation of the Type of Chemical Reactions in Primary Stage of Biomass Fast Pyrolysis** Marion Carrier, *Aston University*	
9:45–10:15	**Catalytic Fast Pyrolysis for Chemical Products** Mark Nimlos, *NREL*	
10:15–10:30	**Break**	
10:30–12:00	**Session 3.1: Pyrolysis Fundamentals** Session Chair: Charles Mullen, *USDA-ARS*	**Session 3.2: Upgrading** Session Chair: Catherine Brewer, *New Mexico State University*
10:30–11:00	**Kinetics of Cellulose Pyrolysis via Pulse-Heated Analysis of Solid Reactions (PHASR)** Saurabh Maduskar, *University of Minnesota*	**Production of Hydrocarbon Liquid Fuel from Biocrude by Hydroprocessing** Ofei D. Mante, *RTI International*
11:00–11:30	**Thin-Film Fast Pyrolysis of Isotopically-Labeled Glucose for the Analysis of Primary Reaction Pathway** Young-Jin Lee, *Iowa State University*	**Continuous Hydrotreatment of Hydrofaction™ Oil to Drop-In Diesel** Claus Uhrenholt Jensen, *Steeper Energy ApS*
11:30–12:00	**Pyrolysis of Two- and Three-Carbon Monosaccharides to Understand Hemicellulose and Cellulose Pyrolysis** Phillip R. Westmoreland, *NC State University*	**Novel Bio-Oil Hydrodeoxygenation Catalysts based on Strong Electrostatic Adsorption** Yaseen Elkasabi, *USDA-ARS Eastern Regional Research Center*
12:00–12:45	**Lunch**	
12:45–1:00	**Presentation of Poster Awards** (Auditorium)	
	Winner: Jake Lindstrom, *Iowa State University*, P18s: **Thermal Deconstruction of Cellulose with Subsequent Hydrolysis to Fermentable Sugars** Runner-Up: Rui Li, *NC A&T State University*, O5s: **Syngas Production by Dry Reforming of Biogas over Biochar Supported Molybdenum Carbides** Runner-Up: Sabyasachi Das, *Michigan State University*, U6s: **Renewable Transportation Fuels via Fast Pyrolysis and Electrocatalytic Hydrogenation**	
1:00–1:30	**Presentation: Catalyst Activity Management in the Anellotech Bio-TCat™ Process** (Auditorium)	
	Chuck Sorensen, *Anellotech*	

Thursday, November 3—Day 3 *(continued)*

1:30–4:30	**Session 3.3: Hydrothermal** Session Chair: Nichole Fitzgerald, *DOE-BETO*	**Session 3.4: Upgrading and Products** Session Chair: Amit Goyal, *Southern Research*
1:30–2:00	**Development of ZrO_2-based Hydrothermally Stable Catalysts for the Catalytic Upgrading of Biomass-Derived Aqueous Streams** Juan A. Lopez-Ruiz, *PNNL*	**Methylation of Carboxylic Acids and Phenols from Fast Pyrolysis Bio-Oil** Suh-Jane Lee, *PNNL*
2:00–2:30	**Fecal Sludge to Energy in a Prototype Supercritical Water Oxidation Reactor** Marc A. Deshusse, *Duke University*	**Thermocatalytic Process for Biomass Conversion to Acrylonitrile for Production of Carbon Fibers** Jadid E. Samad, *Southern Research*
2:30–3:00	**Continuous Pilot-Scale Loblolly Pine Liquefaction to a Partially Deoxygenated Bio-Oil** Taylor Schulz, *Iowa State University*	**Upgrading of the Bio-Oil Model Compounds by a Two-Step Process Combining Hydrogenation-Esterification and Cracking** Junhao Chen, *State Key Laboratory of Clean Energy Utilization, China*
3:00–3:15	**Break**	
3:15–3:45	**Comparing Quantitative Characterization of Bio-crude and Aqueous Phase from Hydrothermal Liquefaction of Biomasses** René B. Madsen, *Aarhus University*	**Purification of Pyrolytic Sugar from Bio-Oil Fractions** Patrick Hall, *Iowa State University, Bioeconomy Institute*
3:45–4:15	**Design, Fabrication, and Testing of the Modular Hydrothermal Liquefaction System (MHTLS)** Justin M. Billing, *PNNL*	**Steam Reforming of Bio-derived Oxygenates: Coupling Ketonization for Greater Stability** Stephen D. Davidson, *PNNL*
4:15–4:45	**Production of Soluble and Hydrolyzable Carbohydrates from Biomass Using THF/Water Co-solvent in the Presence of Acid Catalyst** Arpa Ghosh, *Iowa State University*	**Analysis and Catalytic Upgrading of Pyrolysis Oils from Various Biomass Feedstocks** Mariefel V. Olarte, *PNNL*
4:45–5:00	**Conference Wrap-Up** (Auditorium)	

Friday, November 4

Optional Facility Tour: RTI Headquarters

9:00 am to 12:00 pm