

U.S. DEPARTMENT OF
ENERGY

Office of
ENERGY EFFICIENCY &
RENEWABLE ENERGY

Systems Development & Integration Program

BETO Peer Review Introduction

March 22 2021



Announcements of Interest

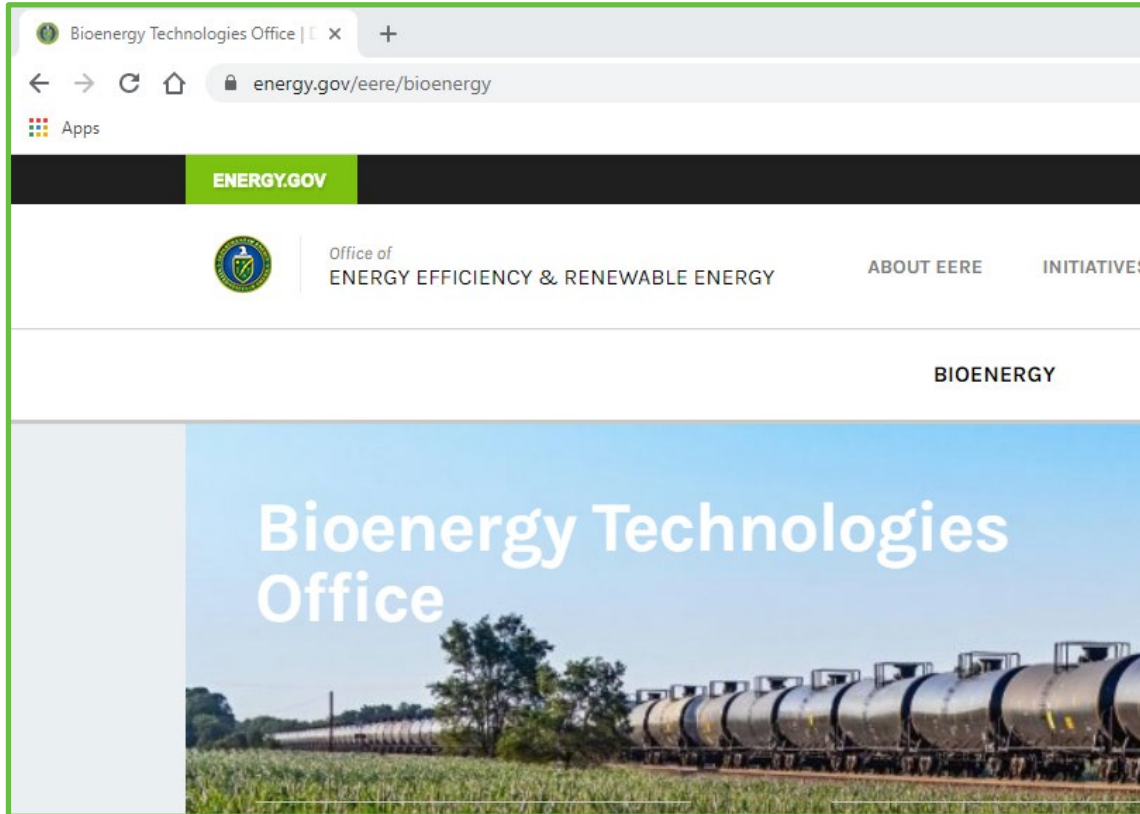
- Notice of Intent –

- **DE-FOA-0002416: FY21 BETO SCALE-UP AND CONVERSION FOA DE-FOA-0002396 NOTICE OF INTENT**

- The Office of Energy Efficiency and Renewable Energy (EERE) intends to issue, on behalf of the Bioenergy Technologies Office (BETO), a Funding Opportunity Announcement (FOA) entitled “FY21 Bioenergy Technologies Scale-up and Conversion FOA.”
- Building a clean energy economy and addressing the climate crisis is a top priority of the Biden Administration. The Administration has laid out a bold plan to lead the world in building a clean energy economy, addressing climate change and achieving net-zero emissions no later than 2050 to the benefit of all Americans. The Department of Energy is committed to pushing the frontiers of science and engineering, catalyzing clean energy jobs through research, development, demonstration, and deployment (RDD&D), and ensuring environmental justice and inclusion of disadvantaged communities.
- In support of these Administration priorities, BETO is focused on developing technologies that convert domestic biomass and other waste resources (e.g. municipal solid waste, biosolids) into low-carbon biofuels and bioproducts. These bioenergy technologies can enable a transition to a clean energy economy, create high-quality jobs, support rural economies, and spur innovation in renewable energy and chemicals production – the bioeconomy. The activities funded through this opportunity will mobilize public clean energy investment in the biofuels, chemical and agricultural industries, accelerate the deployment of bioenergy technologies, and support achieving economy-wide net-zero emissions by 2050.
- This FOA may support high-impact technology RDD&D to accelerate the bioeconomy and, in particular, the production of low-carbon fuels for the aviation industry. BETO is focusing on applied RDD&D to improve the performance and reduce cost of biofuel production technologies and scale-up production systems in partnership with industry. By reducing cost and technical risk, BETO can help pave the way for industry to deploy commercial-scale integrated biorefineries and reduce greenhouse gas emissions from hard to decarbonize sectors, such as aviation. The Program is focused on developing and demonstrating technologies that are capable of producing low-carbon drop-in biofuels at \$2.50 per gallon gasoline equivalent (GGE) by 2030, as well as associated renewable chemical co-products to achieve this target. BETO is focused on biofuel production pathways that can deliver at least 70% lower lifecycle greenhouse gas emissions than petroleum.
- This notice of intent (NOI) is issued so that interested parties are aware of EERE’s intention to issue this FOA in the near term. All the information contained in this NOI is subject to change. EERE will not respond to questions concerning this NOI. Once the FOA has been released, EERE will provide an avenue for potential applicants to submit questions.

- **[EERE Funding Opportunity Exchange - https://eere-exchange.energy.gov/Default.aspx](https://eere-exchange.energy.gov/Default.aspx)**

For More Information -



Learn about:

- Funding Opportunity Announcements
- Publications
- Workshops



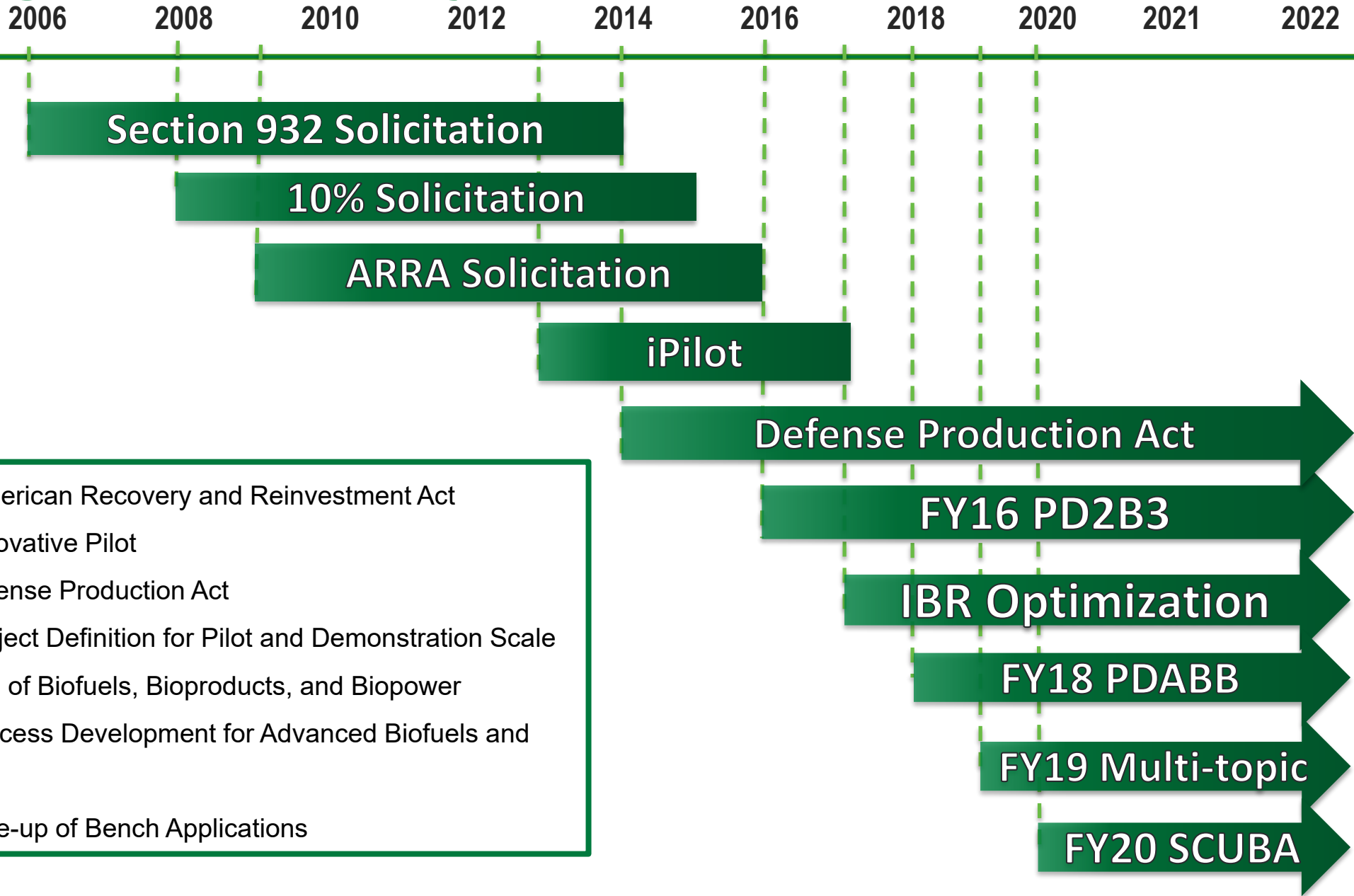
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Sign up to receive Bioenergy Technologies Office news, events, and funding opportunities.

Evolution of the Program



SDI Program FOA History



ARRA = American Recovery and Reinvestment Act
iPilot = Innovative Pilot
DPA = Defense Production Act
PD2B3 = Project Definition for Pilot and Demonstration Scale Manufacturing of Biofuels, Bioproducts, and Biopower
PDABB = Process Development for Advanced Biofuels and Biopower
SCUBA: Scale-up of Bench Applications

SDI WBS

EE-3B Bioenergy Technologies Office

-1 Feedstocks
-2 Conversion
-3 Advanced Development & Optimization
 -1 Modeling and Verification
 -0 No Sub Activity
 -1 Computational
 -2 TEA/LCA
 -3 Verifications
 -4 Marketing and Industry Assessments
 -2 Analysis and Characterization
 -0 No Sub Activity
 -1 Product Testing
 -2 Materials Testing
 -3 Sensors and Controls
 -4 Methods and Standards
 -3 Engineering and Integration (Pillars)
 -1 Feedstock Conversion Interface (FCIC)
 -2 Chemical Catalysis For Bioenergy (ChemCatBio)
 -3 Agile BioFoundry (ABF)
 -4 Bioprocessing Separations Consortium (BioESep)
 -5 Co-Optimization of Fuels and Engines (Co-Optima)
 -6 Consortium for Computational Physics and Chemistry (CCPC)




.....3 Advanced Development & Optimization

-1 Modeling and Verification
-2 Analysis and Characterization
-3 Engineering and Integration (Pillars)
-4 Semi-Works Operations "PDUs"
 -0 No Sub Activity
 -1 Feed Systems
 -2 Deconstruction and Fractionation
 -3 Synthesis of Intermediates and Upgrading
 -4 Storage and Post Storage Infrastructure
-5 System Development "IBRs"
 -0 No Sub Activity
 -1 System Validation
 -2 System Prototype Demonstration
 -3 Actual System Demonstration
-6 Co-Optima *Reviewed Previously*
-7 Emerging and Enabling Technologies
 -1 Feedstock
 -2 Conversion
 -3 Fuels and Products
 -4 Consumer Scale Applications
 -5 Other

EE-3B Bioenergy Technologies Office

-1 Feedstocks
-2 Conversion
-3 Advanced Development & Optimization
-4 Analysis and Sustainability
-5 Biopower/Cookstoves
 -1 Biopower
 -2 Cookstoves
 -3 Heating Oil
 -4 Fuel Cells (NO CURRENT FUNDING)
 -5 Wood Heaters
-6 Corporate Priorities and Management Support
-7 Congressionally Directed Projects

Agenda - Monday

Day 8 - MONDAY, MARCH 22, 2021				
Start Time EST	End Time EST	SYSTEMS DEVELOPMENT AND INTEGRATION		
		Presentation	Organization	Presenter
10:45 AM	11:15 AM	GATHER, TECH CHECK, NETWORKING QUESTIONS		
11:15 AM	3:55 PM	Systems Development and Integration	<i>SDI Program</i>	<i>Liz Moore</i>
11:15 AM	11:45 AM	SDI Technology Area Introduction	<i>BETO</i>	<i>Liz Moore</i>
11:45 AM	12:25 PM	Determination of the Feasibility of Biofuels in Marine Applications - ORNL Part II	<i>ORNL</i>	<i>Mike Kass</i>
12:25 AM	12:45 PM	Evaluation of Bio-oils for Use in Marine Engines	<i>ORNL</i>	<i>Brian Kaul</i>
12:45 PM	1:15 PM	Evaluate New Biomass-Derived Liquid Fuels for Materials Compatibility	<i>ORNL</i>	<i>Jim Keiser</i>
1:15 PM	1:35 PM	BREAK 		
1:35 PM	2:05 PM	Opportunities in biojet: baselining and evaluation OBBE - SNL	<i>SNL</i>	<i>Anthe George</i>
2:05 PM	2:35 PM	Swirl Stove: Swirling combustion for efficient wood burning	<i>MF Fire, Inc</i>	<i>Paul LaPorte</i>
2:35 PM	3:05 PM	Fire MAPS	<i>MF Fire, Inc</i>	<i>Paul LaPorte</i>
3:05 PM	3:25 PM	BREAK 		
3:25 PM	3:55 PM	Advancing wood heater evaluation methodology for accelerating innovation	<i>BNL</i>	<i>Tom Butcher</i>
3:55 PM	4:25 PM	Reviewer Wrap Up and Debrief	<i>Reviewers</i>	

Agenda - Tuesday

Day 9 - TUESDAY, MARCH 23, 2021				
10:45 AM	11:15 AM	GATHER, TECH CHECK, NETWORKING QUESTIONS		
11:15 AM	5:30 PM	Systems Development and Integration	<i>SDI Program</i>	<i>Liz Moore</i>
11:15 AM	11:30 AM	Technology Area Daily Intro	<i>BETO</i>	<i>Liz Moore</i>
11:30 AM	12:00 PM	Integrated Computational Tools to Optimize and De-Risk Feedstock Handling & High-Pressure Reactor	<i>NREL</i>	<i>Peter Ciesielski</i>
12:00 PM	12:30 PM	Improved biomass feedstock materials handling and feeding engineering data sets, design methods, and modeling/simulation tools	<i>Forest Concepts, LLC</i>	<i>James Dooley</i>
12:30 PM	1:00 PM	Integrated Process Optimization for Biochemical Conversion	<i>University of Arkansas</i>	<i>Sandra Eksioglu</i>
1:00 PM	1:20 PM	BREAK		
1:20 PM	1:50 PM	Analytical Modeling of Biomass Transport and Feeding Systems	<i>Purdue University</i>	<i>Michael Ladisch</i>
1:50 PM	2:20 PM	Virtual engineering of low-temperature conversion	<i>NREL</i>	<i>Jonathan Stickel</i>
2:20 PM	2:40 PM	BREAK		

Agenda – Tuesday cont'd

Day 9 – TUESDAY, MARCH 23, 2021 (CONT)

Start Time EST	End Time EST	SYSTEMS DEVELOPMENT AND INTEGRATION		
		Presentation	Organization	Presenter
2:40 PM	3:10 PM	Process Monitoring and Predictions of BioRefinery Performance	<i>NREL</i>	<i>Anne Starace</i>
3:10 PM	3:40 PM	Modeling Flow Behavior in a Disc-Refiner for DMR process	<i>NREL</i>	<i>Xiaowen Chen</i>
3:40 PM	4:10 PM	Scientific Methods for Biomass Reference Scenarios	<i>ORNL</i>	<i>Keith Kline</i>
4:10 PM	4:30 PM	BREAK		
4:30 PM	5:00 PM	Bio-C2G Model for Rapid, Agile Assessment of Biofuel and Co-product Routes	<i>LBNL</i>	<i>Corinne Scown</i>
5:00 PM	5:30 PM	Feedstock to Function: Improving biobased product and fuel development through adaptive technoeconomic and performance modeling	<i>LBNL</i>	<i>Vi Rapp</i>
5:30 PM	6:00 PM	Reviewer Wrap Up and Debrief	<i>Reviewers</i>	

Agenda - Wednesday

Day 10 - WEDNESDAY MARCH 24, 2021				
10:45 AM	11:15 AM	GATHER, TECH CHECK, NETWORKING QUESTIONS		
11:15 AM	6:00 PM	Systems Development and Integration	<i>SDI Program</i>	<i>Liz Moore</i>
11:15 AM	11:30 AM	Technology Area Daily Intro	<i>BETO</i>	<i>Liz Moore</i>
11:30 AM	12:00 PM	Biomass Feedstock User Facility - Improving Bale Deconstruction and Material Flow	<i>INL</i>	<i>Neal Yancey</i>
12:00 PM	12:30 PM	BFNUF Upgrade	<i>INL</i>	<i>Luke Williams</i>
12:30 PM	1:00 PM	ABPDU Operations	<i>LBNL</i>	<i>Deepti Tanjore</i>
1:00 PM	1:20 PM	BREAK		
1:20 PM	1:50 PM	Biochemical Pilot Scale Support and Process Integrations	<i>NREL</i>	<i>Dan Schell</i>
1:50 PM	2:20 PM	Solid Lignin Recovery	<i>NREL</i>	<i>Dan Schell</i>
2:20 PM	2:50 PM	PNNL Hydrothermal PDUs	<i>PNNL</i>	<i>Dan Anderson</i>
2:50 PM	3:10 PM	BREAK		
3:10 PM	3:40 PM	The Engineering of Catalyst Scale Up	<i>NREL</i>	<i>Fred Baddour</i>
3:40 PM	4:10 PM	Optimization of Carbon Efficiency for Catalytic Fast Pyrolysis (CFP) and Hydrotreating	<i>NREL</i>	<i>Kristiina Iisa</i>
4:10 PM	4:40 PM	Bio Oil Co Processing with Refinery Streams	<i>NREL</i>	<i>Kim Magrini</i>
4:40 PM	5:00 PM	BREAK		
5:00 PM	5:30 PM	Process Scale-up to Production Environments	<i>NREL</i>	<i>David Robichaud</i>
5:30 PM	6:00 PM	Developing Hydrotreating Models using Machine Learning	<i>PNNL</i>	<i>Mariefel Olarte</i>
6:00 PM	6:30 PM	Reviewer Wrap Up and Debrief	<i>Reviewers</i>	

Agenda - Thursday

Day 11 – THURSDAY, MARCH 25, 2021				
Start Time EST	End Time EST	SYSTEMS DEVELOPMENT AND INTEGRATION		
		Presentation	Organization	Presenter
10:45 AM	11:15 PM	GATHER, TECH CHECK, NETWORKING QUESTIONS		
11:15 AM	6:00 PM	Systems Development and Integration	SDI Program	Liz Moore
11:15 AM	11:30 AM	Technology Area Daily Intro	BETO	Liz Moore
11:30 AM	12:00 PM	Integrated Reactive Catalytic Fast Pyrolysis System for Advanced Hydrocarbon Biofuels	Research Triangle Institute	Dave Dayton
12:00 PM	12:30 PM	Bio-crude Production and Upgrading to Renewable Diesel	Research Triangle Institute	Dave Dayton
12:30 PM	1:00 PM	Small Scale Decentralized Fuel Production Facilities Via Advanced Heat Exchanger-Enabled Biorefineries	Thermochemical Recovery International Inc.	Ravi Chandran
1:00 PM	1:20 PM	BREAK		
1:20 PM	1:50 PM	Improved Feeding and Residual Solids Recovery System for IBR	Thermochemical Recovery International Inc.	Ravi Chandran
1:50 PM	2:20 PM	Integration of IH2 with the Cool Reformer for the Conversion of Cellulosic Biomass to Drop-In Fuels	Gas Technology Institute	Terry Marker
2:20 PM	2:50 PM	Cool GTL® for the Production of Jet Fuel from Biogas	Gas Technology Institute	Terry Marker
2:50 PM	3:10 PM	BREAK		
3:10 PM	3:40 PM	Low Carbon Hydrocarbon Fuels From Industrial Off Gas	LanzaTech, Inc.	Laurel Harmon
3:40 PM	4:10 PM	Ultra-low Sulfur Winterized Diesel	LanzaTech, Inc.	Laurel Harmon
4:10 PM	4:40 PM	Higher energy-content jet blending components derived from ethanol	Purdue University	Gozdem Kilaz
4:40 PM	5:00 PM	BREAK		
5:00 PM	5:30 PM	Agricultural and Woody Biomass to Diesel Fuel with Bio-oil Intermediate	West Biofuels, LLC	Matthew Summers
5:30 PM	6:00 PM	HYPOWERS: Hydrothermal Processing of Wastewater Solids	Water Research Foundation (WRF)	Jeff Moeller
6:00 PM	6:30 PM	Reviewer Wrap Up and Debrief	Reviewers	

Agenda - Friday

Day 12 - FRIDAY, MARCH 26, 2021				
Start Time EST	End Time EST	SYSTEMS DEVELOPMENT AND INTEGRATION		
		Presentation	Organization	Presenter
10:45 AM	11:15 AM	GATHER, TECH CHECK, NETWORKING QUESTIONS		
11:15 AM	4:40 PM	Systems Development and Integration	SDI Program	Liz Moore
11:15 AM	11:30 AM	Technology Area Daily Intro	BETO	Liz Moore
11:30 AM	12:00 PM	Advance Biofuels and Bioproducts with AVAP	AVAPCO LLC	Kim Nelson
12:00 PM	12:30 PM	Hybrid HEFA-HDCJ Process for the Production of Jet Fuel Blendstocks	Washington State University	Manuel Garcia-Perez
12:30 PM	1:00 PM	Drop-in Renewable Jet Fuel from Brown Grease via the Biofuels ISOCONVERSION Process	Applied Research Associates	Jocelyn Goodwin
1:00 PM	1:20 PM	BREAK		
1:20 PM	1:50 PM	Novel Method for Biomass Conversion to Renewable Jet Fuel Blend	Technology Holding LLC	Mukund Karanjikar
1:50 PM	2:20 PM	Upgrading of Stillage Syrup into Single Cell Protein for Aquaculture Feed	White Dog Labs	Carissa Kessler
2:20 PM	2:50 PM	Pilot-Scale Algal Oil Production	Global Algae Innovations	Dave Hazlebeck
2:50 PM	3:10 PM	BREAK		
3:10 PM	3:40 PM	Pilot-Scale Biochemical and Hydrothermal Integrated Biorefinery (IBR) for Cost-Effective Production of Fuels and Value Added Products	South Dakota School of Mines and Technology	Rajesh Shende
3:40 PM	4:10 PM	Multi-stream Integrated Biorefinery Enabled by Waste Processing	Texas A&M Agrilife Research	Joshua Yuan
4:10 PM	4:40 PM	TRIFTS Catalytic Conversion of Biogas to Drop-in Renewable Diesel Fuel	T2C Energy, LLC	Devin Walker
4:40 PM	5:00 PM	BREAK		
5:00 PM	5:30 PM	Reviewer Wrap Up and Debrief	Reviewers	

System Development & Integration Team



Jim Spaeth



Liz Moore



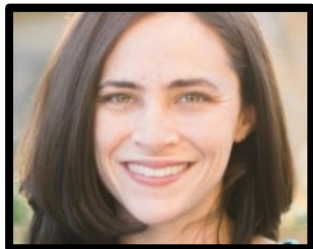
Mark Shmorhun



Josh Messner



Zia Haq



Alicia Lindauer



Brittany Clark



Marykate O'Brien



Clayton Rohman



Alex Jansen



Remy Biron



Ben Simon



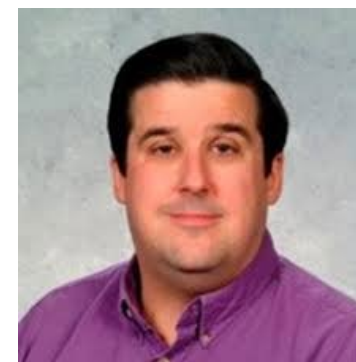
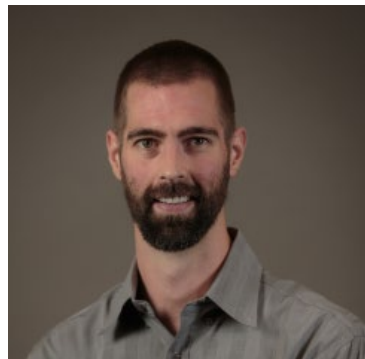
Art Wiselogel



KC Agwu

Introductions – Peer Review Panel

Name	Role and Affiliation	Previous Peer Review Experience
Daniel Lane (lead)	Principal at Saille Consulting	2019
Mark Penshorn	Penshorn Analysis	2017
Ignasi Palou-Rivera	Technology Platform Director - RAPID Manufacturing Institute at AIChE	New this year
Paul Bryan	Independent Consultant	2020 (AMO)
Vicky Putsche	Independent Consultant	New this year



Questions? Help?

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