

# 2021 / AIChE ANNUAL MEETING

NOVEMBER 7-11 • BOSTON, MA  
NOVEMBER 15-19 • VIRTUAL



SUSTAINABILITY  
USERS GUIDE



## Enact meaningful change

At IfS we're uniting experts, thought-leaders and influencers to provide you with forums to connect with like-minded professionals, exchange ideas, forge collaborations and enable progress.

## Join your sustainability community at one of our upcoming events.



**December 1-3, 2021 • [aiche.org/water](https://aiche.org/water)**

Learn and understand the current status of water usage, treatment, and recycling so that we, as a community, can start to review current and prospective technologies for water usage, as well as sustainability.



**December 9-10, 2021 • [aiche.org/bioenergy](https://aiche.org/bioenergy)**

This conference engages bioenergy sustainability researchers with the goal to promote collaboration and disseminate the latest innovative concepts, research methods and results in the various domains of bioenergy sustainability.



**December 15-17, 2021 • [aiche.org/esd](https://aiche.org/esd)**

Engineers, scientists and policy makers will gather to discuss technical and engineering challenges of addressing the 2030 Agenda for Sustainable Development and the 17 Sustainable Development Goals (SDGs).

**To learn more about IfS events,  
member benefits and resources, visit [aiche.org/ifs](https://aiche.org/ifs)**

*Event details including dates and locations are subject to change, please check the conference websites for the latest information.*

AIChE's **Institute for Sustainability (IfS)** is a member-driven organization that aids in pushing the sustainability profession forward, engaging the community, and defining excellence across the field. IfS provides multidisciplinary scientific rigor and research for sustainability discussions, encourages the incorporation of sustainability concepts in engineering education, and facilitates the development of measurement tools to guide the design of more sustainable products and processes.



As a member of IfS, you will enjoy a vast array of opportunities to communicate with leading international engineers, researchers, academics and scientists. Connect for ideas, inspiration, and technical information.

- **Technical Resources** - Keep apprised of new developments in the chemical engineering profession through our CEP magazine, AIChExchange and SmartBrief electronic newsletters, as well as Journals published in partnership with Wiley.
- **Exclusive Technical Content** - Access scientific and technical opportunities and research for sustainability discussions. IfS approaches sustainability from the perspectives of engineering and scientific disciplines to promote the societal, economic, and environmental benefits of sustainable and green engineering.
- **Conferences** - Get the lowest rates on future conference registrations (both virtual and in-person).
- **Education** - Build new technical knowledge and skills through live and archived webinars, credentials as well as self-paced eLearning courses.
- **Advance Your Career** - Whether you are actively searching or just researching possibilities, CareerEngineer is the leading e-recruitment source for chemical engineers at every level, in every field.
- **AIChE Engage** - Cultivate meaningful professional relationships through AIChE Engage, the mobile-friendly community discussion platform.
- **Students** - Get all the up-to-date information on grants and sponsorship opportunities to support your registration to present at any of the IfS conferences. Take part in the next dedicated Poster and Short Talk Session to network with leading professionals in your field of study.

**Join today!**

[www.aiche.org/ifs/membership](http://www.aiche.org/ifs/membership)

The Sustainable Engineering Forum promotes Sustainable Engineering and Sustainable Development in an inclusive forum.

This technical forum is open to all disciplines to promote technical and professional development with a focus on sustainability principles and practice.

More information at: [www.aiche.org/sef](http://www.aiche.org/sef)



IfS is governed by a Managing Board of industrial and academic leaders, which sets the course for the society.

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**Fengqi You**, *Cornell University*



## FEATURED PROGRAMMING Be sure to attend these conference highlights –

### TUESDAY, NOVEMBER 9, 2021

#### Plenary Session: Waste Plastics

3:30 PM – 6:00 PM,

Room 200, Hynes Convention Center

#### Alliance to End Plastic Waste: Global Activities in Combating Plastics Waste

**Steve Sikra**, *Alliance to End Plastic Waste*

#### Eastman in the Circular Economy – How Life Cycle Assessment (LCA) Enables Commercial Scale Molecular Recycling

**Teni Butler**, *Eastman*

#### Creating a Pure Planet by Transforming Recycling

**Dustin Olson**, *PureCycle Technologies*

### WEDNESDAY, NOVEMBER 10, 2021

#### Sustainable Engineering Forum Plenary

8:00 AM – 10:30 AM,

Room 312, Hynes Convention Center

#### Reinventing the Chemical/Materials Company: Transitioning to a Sustainable Circular Enterprise

**George Stephanopoulos**, *Massachusetts Institute of Technology*, **Bhavik Bakshi**, *The Ohio State University*, and **George Basile**, *The Global Kaiteki Center, Arizona State University*

#### A Multi-scale Systems Engineering Approach Towards Sustainable Energy Transition Strategies

**Efstathios N. Pistikopoulos**, *Texas A&M University*

#### System-Level Approaches for Intensifying the CO<sub>2</sub> Electrolysis Process

**Saket Sanjay Bhargava**, *International Institute for Carbon-Neutral Energy Research, University of Illinois at Urbana-Champaign*, **Daniel Azmoodeh**, *University of Illinois at Urbana-Champaign*, **Prithviraj Chumble**, *University of Illinois at Urbana-Champaign*, **Sujay Someshwar**, *University of Illinois at Urbana-Champaign*, and **Paul Kenis**, *International Institute for Carbon-Neutral Energy Research, University of Illinois*

#### Sustainable Synthesis of NH<sub>3</sub> via Electrochemical Reduction of N<sub>2</sub> on an Earth Abundant Cu Gas Diffusion Electrode at Ambient Conditions

**Nishithan Balaji Chidambara Kani**, *University of Illinois at Chicago*

#### Increasing Energy Yield from Dusty Solar Panels by a New Generation of Electrostatic Based Self-Cleaning Technology

**Alexander Orlov**, *Stony Brook University*

#### The Climate Solutions Community Workshop

10:30 AM – 1:30 PM,

Grand Ballroom, Sheraton Back Bay

This workshop will serve as a relaunch of The Climate Solutions Community (TCSC) by bringing together engineers and scientists to learn about and discuss the many options for addressing climate change.

Learn more at: [www.aiche.org/climateworkshop](http://www.aiche.org/climateworkshop)

Don't forget to log in for the virtual portion of the Annual Meeting, where the program continues.

# SUSTAINABILITY PROGRAM GRID

## Property Key

Hynes CC = John B. Hynes Veterans Memorial Convention Center

Sheraton = Sheraton Back Bay • Marriott = Marriott Copley Place

TIME	SESSION	PROPERTY	ROOM
<b>SUNDAY, NOVEMBER 7</b>			
03:30 PM - 06:00 PM	Green Chemical Reaction Engineering for Sustainability	Hynes CC	205
03:30 PM - 06:00 PM	Fundamentals of Food, Energy, and Water Systems	Hynes CC	308
03:30 PM - 06:00 PM	Life Cycle Analysis of Bio-Based Fuels, Energy, and Chemicals	Hynes CC	311
03:30 PM - 06:00 PM	Reactor Engineering for Biomass Feedstocks	Hynes CC	312
03:30 PM - 06:00 PM	Distributed Chemical and Energy Processes for Sustainability	Hynes CC	313
<b>MONDAY, NOVEMBER 8</b>			
08:00 AM - 10:30 AM	Environmentally Friendly Product and Process Development for Sustainability	Hynes CC	300
08:00 AM - 10:30 AM	Advanced Treatment Technologies for Water	Hynes CC	308
08:00 AM - 10:30 AM	Atmospheric Chemistry and Physics: Modeling and Field Studies	Hynes CC	309
08:00 AM - 10:30 AM	Advances in Life Cycle Assessment	Hynes CC	311
08:00 AM - 10:30 AM	Reactor Engineering for Biomass Feedstocks II	Hynes CC	312
08:00 AM - 10:30 AM	Design, Analysis, and Optimization of Sustainable Energy Systems and Supply Chains	Hynes CC	313
08:00 AM - 10:30 AM	Electrochemistry for Applications in Sustainability	Sheraton	Commonwealth
12:30 PM - 03:00 PM	Adsorbent Materials and Applications for Sustainable Energy and Chemicals	Hynes CC	109
12:30 PM - 03:00 PM	Environmental Division Awards and Honors (Invited Talks)	Hynes CC	309
12:30 PM - 03:00 PM	Design for a Circular Economy-I	Hynes CC	311
12:30 PM - 03:00 PM	Sustainable Biorefineries Plenary Session (Invited Talks)	Hynes CC	312
12:30 PM - 03:00 PM	Design, Analysis, and Optimization of Sustainable Energy Systems and Supply Chains II	Hynes CC	313
03:30 PM - 06:00 PM	Water Reuse and Recycling	Hynes CC	308
03:30 PM - 06:00 PM	Waste Plastic - Recycle, Reuse and Remediation Strategies	Hynes CC	309
03:30 PM - 06:00 PM	Green Chemistry and Engineering-I	Hynes CC	311
03:30 PM - 06:00 PM	Design, Analysis, and Optimization of Sustainable Energy Systems and Supply Chains III	Hynes CC	313
03:30 PM - 06:00 PM	Transport Phenomena in Sustainable Fuels: Biofuels, Hydrogen, and Syngas	Sheraton	Constitution B

This program is as of October 6, 2021. An up-to-date program is available at [aiche.org/annual](https://aiche.org/annual) and in the AIChEvents app.



# SUSTAINABILITY PROGRAM GRID

TIME	SESSION	PROPERTY	ROOM
<b>TUESDAY, NOVEMBER 9</b>			
08:00 AM - 10:30 AM	Water Reuse and Recycling II	Hynes CC	308
08:00 AM - 10:30 AM	Fundamentals of Environmental Kinetics and Reaction Engineering	Hynes CC	309
08:00 AM - 10:30 AM	Process Design: Innovation for Sustainability	Hynes CC	311
08:00 AM - 10:30 AM	Concentrated Solar Power Generation and Chemical Processing I	Hynes CC	313
08:00 AM - 10:30 AM	Nanoscale Behavior of Sustainable Processes	Marriott	Salon J/K
12:30 PM - 03:00 PM	Soft Systems, Molecular Simulation, Sustainability	Hynes CC	306
12:30 PM - 03:00 PM	Remediation of Emerging Contaminants and Legacy Compounds	Hynes CC	308
12:30 PM - 03:00 PM	Design and Analysis of Carbon Capture and Negative Emissions Technologies - Experimental	Hynes CC	309
12:30 PM - 03:00 PM	The Food-Energy-Water Nexus	Hynes CC	311
12:30 PM - 03:00 PM	Concentrated Solar Power Generation and Chemical Processing II	Hynes CC	313
03:30 PM - 06:00 PM	Plenary Session: Waste Plastics (Invited Talks)	Hynes CC	200
03:30 PM - 06:00 PM	Tools and Techniques for Sustainable/Green Product Design	Hynes CC	303
03:30 PM - 06:00 PM	Fuel and Energy Decarbonization	Hynes CC	305
03:30 PM - 06:00 PM	Remediation of Emerging Contaminants and Legacy Compounds II	Hynes CC	308
03:30 PM - 06:00 PM	Design and Analysis of Carbon Capture and Negative Emissions Technologies - Models	Hynes CC	309
03:30 PM - 06:00 PM	Biofuels Production: Design, Simulation, and Economic Analysis	Hynes CC	311
<b>WEDNESDAY, NOVEMBER 10</b>			
08:00 AM - 10:30 AM	Recycling and Upcycling of Plastic Waste	Hynes CC	200
08:00 AM - 10:30 AM	Next-Gen Manufacturing for Resilience and Sustainability	Hynes CC	202
08:00 AM - 10:30 AM	Adsorbent Materials for Sustainable Energy and Chemicals	Hynes CC	305
08:00 AM - 10:30 AM	Design and Optimization of Integrated Energy Systems	Hynes CC	308
08:00 AM - 10:30 AM	Sustainable Engineering Forum Plenary (Invited Talks)	Hynes CC	312
12:30 PM - 03:00 PM	Conversion of Waste Plastic into Liquid Fuels	Hynes CC	200
12:30 PM - 03:00 PM	Environmental Issues involving Biochar	Hynes CC	308

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# SUSTAINABILITY PROGRAM GRID

TIME	SESSION	PROPERTY	ROOM
12:30 PM - 03:00 PM	Sustainable Energy: Generation and Storage	Hynes CC	310
12:30 PM - 03:00 PM	Policy and Sustainability	Hynes CC	313
12:30 PM - 03:00 PM	Biodegradable Polymers from Forest Resources - Sustainable Biomaterials	Marriott	Exeter
03:30 PM - 05:00 PM	Poster Session: Environmental Division	Hynes CC	Exhibit Hall C
03:30 PM - 05:00 PM	Poster Session: Sustainability and Sustainable Biorefineries	Hynes CC	Exhibit Hall C
03:30 PM - 06:00 PM	Analysis and Assessment for Solving the Plastic Waste Crisis	Hynes CC	200
03:30 PM - 06:00 PM	Process Design in Energy and Sustainability	Sheraton	Back Bay Ballroom C
<b>THURSDAY, NOVEMBER 11</b>			
08:00 AM - 10:30 AM	Fundamentals and Applications for Municipal Solid Waste Treatment and Valorization	Hynes CC	309
08:00 AM - 10:30 AM	Biological Conversions and Processes for Renewable Feedstocks	Hynes CC	312
12:30 PM - 03:00 PM	Sustainable Fuel from Renewable Resources	Hynes CC	309
12:30 PM - 03:00 PM	Sustainability and Consumer Products	Hynes CC	311
12:30 PM - 03:00 PM	Chemical and Catalytic Conversions and Processes for Renewable Feedstocks	Hynes CC	312
03:30 PM - 06:00 PM	Sustainable Management and Uses of Post-Consumer Materials and Waste	Hynes CC	311
03:30 PM - 06:00 PM	Chemical and Catalytic Conversions and Processes for Renewable Feedstocks II	Hynes CC	312
03:30 PM - 06:00 PM	CO <sub>2</sub> Capture for Power Generation	Hynes CC	313
<b>MONDAY, NOVEMBER 15</b>			
08:00 AM - 10:30 AM	CO <sub>2</sub> Industrial, Engineering and R&D Approaches I	Virtual	Environmental Division (09)
10:30 AM - 12:00 PM	Poster Session: Sustainable Engineering Forum - Virtual	Virtual	Posters
10:30 AM - 12:00 PM	Poster Session: Environmental Division - Virtual	Virtual	Posters
12:30 PM - 03:00 PM	Feedstock Conversion Interface Consortium – Understanding Feedstock Variability to Enable Next Generation Biorefineries (Invited Talks)	Virtual	Sustainable Engineering Forum (23)
03:30 PM - 06:00 PM	Feedstock Conversion Interface Consortium – Understanding Feedstock Variability to Enable Next Generation Biorefineries II (Invited Talks)	Virtual	Sustainable Engineering Forum (23)

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# SUSTAINABILITY PROGRAM GRID

TIME	SESSION	PROPERTY	ROOM
<b>TUESDAY, NOVEMBER 16</b>			
08:00 AM - 10:30 AM	CO <sub>2</sub> Industrial, Engineering and R&D Approaches II	Virtual	Environmental Division (09)
08:00 AM - 10:30 AM	Resilient and Sustainable Supply Chains and Product Systems	Virtual	Sustainable Engineering Forum (23)
12:30 PM - 03:00 PM	Design and Analysis of Carbon Capture and Emissions Control Technologies - Virtual	Virtual	Environmental Division (09)
12:30 PM - 03:00 PM	Advances in Clean Energy R&D (Invited Talks)	Virtual	Sustainable Engineering Forum (23)
03:30 PM - 06:00 PM	Feedstock Logistics for Biorefineries	Virtual	Sustainable Engineering Forum (23)
03:30 PM - 06:00 PM	Transport Phenomena In Sustainable Fuels II	Virtual	Transport and Energy Processes (07)
<b>WEDNESDAY, NOVEMBER 17</b>			
08:00 AM - 10:30 AM	Novel Approaches to CO <sub>2</sub> Utilization I	Virtual	Sustainable Engineering Forum (23)
12:30 PM - 03:00 PM	Sustainability Fundamentals and Metrics Applications	Virtual	Environmental Division (09)
12:30 PM - 03:00 PM	Novel Approaches to CO <sub>2</sub> Utilization II	Virtual	Sustainable Engineering Forum (23)
12:30 PM - 03:00 PM	Waste Plastics Virtual Session	Virtual	Waste Plastics (TJ)
03:30 PM - 06:00 PM	Design and Optimization of Integrated Energy Systems - Virtual	Virtual	Environmental Division (09)
03:30 PM - 06:00 PM	Concentrated Solar Power Generation and Chemical Processing III	Virtual	Sustainable Engineering Forum (23)
<b>THURSDAY, NOVEMBER 18</b>			
08:00 AM - 10:30 AM	Remediation of Emerging Contaminants and Legacy Compounds - Virtual	Virtual	Environmental Division (09)
08:00 AM - 10:30 AM	Engineering Geologic Carbon Dioxide Storage Systems	Virtual	Sustainable Engineering Forum (23)
08:00 AM - 10:30 AM	Advances in Low-Cost Renewable Hydrogen Production at Large Scale	Virtual	Synthetic & Renewable Fuels (TH)
12:30 PM - 03:00 PM	Atmospheric Chemistry and Physics: Laboratory Studies - Virtual	Virtual	Environmental Division (09)
12:30 PM - 03:00 PM	Lignin for Sustainable Industrial Uses	Virtual	Forest and Plant Bioproducts Division (17)

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# SUSTAINABILITY PROGRAM GRID

TIME	SESSION	PROPERTY	ROOM
12:30 PM - 03:00 PM	Big Data and Analytics for Sustainability	Virtual	Sustainable Engineering Forum (23)
12:30 PM - 03:00 PM	Renewable Fuels Production from Hydrogen and Captured CO <sub>2</sub> or N <sub>2</sub>	Virtual	Synthetic & Renewable Fuels (TH)
03:30 PM - 06:00 PM	Atmospheric Chemistry and Physics: Nanoparticles and Health - Virtual	Virtual	Environmental Division (09)
03:30 PM - 06:00 PM	Sustainable Materials from Lignocellulosic Resources for Industrial Applications	Virtual	Forest and Plant Bioproducts Division (17)
03:30 PM - 06:00 PM	Value-Added Biorefinery Co-Products	Virtual	Sustainable Engineering Forum (23)
<b>FRIDAY, NOVEMBER 19</b>			
08:00 AM - 10:30 AM	Division Plenary: Valorization of Waste plastics including Ocean Plastics along with Agro-residues/ Forestry waste for Sustainable Biocomposites (Invited Talks)	Virtual	Forest and Plant Bioproducts Division (17)
08:00 AM - 10:30 AM	Climate Change and Engineering Sustainability	Virtual	Sustainable Engineering Forum (23)
12:30 PM - 03:00 PM	Sustainable Fuel from Renewable Resources & End-of-Life Material Management	Virtual	Environmental Division (09)
12:30 PM - 03:00 PM	Value-Added Uses of Industrial Coproducts and Natural Fibres in Sustainable Uses	Virtual	Forest and Plant Bioproducts Division (17)
12:30 PM - 03:00 PM	Advances in Algae Cultivation, Conversion and Products	Virtual	Sustainable Engineering Forum (23)
03:30 PM - 06:00 PM	Fundamentals and Applications for Waste Treatment and Valorization	Virtual	Environmental Division (09)

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## MEMBER BENEFITS

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## Conferences

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## Students – funding opportunities

Get all the up-to-date information on Grants and Sponsorship Opportunities to support your registration to present at any of the IfS conferences. Take part in the next dedicated Poster and Short Talk Session to network with leading professionals in your field of study.

Access scientific and technical opportunities and research for sustainability discussions. IfS approaches sustainability from the perspectives of engineering and scientific disciplines to promote the societal, economic, and environmental benefits of sustainable and green engineering. Topics within IfS to interact with:

- Alternative/Renewable Energy
- Circular Economy
- Food-Energy-Water Nexus
- Plastic Lifecycle Management
- Resilience and Adaptation
- Sustainable Development
- Sustainability Education
- Water Initiatives
- Waste Management

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