



REMADE CIRCULAR ECONOMY TECH SUMMIT & CONFERENCE

MARCH 20-21, 2023

NATIONAL ACADEMY OF SCIENCES BUILDING
WASHINGTON D.C.



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**REMADE
CIRCULAR
ECONOMY
TECH SUMMIT
& CONFERENCE**

WELCOME

On behalf of the entire team, welcome to the first-ever REMADE Circular Economy Technology Summit & Conference. During the event, we will advance the national conversation on a Circular Economy approach and how sustainable manufacturing can support the nation in meeting its multiple energy, environmental, industrial decarbonization, and economic goals.

**THANK YOU FOR JOINING US FOR THIS
NATIONAL THOUGHT-LEADERSHIP ENDEAVOR.**

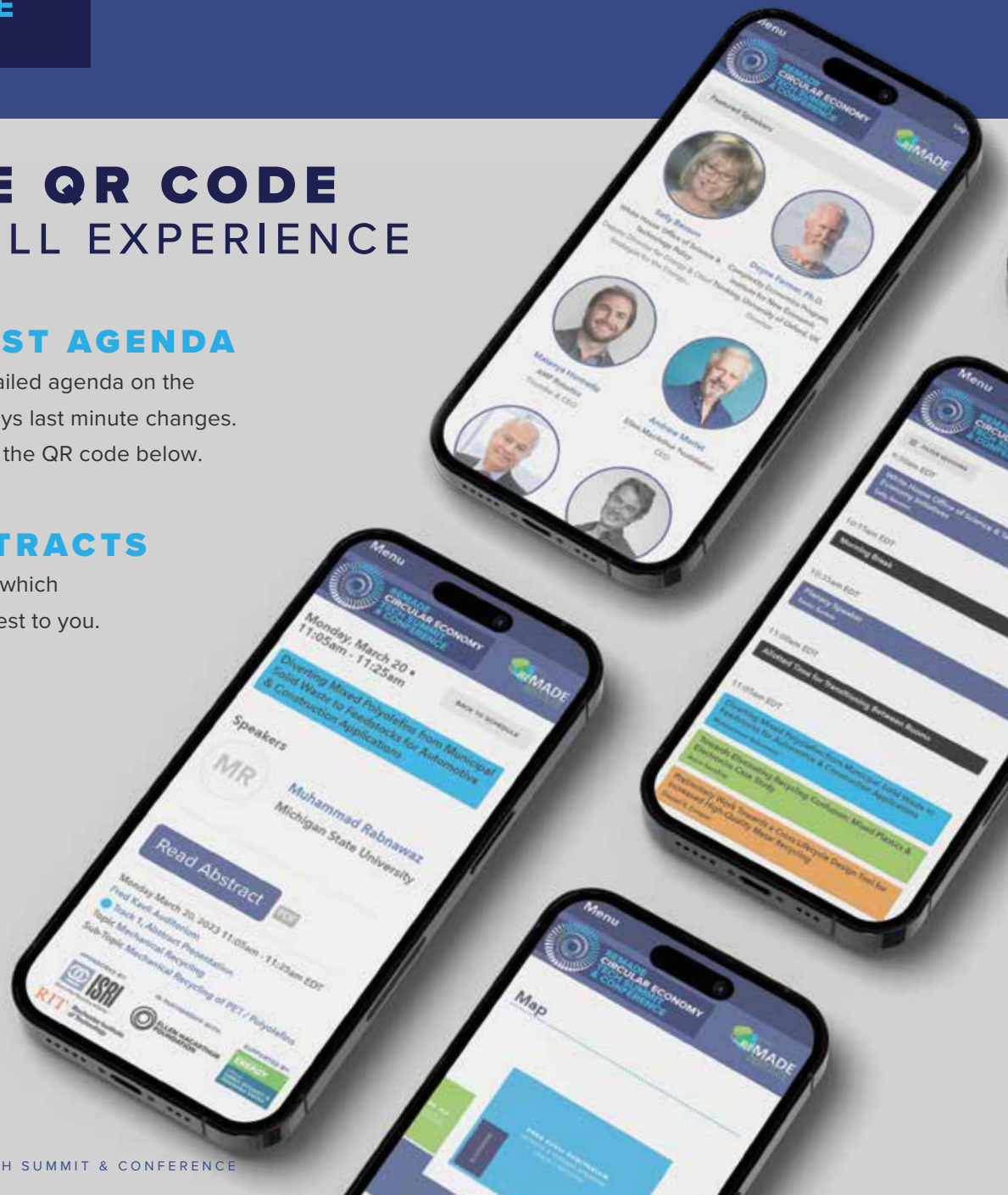
SCAN THE QR CODE FOR THE FULL EXPERIENCE

VIEW THE LATEST AGENDA

While this piece includes a detailed agenda on the following pages, there are always last minute changes. For the latest information, scan the QR code below.

READ THE ABSTRACTS

Read the abstracts and decide which presentations are of most interest to you.



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Thank you to all of our conference partners, sponsors, and supporters. Additional thanks to the National Science Foundation for their financial support to enable students and early career faculty to attend. We are grateful to all of you for your support.







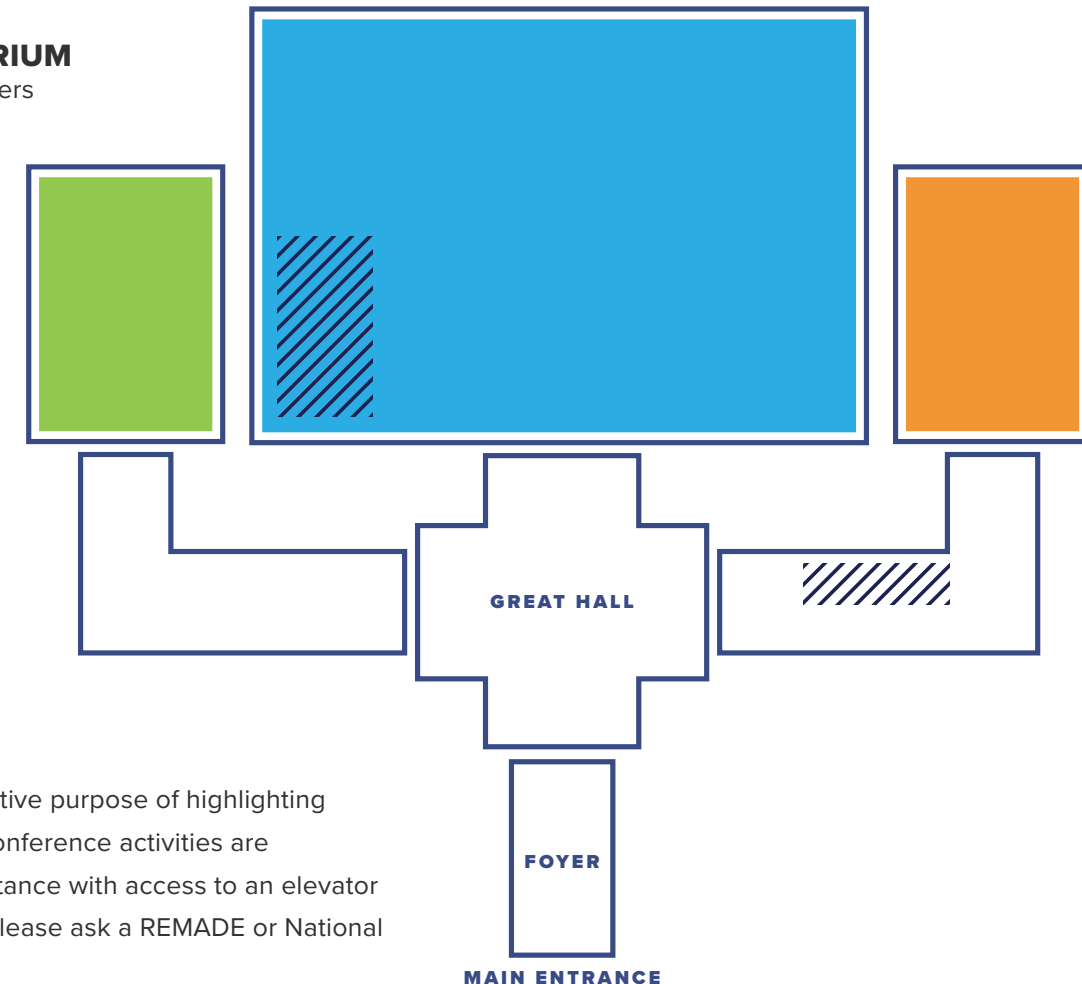
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FIND YOUR WAY

-  **FRED KAVLI AUDITORIUM**
 - Keynote & Plenary Speakers
 - Track 1 Sessions
-  **NAS 120**
 - Track 2 Sessions
-  **NAS 125**
 - Track 3 Sessions
-  **RESTROOMS**



Please note this map is for the illustrative purpose of highlighting main locations where sessions and conference activities are occurring. If you need additional assistance with access to an elevator or ramp due to mobility restrictions, please ask a REMADE or National Academies employee for assistance.

MAIN ENTRANCE

DAY ONE AGENDA 03.20.2023

8:00 am	Registration		
9:00 am	Welcome & Opening Remarks		Nabil Nasr <i>CEO, REMADE Institute</i>
9:10 am	Ellen MacArthur Foundation Welcome Remarks		Andrew Morlet <i>CEO, Ellen MacArthur Foundation</i>
9:20 am	Keynote Speaker		Dr. Diana Bauer <i>Deputy Director, U.S. Department of Energy, Advanced Materials & Manufacturing Technologies Office (AMMTO)</i>
9:45 am	White House Office of Science & Technology Policy: Circular Economy Initiatives		Sally Benson <i>Deputy Director for Energy, White House Office of Science & Technology Policy</i>
10:10 am	Morning Break		
10:30 am	Plenary Speaker		Kevin Surace <i>Chairman & CTO, Appvance</i>
10:55 am	Transition Time Between Rooms		
11:00 am	TRACK 1	TRACK 2	TRACK 3
	Mechanical Recycling Mechanical Recycling of PET / Polyolefins Paper Title: Diverting Mixed Polyolefins from Municipal Solid Waste to Feedstocks for Automotive & Construction Applications Presenter: Muhammad Rabnawaz <i>Michigan State University</i>	Enabling a Circular Economy through AI & Machine Learning Applications of Artificial Intelligence & Machine Learning in Recycling Paper Title: Towards Eliminating Recycling Confusion: Mixed Plastics & Electronics Case Study Presenter: Amin Sarafraz <i>University of Miami</i>	Systems Analysis Systems Analysis & Material Flows - Recycling I Paper Title: Preliminary Work Towards a Cross Lifecycle Design Tool for Increased High-Quality Metal Recycling Presenter: Daniel R. Cooper <i>University of Michigan</i>
11:20 am	TRACK 1	TRACK 2	TRACK 3
	Paper Title: Ultrahigh-Speed Extrusion of Recycled Film-Grade LDPE & Injection Molding Characterization Presenter: Davide Masato <i>University of Massachusetts-Lowell</i>	Paper Title: Identification & Separation of E-Scrap Components Using Modified Image Recognition Model Based On Advanced Deep Learning Tools Presenter & Author: Rahul Kumar Sunil Singh <i>University of Utah</i>	Paper Title: Assessing the Status Quo of U.S. Steel Circularity & Decarbonization Options Presenter: Barbara Reck <i>Yale University</i>
11:40 am	TRACK 1	TRACK 2	TRACK 3
	Paper Title: Composites from Post-Consumer Polypropylene Carpet & HDPE Retail Bags Presenter: Anuj Maheshwari <i>Oklahoma State University</i>	Paper Title: Enhanced Processing of Aluminum Scrap at End-of-Life Via Artificial Intelligence & Smart Sensing Presenter: Emily Molstad <i>Solvus Global, LLC & Valis Insights</i>	Paper Title: Fiber & Fabric-Integrated Tracing Technologies for Textile Sorting & Recycling: A Review Presenter: Brian Iezzi <i>University of Michigan</i>
12:00 pm	15 Minutes of Q&A 🕒 End of Session Block	15 Minutes of Q&A 🕒 End of Session Block	15 Minutes of Q&A 🕒 End of Session Block
12:15 pm	Lunch		
1:15 pm	Plenary Speaker		John Warner <i>President & CTO, Warner-Babcock Institute for Green Chemistry</i>
1:40 pm	Plenary Speaker		Tom Graedel, Ph.D. <i>Clifton R. Musser Professor Emeritus of Industrial Ecology, Professor Emeritus of Chemical Engineering, Yale University</i>
2:05 pm	Afternoon Break		

2:25 pm	TRACK 1	TRACK 2	TRACK 3
	Chemical & Solvent-Based Recycling PET & Polyolefins Paper Title: Modifying the Twin-Screw Extruder to Facilitate Increased Depolymerization Rates of Poly(Ethylene Terephthalate) through Glycolysis Presenter: Jonathan Hatt <i>Washington State University</i>	Pathways to Net Zero Emissions in Manufacturing & Materials Reducing Energy & Emissions in Manufacturing & Recycling Paper Title: Emission Reduction for an iMFLUX® Constant Pressure Injection Molding Process Presenter: William F. Lawless III <i>iMFLUX</i>	Circular Economy Circularity Paper Title: Standards as Enablers for a Circular Economy Presenter: Noah Last <i>National Institute of Standards & Technology (NIST) & Georgetown University</i>
2:45 pm	TRACK 1	TRACK 2	TRACK 3
	Paper Title: Sustainable Petrochemical Alternatives From Plastic Upcycling Presenter: Ryan A. Hackler <i>Aeternal Upcycling, Inc</i>	Paper Title: Enzyme-Based Biotechnologies For Removing Stickies & Regaining Fiber Quality in Paper Recycling Presenter: Jason Wang <i>Western Michigan University</i>	Paper Title: Circularity Index: Performance Assessment of a Low Carbon & Circular Economy Presenter: Gabriel Carmona <i>University of Cambridge, UK</i>
3:05 pm	TRACK 1	TRACK 2	TRACK 3
	Paper Title: Investigation of Primary Decomposition of Polypropylene Using a PY-GC×GC-FID/TOF-MS System Presenter: Barbara Alejandra Perez <i>Pennsylvania State University</i>	Paper Title: Removal Of Iron & Manganese Impurities from Secondary Aluminum Melts Using Microstructural Engineering Techniques Presenter: Tom Grosko <i>Smelter Service Corporation</i>	Paper Title: Biodegradable Polymers for Circular Economy Transitions - Challenges & Opportunities Presenter: Koushik Ghosh <i>Sandia National Laboratories</i>
3:25 pm	TRACK 1	TRACK 2	TRACK 3
	Paper Title: Upcycling Polyethylene Waste Into Value-Added Nylons for Sustainable Automotive Manufacturing Presenter: Michael S. Behrendt <i>Michigan State University</i>	Paper Title: Upcycling of Aerospace Aluminum Scrap Presenter: Mohamed Aboukhatwa <i>University of Illinois at Urbana-Champaign</i>	
3:45 pm	15 Minutes of Q&A 🕒 End of Session Block	15 Minutes of Q&A 🕒 End of Session Block	15 Minutes of Q&A 🕒 End of Session Block
4:00 pm	Afternoon Break		
4:20 pm	TRACK 1	TRACK 2	TRACK 3
	E-Scrap Recycling E-Scrap Recycling of Metals Paper Title: Selective Leaching & Electrochemical Purification for the Recovery of Tantalum from Tantalum Capacitors Presenter: Randall Adcock <i>Arizona State University</i>	Pathways to Net Zero Emissions in Manufacturing & Materials Industrial Decarbonization Paper Title: Circular Economy Contributions to Decarbonizing the U.S. Industrial Sector Presenter: Julien Walzberg <i>National Renewable Energy Laboratory (NREL)</i>	Circular Economy Building a Circular Economy for Materials & Products - Recycling Paper Title: Evaluation of Nationwide Supply Chain Scenarios for a Circular Economy of PET & Olefin Plastics Presenter: Tasmin Hossain <i>Idaho National Laboratory</i>
4:40 pm	TRACK 1	TRACK 2	TRACK 3
	Paper Title: Lead Leaching & Electrowinning Using Acetic Acid for Recovery of Lead in Silicon Solar Modules Presenter: Natalie Click <i>Arizona State University</i>	Paper Title: Environmentally Extended Input-Output (EEIO) Modeling for Industrial Decarbonization Opportunity Assessment: A Circular Economy Case Study Presenter: Heather Liddell <i>Energetics</i>	Paper Title: Nextcycle: Building Robust Circular Economies Through Partnership & Innovation Presenter: Juri Freeman <i>Resource Recycling Systems Inc.</i>
5:00 pm	TRACK 1		TRACK 3
	Paper Title: Thermolysis Processing of Waste Printed Circuit Boards: Char-Metals Mixture Characterization for Recovery of Base & Precious Metals Presenter: Mohammad Rezaee <i>Pennsylvania State University</i>		Paper Title: My So-Called Trash: Evaluating the Recovery Potential of Textiles in New York City Residential Refuse Presenter: Sarah Coulter <i>Accelerating Circularity, Inc.</i>
5:20 pm	15 Minutes of Q&A 🕒 End of Session Block	15 Minutes of Q&A 🕒 End of Session Block	15 Minutes of Q&A 🕒 End of Session Block
5:35 pm	Poster Session & Reception		See Page 11 for List of Projects & Presenters
7:15 pm	Adjourn Day 1		

DAY TWO AGENDA 03.21.2023

8:00 am	Registration		
8:15 am	Roadmap to Accelerate the Transition to Circular Economy	Nabil Nasr <i>CEO, REMADE Institute</i>	
8:40 am	EMF 2030: The Road for the Future	Andrew Morlet <i>CEO, Ellen MacArthur Foundation</i>	
9:05 am	Welcome to the Supply-Side Economy – Grasping the Circularity Moment		
9:35 am	Keynote Speaker Doyne Farmer, Ph.D. <i>Director, Complexity Economics Program, Institute for New Economic Thinking, University of Oxford, UK</i>		
10:05 am	Morning Break		
10:25 am	Plenary Speaker Matanya Horowitz <i>Founder & CEO, AMP Robotics</i>		
10:50 am	Transition Time Between Rooms		
10:55 am	TRACK 1 Chemical & Solvent-Based Recycling Chemical & Solvent-Based Recycling of Mixed Plastics Paper Title: A Novel Solvent-Based Recycling Technology Presenter: Ezra Bar-Ziv <i>Michigan Technological University</i>	TRACK 2 Design For Circularity Paper Title: Calculator for Sustainable Tradeoff Optimization in Multi-Generational Product Family Development Considering Re-X Performances Presenter: Harrison Kim <i>University of Illinois Urbana-Champaign</i>	TRACK 3 Circular Economy Building a Circular Economy for Materials & Products - Remanufacturing Paper Title: Pathways to Net Zero Emissions in Manufacturing & Materials Production - HVAC OEMs Perspectives Presenter: Deba Maitra <i>Trane Technologies</i>
11:15 am	TRACK 1 Paper Title: Valorization of Plastic Waste Via Advanced Separation & Processing Presenter: Paschalis Alexandridis <i>State University of New York (SUNY), Buffalo</i>	TRACK 2 Paper Title: A Practical Methodology for Developing & Prioritizing Remanufacturing Design Rules Presenter: Mike Haselkorn <i>REMADE Institute</i>	TRACK 3 Paper Title: A Systems Approach to Addressing Industrial Products Circularity Challenges Presenter: Manish Gupta <i>Hitachi America, Ltd.</i>
11:35 am	Paper Title: When is it Profitable to Make a Product Sustainable? Insights from a Decision-Support Tool Presenter: Karan Bhuwalka <i>Massachusetts Institute of Technology (MIT)</i>	TRACK 2 Paper Title: Recyclability Feedback for Part Assemblies in Computer-Aided Design Software Presenter: Bert Bras <i>Georgia Institute of Technology</i>	
11:55 am	15 Minutes of Q&A 🕒 End of Session Block	15 Minutes of Q&A 🕒 End of Session Block	15 Minutes of Q&A 🕒 End of Session Block
12:10 pm	Lunch		
1:10 pm	TRACK 1 Mechanical Recycling Recycling of Tire Rubber for Paving Applications Paper Title: Crumb Rubber from End-of-Life Tires to Reduce the Environmental Impact and Material Intensity of Road Pavements Presenter: Annick Anttil <i>Michigan State University</i>	TRACK 2 Enabling a Circular Economy through AI & Machine Learning Applications of Artificial Intelligence & Machine Learning in Remanufacturing Paper Title: Tire Life Assessment For Increasing Remanufacturing of Commercial Vehicle Tires Presenter: Vispi Karkaria <i>Northwestern University</i>	TRACK 3 Systems Analysis Systems Analysis & Material Flows - Recycling II Paper Title: Environmental & Economic Analyses Of Chemical 1 Recycling Via Dissolution of Waste Polyethylene 2 Terephthalate Presenter: Utkarsh S. Chaudhari <i>Michigan Technological University</i>
1:30 pm	TRACK 1 Paper Title: Stabilization Of Waste Plastics With Lightly Pyrolyzed Crumb Rubber In Asphalt Presenter: Baoshan Huang <i>The University of Tennessee</i>	TRACK 2 Paper Title: Deep Learning For Defect Detection in Inspection Presenter: Gül E. Kremer <i>The University of Dayton</i>	TRACK 3 Paper Title: Techno-Economic Analysis of A Material Recovery Facility Employing Robotic Sorting Technology Presenter: SM Mizanur Rahman <i>Yale University</i>

1:50 pm	TRACK 1 Paper Title: Cross-Industry Utilization of Ground Tire Rubber For Energy Efficient Pavements Presenter: Brittany Hallmark-Haack <i>Iowa State University</i>	TRACK 2 Paper Title: Image Based Machine Learning in Automotive Used Parts Identification for Remanufacturing Presenter: Abu Islam <i>Rochester Institute of Technology</i>	TRACK 3 Paper Title: Key Strategies in Industry For Circular Economy: Analysis of Remanufacturing & Beneficial Reuse Presenter: Subodh Chaudhari <i>Oak Ridge National Laboratory</i>
2:10 pm	TRACK 1 Paper Title: Recycling Waste Tire Rubber in Asphalt Pavement Design and Construction Presenter: Zhanping You <i>Michigan Technological University</i>	TRACK 2 Paper Title: Image-based Methods for Inspection of Printed Circuit Boards Presenter: Nenad G. Nenadic <i>Rochester Institute of Technology</i>	TRACK 3 Paper Title: Spatio-Temporal Life Cycle Assessment of NMC111 Hydrometallurgical Recycling In the U.S. Presenter: Annick Anttil <i>Michigan State University</i>
2:30 pm	TRACK 1 Paper Title: Analysis & Design For Sustainable Circularity of Barrier Films Used in Sheet Molding Composites Production Presenter: Farshid Nazemi <i>The Ohio State University</i>		TRACK 3 Paper Title: Development of Manufacturing Technologies to Increase Scrap Steel Recycling Into New Tires Presenter: Robert Radulescu <i>Michelin North America</i>
2:50 pm	15 Minutes of Q&A 🕒 End of Each Session	15 Minutes of Q&A 🕒 End of Session	15 Minutes of Q&A 🕒 End of Session
3:05 pm	Afternoon Break		
3:25 pm	TRACK 1 Mechanical Recycling Recycling of Elastomers Paper Title: An Update On PVC Plastic Circularity & Emerging Advanced Recovery Technologies For End-Of-Life PVC Materials Presenter: Richard Krock <i>VyChlor Advisors LLC</i>	TRACK 2 Innovations in Remanufacturing Low-Cost Repair Technologies Paper Title: Effects of Ultrasonic Impact Treatment on the Fatigue Performance of the High Strength Alloy Steel Presenter: Joha Shamsjoha <i>Rochester Institute of Technology</i>	TRACK 3 Circular Economy Building a Circular Economy for Materials & Products - Recycling Paper Title: Clean Energy Technologies, Critical Materials, & the Potential For Remanufacturing Presenter: Thomas Graedel <i>Yale University</i>
3:45 pm	TRACK 1 Paper Title: Dynamic Crosslinking for EVA Recycling Presenter: Kimberly Miller McLoughlin <i>Braskem America</i>	TRACK 2 Paper Title: Mechanical Properties of High Carbon Steel Coatings On Gray Cast Iron Formed by Twin Wire Arc Presenter: Mark Walluk <i>Rochester Institute of Technology</i>	TRACK 3 Paper Title: Qualification of Future Electric Vehicle Battery Waste Stream for Repurposing and Recycling in Ireland Presenter: Colin Fitzpatrick <i>University of Limerick, Ireland</i>
4:05 pm	TRACK 1 Paper Title: Chemical Pre-Treatment of Tire Rubbers For Froth Flotation Separation of Butyl & Non-Butyl Rubbers Presenter: Haruka Pinegar <i>Argonne National Laboratory</i>	TRACK 2 Paper Title: Towards Development of Additive Manufacturing Material & Process Technologies to Improve the Re-Manufacturing Efficiency of Commercial Vehicle Tires Presenter: Christopher Williams <i>Virginia Tech</i>	TRACK 3 Paper Title: Circular Economy & the Digital Divide: Assessing Opportunity For Value Retention Processes in the Consumer Electronics Sector Presenter: Kyle Parnell <i>Rochester Institute of Technology</i>
4:25 pm	15 Minutes of Q&A 🕒 End of Each Session	15 Minutes of Q&A 🕒 End of Session	15 Minutes of Q&A 🕒 End of Session
4:40 pm	Closing Remarks		Nabil Nasr <i>CEO, REMADE Institute</i>
4:50 pm	Adjourn Conference		

DAY ONE KEYNOTE & PLENARY SPEAKERS



DR. DIANA BAUER

DEPUTY DIRECTOR | U.S. DEPARTMENT OF ENERGY,
ADVANCED MATERIALS & MANUFACTURING TECHNOLOGIES OFFICE (AMMTO)

Dr. Diana Bauer serves as the Deputy Director of the Advanced Materials and Manufacturing Technologies Office (AMMTO) within the Office of Energy Efficiency and Renewable Energy (EERE) at the U.S. Department of Energy (DOE).

In this role, Dr. Bauer is responsible for technical coordination and strategic planning. She also has departmental and interagency leadership roles in circular economy, critical materials, energy storage, and the energy-water nexus focus areas.

Before joining AMMTO, Diana directed the Office of Energy Systems Integration Analysis within the Department's Office of Policy, where she and her staff looked at the connection between energy and other systems. She was the lead author of *The Water-Energy Nexus: Challenges and Opportunities* in 2014. Also, in the policy office, she led the drafting of DOE's 2010 and 2011 Critical Materials Strategy reports.

Before joining the Department of Energy, Diana led the extramural sustainability research program at the Environmental Protection Agency, which focused on green engineering, green chemistry, green buildings, and transportation systems.

Dr. Bauer has a Ph.D. in mechanical engineering with a concentration in green design and manufacturing from the University of California, Berkeley.



SALLY BENSON

DEPUTY DIRECTOR FOR ENERGY & CHIEF STRATEGIST FOR THE ENERGY TRANSITION
WHITE HOUSE OFFICE OF SCIENCE & TECHNOLOGY POLICY

An internationally-recognized energy expert, Dr. Benson serves as Deputy Director for Energy & Chief Strategist for the Energy Transition at OSTP. Trained as an earth scientist and engineer, she is an expert on a wide variety of topics related to energy and the environment. For the past 25 years, she has focused on deep decarbonization of the global energy system. She comes to OSTP from Stanford University where she is the Precourt Family Professor of Energy Resources Engineering, in the School of Earth, Energy and Environmental Sciences. During her time at Stanford, she was also the Director of the Global Climate and Energy Project, a research program focused on discovering and developing new technologies for reducing carbon dioxide emissions from the energy system. Prior to joining Stanford University, she was at Lawrence Berkeley National Laboratory, where she held many positions, including Earth Sciences Division Director, Associate Laboratory Director for Energy Sciences, and Deputy Director for Operations. She has been a coordinating lead author for the Intergovernmental Panel on Climate Change (IPCC), and a member of several National Academy of Sciences studies related to energy and the environment, most recently the study on Negative Emissions Technologies and Reliable Sequestration.



KEVIN SURACE

CHAIRMAN & CTO | APPVANCE

Kevin is a Silicon Valley innovator, serial entrepreneur, CEO, and futurist. He was INC Magazines' Entrepreneur of the Year, a CNBC top Innovator of the Decade, World Economic Forum Tech Pioneer, Chair of Silicon Valley Forum, Planet Forward Innovator of the Year nominee, featured for 5 years on TechTV's Silicon Spin, and inducted into RIT's Innovation Hall of Fame. He has 93 worldwide patents and has led pioneering work on the first cellular data smartphone (AirCommunicator), the first human-like AI virtual assistant (Portico), soundproof drywall, high R-value windows, AI-driven building management, AI-driven QA automation, supply-chain auctions, and the window/energy retrofits of the Empire State Building and NY Stock Exchange.



JOHN WARNER

PRESIDENT & CTO | WARNER BABCOCK INSTITUTE FOR GREEN CHEMISTRY

John Warner is a chemistry inventor and co-founder of the field of Green Chemistry. In the 1990s, John realized that global students in chemistry had little (or no) training in predictive toxicology or understanding of environmental systems. He felt that the consequence of this lack of training was a root cause for why many industrial products and processes have negative impacts on human health and the environment. Together with Paul Anastas, he defined the field of Green Chemistry and created the 12 Principles of Green Chemistry, spending his life working to change the field of chemistry and the education of future chemists.



TOM GRAEDEL

CLIFTON R. MUSSER PROFESSOR EMERITUS OF INDUSTRIAL ECOLOGY, PROFESSOR EMERITUS OF
CHEMICAL ENGINEERING, YALE UNIVERSITY

Professor Graedel was elected to the U.S. National Academy of Engineering for "outstanding contributions to the theory and practice of industrial ecology, 2002." His research is centered on developing and enhancing industrial ecology, the organizing framework for the study of the interactions of the modern technological society with the environment. His textbook, *Industrial Ecology*, cowritten with B. R. Allenby of AT&T, was the first book in the field and is now in its second edition. It, and his 2004 textbook, *Greening the Industrial Facility*, are used for F&ES courses of the same names. His current interests include studies of the flows of materials within the industrial ecosystem and the development of analytical tools to assess the environmental characteristics of products, processes, the service industry, and urban infrastructures. He is a fellow of Pierson College.

DAY TWO KEYNOTE & PLENARY SPEAKERS



PLENARY
SPEAKER

NABIL NASR

CEO | REMADE INSTITUTE

Dr. Nabil Nasr is the founding Chief Executive Officer of the REMADE Institute, where he oversees everything from node-level research roadmap development to corporate engagement of the Institute's largest industrial partners. Dr. Nasr also serves as the Director of the Golisano Institute for Sustainability and an Associate Provost for Academic Affairs at the Rochester Institute of Technology. Throughout his career, Dr. Nasr has worked in the fields of sustainable manufacturing, remanufacturing, clean production, and sustainable product development for over 25 years, and is considered an international leader in research and development efforts in those disciplines. Dr. Nasr has served as an expert delegate for the U.S. government in several international forums, including the Asia Pacific Economic Cooperation (APEC), the United Nations, the World Trade Organization (WTO), and the Organisation for Economic Cooperation and Development (OECD). Dr. Nasr is also a member of the International Resource Panel (IRP) of the United Nations Environment Programme (UNEP). Dr. Nasr's significant expertise in sustainable manufacturing leadership continues with his latest endeavor, the REMADE Institute.

Dr. Nasr holds a BS in Industrial Engineering from Helwan University (Egypt), an MEng in Manufacturing Engineering from the Pennsylvania State University, and both an MS and PhD in Industrial & Systems Engineering from Rutgers University.



PLENARY
SPEAKER

ANDREW MORLET

CEO | ELLEN MACARTHUR FOUNDATION

Andrew is Chief Executive of the Ellen MacArthur Foundation, which was established in 2010. The Foundation aims to accelerate the transition to a circular economy - one that is restorative and regenerative by design, eliminating waste and pollution, and keeping products and materials in high-value use for longer. Prior to joining the Ellen MacArthur Foundation, Andrew was a consultant strategy partner with McKinsey & Company, Andersen Consulting and Accenture, and previously worked in medical research focused on HIV/AIDS epidemiology.



KEYNOTE
SPEAKER

PROF. DR. MARTIN R. STUCHEY

FOUNDER | THE LANDBANKING GROUP GMBH & SYSTEMIQ LTD.

Prof. Dr. Martin Stuchtey is founder of The Landbanking Group – the world's first depository for natural capital accounts. He is also founder of SYSTEMIQ, a consulting and investment company with a mission to drive the attainment of the Paris climate agreement and the Sustainable Development Goals. He spent 20 years with McKinsey & Co., finally as Director of the Centre for Business & Environment. He holds a chair for resource strategies and management at the University of Innsbruck. He is author of many papers, reports, newspaper and television contributions and the book, *A Good Disruption – Redefining Growth in the Twenty-first Century*, mostly dealing with questions of circular and regenerative design of industrial systems. He is an organic farmer, father of six and an avid alpinist.



KEYNOTE
SPEAKER

DOYNE FARMER

DIRECTOR | COMPLEXITY ECONOMICS PROGRAM, INSTITUTE FOR NEW ECONOMIC THINKING, OXFORD MARTIN SCHOOL, UNIVERSITY OF OXFORD, UK

J. Doyne Farmer is Director of the Complexity Economics programme at the Institute for New Economic Thinking at the Oxford Martin School and Baillie Gifford Professor of Mathematics at the University of Oxford, as well as an External Professor at the Santa Fe Institute.

His current research is in economics, including agent-based modeling, financial instability and technological progress. He was a founder of Prediction Company, a quantitative automated trading firm that was sold to UBS in 2006. His past research includes complex systems, dynamical systems theory, time series analysis and theoretical biology.



PLENARY
SPEAKER

MATANYA HORROWITZ

FOUNDER & CEO | AMP ROBOTICS

Dr. Matanya Horowitz is the founder and CEO of AMP Robotics, an industrial artificial intelligence (AI) and robotics company applying automation to modernize recycling and enable a world without waste.

Horowitz developed and commercialized AMP's breakthrough AI platform, AMP Neuron™, and robotics system, AMP Cortex™, which automates the identification and sorting of recyclables from mixed material streams. AMP's AI platform is continuously trained to recognize different colors, textures, shapes, sizes, patterns, and even brand labels to identify materials and their recyclability. Neuron then guides robots to pick and place the material to be recycled. AMP's technology recovers recyclables from municipal waste, precious commodities from electronic waste, and high-value materials from construction and demolition debris at superhuman speeds with extremely high accuracy.

Horowitz earned four bachelor's degrees, in electrical engineering, computer science, applied mathematics, and economics, along with a master's degree in electrical engineering, from the University of Colorado at Boulder. He holds a doctorate in control and dynamical systems from the California Institute of Technology, with publications and research in control theory, path planning, and computer vision.

DAY ONE POSTER SESSION PARTICIPANTS

Title of Project	Project Team
Chemical Conversion & Process Control for Increased Use of Polyethylene & Polypropylene Secondary Feedstocks	University of Massachusetts-Lowell, Massachusetts Institute of Technology (MIT), SER North America LLC, iMFLUX Inc.
Chemical Recycling of Mixed PET/Polyolefin Streams Through Sequential Pyrolysis & Catalytic Upgrading	The Pennsylvania State University, Northwestern University (NU), Shaw Group Industries, Inc., Process Systems Enterprise, Inc. - A Siemens Business
Data-Driven Design Decision Support for Remanufacturing of High-Value Components in Industrial & Agricultural Equipment	Iowa State University (ISU), University of Illinois at Urbana-Champaign (UIUC), Mississippi State University (MSU), John Deere, Automotive Parts Remanufacturers Association (APRA)
Delamination as Key Enabler for the Recycling of Polymer-based Multilayer Packaging	The Research Foundation for SUNY -University of Buffalo, Pacific Northwest National Laboratory, Modern Corporation, Honeywell (Performance Materials Technologies)
Design Iteration Support Tool to Sustain Remanufacturability	Iowa State University (ISU), Danfoss
Development of Instruments & Techniques that Can Assess Tire Life & Increase Re-Manufacturing of Commercial Vehicle Tires	Michelin North America, Northwestern University
Dynamic Systems Analysis of PET and Olefin Polymers in a Circular Economy	Michigan Technological University, Idaho National Laboratory, Resource Recycling Systems (RRS), Yale University, Chemstations, Honeywell UOP
Enabling Cross-industry Reuse of Comingled Waste Plastics as Quality Asphalt Modifier for Sustainable Pavement	University of Tennessee, Oak Ridge National Laboratory, Paragon Technical Services Inc. (subsidiary of Ergon Asphalt & Emulsions, Inc.)
Enhanced Processing of Aluminum Scrap at End-of-life via Artificial Intelligence & Smart Sensing	Solvus Global, LLC, Energy Research Company (ERCo), Eck Industries, Mercury Marine, Novelis, Schnitzer Steel Industries
Identification of Mixed Plastics and Valuable Electronics at the Source	University of Miami, Lid Vizion, LLC
Mapping the Materials Base for REMADE	Yale, Massachusetts Institute of Technology (MIT)
Material & Vehicle design for High-Value Recycling of Aluminum & Steel Automotive Sheet	University of Michigan, Ford Motor Company, Novelis, Argonne National Laboratory, The Institute of Scrap Recycling Industries (ISRI), The Aluminum Association, Light Metal Consultants
New Approaches to Improve De-inking Flotation to Increase the Availability of High-quality Low-cost Recycle Paper Fibers	Virginia Tech, Thiele Kaolin
Quantification of Financial & Environmental Benefits Tradeoff in Multi-generational Product Family Development Considering Re-X Performances	University of Illinois at Urbana-Champaign (UIUC), Iowa State University (ISU), John Deere, Green Electronics Council
Recycling Technologies for Silicon Solar Modules	Arizona State University, First Solar Inc., TG Companies LLC
Selective Recovery of Elements from molten Aluminum Alloys	Phinix, LLC, Worcester Polytechnic Institute, Kingston Process Metallurgy, Smelter Service Corporation, Certified Flux Solutions, LLC
Development of an Automated Method for Disassembly and Separation of Apparel for Recycling	Rochester Institute of Technology (RIT), Nike, Inc.
High Speed Laser Cladding Repair Process Development	Rochester Institute of Technology (RIT), Caterpillar Inc., Synergy Additive Manufacturing, LLC
Low-Heat Repair of Cast Iron	Rochester Institute of Technology (RIT), John Deere
Rapid Damage Identification to Reduce Remanufacturing Costs	Iowa State University, John Deere
Supramolecular Interfacial Reinforcement for Manufacture Utilizing Mixed Secondary Plastic Feedstock	The University of Akron, Braskem
Analysis & Design for Sustainable Circularity of Barrier Film in Sheet Molding Composites	The Ohio State University, Kohler Co., National Renewable Energy Laboratory, Arizona State University

ORGANIZERS & COMMITTEES

CONFERENCE CHAIR

Nabil Nasr
REMADE Institute

ORGANIZING COMMITTEE

Magdi Azer
REMADE Institute

John Kreckel
REMADE Institute

Joe Cresko
U.S. Department of Energy

Barbara Reck
Yale University

Ed Daniels
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Michael Thurston
Rochester Institute of Technology

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