2022 MIT Sustainability Conference

September 20, 2022 - September 21, 2022

Day 1: September 20 (Tuesday)

8:00 AM  Registration with Light Breakfast
Welcome and Introduction
John Roberts
Executive Director (Interim), MIT Corporate Relations

John Roberts has been Executive Director of MIT Corporate Relations (Interim) since February 2022. He obtained his Ph.D. in organic chemistry at MIT and returned to the university after a 20-year career in the pharmaceutical industry, joining the MIT Industrial Liaison Program (ILP) in 2013. Prior to his return, John worked at small, medium, and large companies, holding positions that allowed him to exploit his passions in synthetic chemistry, project leadership, and alliance management while growing his responsibilities for managing others, ultimately as a department head. As a program director at MIT, John built a portfolio of ILP member companies, mostly in the pharmaceutical industry and headquartered in Japan, connecting them to engagement opportunities in the MIT community. Soon after returning to MIT, John began to lead a group of program directors with a combined portfolio of 60-80 global companies. In his current role, John oversees MIT Corporate Relations which houses ILP and MIT Startup Exchange.

J.J. Laukaitis
Program Director, MIT Corporate Relations

J.J. Laukaitis joined the Industrial Liaison Program in 2012 and is a strong believer in the amplifying power that comes from building enduring relationships between industry leaders and MIT researchers and innovators.

J.J. has over 25 years of experience in engineering, product management and commercial sales management across multiple industries including mechanical design and manufacturing, electronics, semiconductor equipment, health care IT and renewable energy.

In his work for PTC, Continuum, Teradyne, DFT Microsystems and GE, J.J. has managed programs to conceive, design and launch new products and services and has led major initiatives to transform customer information into insight for revenue growth.

Ron Spangler
Program Director, MIT Corporate Relations

Ron Spangler joined the Office of Corporate Relations (OCR) in October 2013 as Senior Industrial Liaison Officer.

Spangler comes to OCR with many years of experience in business development, portfolio management, product development, and strategy. For the past thirteen years, he has been at TIAx as Director, Government Business Development where he has been responsible for new technology-based business development, with emphasis on products and services in energy and defense. Prior to that, he was at Milde Technology Corporation, an MIT spinoff, as Vice President, Marketing and Business Development. Spangler has also held positions at Cymer Inc. as Director, Product Marketing Emergin Technologies and Applications and
9:25 AM  
**Sustainability Resources and Opportunities at MIT; Overviews of Leading Programs and Centers**

- MIT Climate and Sustainability Consortium
- MIT Environmental Solutions Initiative
- MIT Laboratory for Aviation and the Environment
- MIT Abdul Latif Jameel Water & Food Systems Lab

9:45 AM  
**Disruptive Developments in CO2 Capture, Water Recovery and Consumer Packaging**

Kripa Varanasi  
Professor of Mechanical Engineering

Kripa Varanasi is a Professor of Mechanical Engineering at MIT. He received his B.Tech from IIT Madras, India and his SM (ME and EECS) and Ph.D from MIT. Prior to joining MIT as a faculty member, Prof. Varanasi was a lead researcher and project leader at the GE Global Research Center. At GE he received many awards for his work including Best Patent, Best Technology Project and Leadership Award. At MIT, the focus of his work is in understanding the physico-chemical phenomena at interfaces and developing novel materials, devices, and products that can dramatically enhance performance in energy, water, agriculture, transportation, medical, and consumer devices. He is passionate about entrepreneurship and translating technologies from lab to market. He has co-founded multiple companies including LiquiGlide, Infinite Cooling, AgZen, and Everon24. Time and Forbes Magazines have named LiquiGlide to their “Best Inventions of the Year”. His Infinite Cooling project has won first prize at DOE’s National Cleantech University Prize, MIT 100K, Harvard Business School Energy & Environment Start-up, and MassChallenge. Prof. Varanasi has received numerous awards for his work NSF Career Award, DARPA Young Faculty Award, SME Outstanding Young Manufacturing Engineer Award, ASME Bergles-Rohsenow Heat Transfer Award, Boston Business Journal’s 40 under 40, ASME Gustus L. Larson Memorial Award for outstanding achievements in mechanical engineering, APS Milton van Dyke award, and MIT Graduate Student Council’s Frank E. Perkins Award for Excellence in Graduate Advising.

[View full bio](#)

10:15 AM  
**Networking Break**

10:40 AM  
**CREWSnet: Cutting-edge Forecasting Technology that Boosts Climate Resilience**

John C. Aldridge  
Assistant Leader, Humanitarian Assistance and Disaster Relief Systems Group

[MIT Lincoln Laboratory](#)
Decarbonizing Metallurgical Processes
Antoine Allanore
Associate Professor of Metallurgy, MIT Department of Materials Science and Engineering
Antoine Allanore
Associate Professor of Metallurgy, MIT Department of Materials Science and Engineering

Prof. Antoine Allanore has more than a decade of experience in the field of chemical metallurgy. Since 2004, as R&D engineer at ArcelorMittal in France, then at MIT since 2010, he has developed several alternative processes for metal extraction that adopt green chemistry principles. He co-founded Boston Electrometallurgical Corporation (BEMC) to engineer the large-scale development of such approaches. In 2012, he was appointed the T.B. King Assistant Professor of Metallurgy in the Department of Materials Science & Engineering at MIT, where his research group aims at developing sustainable materials extraction and manufacturing processes. His group has proposed a novel approach to investigate and control water/mineral interactions in soils using microfluidics (Word Congress on Soils Science, Korea, 2014, PLOSOne, 2015). Focusing on mining and processing of unconventional resources (Journal of the Total Environment, 2015, Green Chemistry 2015), he invented a waste-free process to produce a potassium fertilizer from earth-abundant raw materials. The product has been designed to suit tropical soils and has succeeded crop-tests. It is now under field evaluation in Brazil (16th World Fertilizer Congress, Rio, 2014). He teaches thermodynamics and sustainable chemical metallurgy at both the undergraduate and graduate level. He was awarded the DeNora Prize in 2012 and the Early Career Faculty Fellow award in 2015, both from TMS (The Minerals, Metals & Materials Society).

View full bio
Ariadna Rodenstein
Events Leader, MIT Startup Exchange

Ariadna joined MIT Startup Exchange in a new role as Events Leader in September 2019. She has responsibility for the development and execution of events featuring startups, and for helping to promote collaboration and partnerships between MIT-connected startups and industry. She works closely with the Industrial Liaison Program (ILP), also within Corporate Relations, and with other areas around the MIT innovation ecosystem and beyond. Prior to this, Ariadna worked for over a decade at Credit Suisse Group in New York City and London in a few different roles in event management and later became a Director for client strategy. She has combined her experience in the private sector with work in non-profits as a Consultant and Development Director at the New York Immigration Coalition, Immigrant Defense Project and Americas Society/Council of the Americas. Ariadna also served on the Board of the Riverside Clay Tennis Association in NY for several years. She earned her B.A. in Political Science and Communications from New York University (NYU), also doing coursework at the Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM) in Mexico City, and her M.A. in Sociology from the City University of New York (CUNY).

David Heller
Co-founder & Head of Operations
C16 Biosciences

Supply Chain Transparency
Leonardo Bonanni
Founder and CEO, Sourcemap

Dr. Leonardo Bonanni is the founder and CEO of Sourcemap, the supply chain transparency platform. Leading brands and manufacturers use Sourcemap software to trace their products to the source and ensure that corporate standards are met every step of the way, including zero-deforestation, zero-child labor, and the highest standards for raw materials such as recycled, fair trade and organic. You can see Timberland and The North Face, Mars and Hershey, all publishing their Sourcemap-verified supply chains on open.sourcemap.com, the world's largest supply chain disclosure website. Leo developed Sourcemap as part of his PhD at the MIT Media Lab and has been named among America's 100 Most Influential People in Business Ethics and America's Most Promising Social Entrepreneurs.

Yuval Pearl
Head, Environmental Policy
Metha.ai

Abigail Jablansky
Senior Business Development Lead
Amogy

Stephen Conant
Vice President for Commercial
VEIR

Daniel Stack
Co-Founder & CEO
Electrified Thermal Solutions

Maher Damak
Co-Founder & CEO
Infinite Cooling

Richard E. Riman
Founder
RRTC
Jason Jay
Senior Lecturer, Sustainability
Director, Sustainability Initiative, Sloan School of Management

Jason Jay is a Senior Lecturer at the MIT Sloan School of Management and Director of the Sustainability Initiative at MIT Sloan.

He teaches courses on leadership, strategy, and innovation for sustainable business. Jason engages students and alumni in hands-on projects with leading companies and organizations. These efforts help build a community of innovators for sustainability that includes MIT students and alumni, faculty and researchers, with partners in business, government, NGOs, and hybrid organizations.

Jason’s research focuses on how people navigate the tensions inherent in the quest for sustainability, as they simultaneously pursue their own self-interest and the flourishing of human and other life. This work includes deep case studies of cross-sectoral collaboration and hybrid organizations that combine social and business goals. These case studies have been published in the Academy of Management Journal and California Management Review. He also contributes to the MIT Sloan Management Review, Stanford Social Innovation Review, and Greenbiz on the topic of sustainability-oriented innovation (SOI). A key finding of his research is that social innovation occurs through authentic conversations that hold the tension between divergent values and perspectives. With Gabriel Grant, he is the author of Breaking Through Gridlock: The Power of Conversation in a Polarized World.

As a facilitator and consultant, Jason has helped advance sustainability strategy with companies like Biogen, Novartis, and Bose. He is a research partner and facilitator for the EDF Climate Corps and its network of companies. He has contributed to the strategy and curriculum of the Harvard Kennedy School’s Social Innovation and Change Initiative as a faculty affiliate.

Prior to MIT, Jay ran an internet startup, traveled around the world, taught kindergarten in a progressive preschool, and worked as a consultant with Dialogos International, where he consulted on leadership development and organizational change for major international corporations and NGO’s including BP and the World Bank.

Jay holds an AB in psychology and a Master’s in education from Harvard University, and a PhD in Organization Studies from the MIT Sloan School of Management.

View full bio

Wei Cai
Chief Technology Officer
Technip Energies

Jerry Gupta
P&C Research Lead
Swiss Re Institute

Mike Witt
Vice President and Chief Sustainability Officer
Northrop Grumman
Richard Lester is the Japan Steel Industry Professor and Associate Provost at the Massachusetts Institute of Technology, where he oversees the international activities of the Institute. From 2009 to 2015 he served as head of MIT’s Department of Nuclear Science and Engineering, leading the Department successfully through a period of rapid rebuilding and strategic renewal.

Professor Lester’s research is concerned with innovation strategy and management, with a frequent focus on the energy and manufacturing sectors. He is widely known for his work on local, regional, and national systems of innovation, and he has led major studies of national and regional competitiveness and innovation performance commissioned by governments and industry groups around the world. He is the founding director and faculty chair of the MIT Industrial Performance Center.

Professor Lester is also well known for his teaching and research on nuclear technology innovation, management and control. He has been a long-time advocate of advanced nuclear reactor and fuel cycle technologies to improve the safety and economic performance of nuclear power, and his studies in the field of nuclear waste management helped provide the foundation for new institutional and technological strategies to deal with this longstanding problem.

Professor Lester’s latest book, Unlocking Energy Innovation: How America Can Build a Low-Cost, Low-Carbon Energy System (written with David Hart), outlines a strategy for mobilizing America’s innovation resources in support of a decades-long transition to an affordable and reliable low-carbon global energy system. Professor Lester is also the author or co-author of seven other books, including: The Productive Edge: A New Strategy for Economic Growth; Innovation—The Missing Dimension (with Michael Piore); Making Technology Work: Applications in Energy and the Environment (with John Deutch); Made in America: Regaining the Productive Edge (with Michael Dertouzos and Robert Solow); and Radioactive Waste: Management and Regulation (with Mason Willrich.)

Professor Lester obtained his undergraduate degree in chemical engineering from Imperial College and earned his Ph.D. in nuclear engineering from MIT. He has been a member of the MIT faculty since 1979. He is an advisor to governments, corporations, foundations and non-profit groups, and he serves as chair of the National Academies’ Board on Science, Technology, and Economic Policy.
2:45 PM

Materials Advancements in Membrane Separations
Jeffrey Grossman
Head of the Department of Materials Science and Engineering
Morton and Claire Goulder and Family Professor in Environmental Systems
Professor of Materials Science and Engineering
MacVicar Fellow, MIT Materials Science and Engineering

Jeffrey Grossman
Head of the Department of Materials Science and Engineering
Morton and Claire Goulder and Family Professor in Environmental Systems
Professor of Materials Science and Engineering
MacVicar Fellow
MIT Materials Science and Engineering

Jeffrey C. Grossman is the Department Head of Materials Science and Engineering at the Massachusetts Institute of Technology and the Morton and Claire Goulder and Family Professor in Environmental Systems. He received his PhD in theoretical physics from the University of Illinois and performed postdoctoral work at the University of California at Berkeley. In 2009 he joined MIT, where he has developed a research program known for its contributions to energy conversion, energy storage, membranes, and clean-water technologies. He has published more than 200 scientific papers, holds 17 current or pending U.S. patents, and recently co-founded two companies to commercialize novel membranes materials for efficient industrial separations

View full bio

3:15 PM

A New Digital Twin of the Earth: Increased Accuracy in Predicting Droughts, Floods, Heat Waves
Noelle Eckley Selin
Professor
Director, MIT Technology and Policy Program (TPP)
Primary Appointment - MIT Institute for Data, Systems & Society (IDSS)
Noelle Eckley Selin
Professor
Director, MIT Technology and Policy Program (TPP)
Primary Appointment - MIT Institute for Data, Systems & Society (IDSS)

Noelle Eckley Selin is a Professor in the Institute for Data, Systems and Society and the Department of Earth, Atmospheric and Planetary Sciences. Her research uses atmospheric chemistry modeling to inform decision-making on air pollution, climate change and hazardous substances such as mercury and persistent organic pollutants (POPs). Professor Selin received her PhD from Harvard University in Earth and Planetary Sciences as part of the Atmospheric Chemistry Modeling Group, where she developed and evaluated a global, 3D model of mercury pollution. Prior to joining the MIT faculty, she was a research scientist with the MIT Joint Program on the Science and Policy of Global Change. In addition to her scientific work, she has published articles and book chapters on the interactions between science and policy in international environmental negotiations, in particular focusing on global efforts to regulate hazardous substances. Professor Selin is also affiliated with the MIT Joint Program on the Science and Policy of Global Change and the MIT Center for Environmental Health Sciences, and she also serves as the Director of MIT’s Technology and Policy Program.
Engineering Nitrogen Delivery to Cereals
Christopher Voigt
Daniel I.C. Wang Professor of Advanced Biotechnology, MIT Department of Biological Engineering

Christopher Voigt is the Daniel I.C. Wang Professor of Advanced Biotechnology in the Biological Engineering Department at the Massachusetts Institute of Technology. Dr. Voigt is an expert in Synthetic Biology and has led research programs across medicine, agriculture, chemistry/materials and defense. He is the co-Director of the Center for Synthetic Biology and the Editor-and-Chief of ACS Synthetic Biology. He is a Founder of Pivot Bio and Asimov IO and has served on the SABs of DSM, Synlogic, Amyris, Bolt Threads, Zymergen, Design Therapeutics, Arcella, Aanika, Sentli, DeepBiome, Empress Biotechnologies, and Twist Bioscience. He is an Vannevar Bush Faculty Fellow (VBFF) for the Office of the Secretary of Defense (OSD), a member of the Bush Fellows Research Study Team (BFRST) and a Newton Award Recipient. He was a founding member of the Engineering Biology Research Consortium (EBRC) (formally SynBERC). He is a founder of the Synthetic Biology, Evolution, Engineering and Design (SEED) conference series.

View full bio

Nitrogenous fertilizer is critical to obtain high crop yields, but its production and use consumes 3% of the global energy supply and 2-6% of greenhouse gases, including potent N$_2$O. Biological nitrogen fixation offers an alternative, but the nitrogenase is a complex enzyme that requires dozens of genes and tight regulation to function and symbiotic relationships with crops are difficult to control. Here, I will present several approaches we are taking to engineer corn or corn-associated microbes to fix their own nitrogen. First, I will discuss approaches to engineer bacteria that associate with maize roots to break and replace their regulatory pathways so that they turn on nitrogen fixation even in the presence of applied nitrogen fertilizer. Second, I will describe efforts to engineer plants themselves to carry the microbial pathways. Collectively, approaches from Synthetic Biology are facilitating new approaches to this long-standing problem to produce self-fertilizing crop systems.

4:15 PM
MIT Office of Sustainability
Julie Newman
Director, MIT Office of Sustainability

Julie joined MIT as the Institute’s first Director of Sustainability in the summer of 2013. She has worked in the field of sustainable development and campus sustainability for twenty years. Her research has focused on the intersection between decision-making processes and organizational behavior in institutionalizing sustainability into higher education.

4:45 PM
Day 1 Wrap-UP with Networking Reception

Day 2: September 21 (Wednesday) Sustainability Workshops
Sustainability Workshops

Sustainability is fast becoming an imperative across numerous industrial domains. The companies that get ahead of the curve will both do good and do well in the coming sustainable economy.

Building on the lessons learned from Day 1 of the 2022 MIT Sustainability Conference, these focused, structured, topical workshops will give you the opportunity to interact with MIT and your peers in the Industrial Liaison Program, to define common challenges in industrial sustainability, and to understand how your engagement with MIT can help shape your company’s responses. There will be homework!

We have arranged these workshops in two sessions, to allow you to engage on more than one topic:

8:30 AM - 9:00 AM  
Registration with Light Breakfast

9:00 AM - 10:30 AM  
Session 1: Designing Plastics for End-of-Life to Enable Circularity  
MIT Environmental Solutions Initiative and the MIT Climate and Sustainability Consortium

To improve the circularity of plastics, we need to design the plastics system with the products’ end-of-life explicitly considered. This includes material, product, recovery, and system design. This is a challenge because there are many stakeholders in the system and there are currently limited incentives for them to collaborate.

This workshop will include a discussion of the barriers limiting design of plastics for end-of-life and highlight efforts by MIT and industry partners to overcome them. These include technological advances in material production and recovery, as well as innovative product and system design solutions for a range of conventional and bio-based polymer systems.

9:00 AM - 10:30 AM  
Session 1: Sustainable Aviation – An economy-wide challenge  
MIT Aeronautics and Astronautics

Aviation is considered a tough-to-decarbonize mode of transportation because volume and weight challenges render many decarbonization pathways infeasible (e.g. large battery-electric airliners). In fact, it is likely that aviation’s value chain will have to be re-designed to meet ambitious environmental goals. This has economy-wide implications: not only will the world need new aircraft, but operational patters will have to be adjusted, and infrastructure as well as a supporting energy system will have to be built. As such, this decarbonization challenge provides a prime example for tackling complex decarbonization challenges which are interlinked with the future shape of our global economy.

This workshop takes a holistic approach towards the problem. It brings together academics and industry to identify guiding sustainability metrics and gain insights into approaches for achieving system-level change.

10:30 AM - 11:00 AM  
Networking Break

11:00 AM - 12:30 PM  
Session 2: Setting and Adopting Net Zero Greenhouse Gas Targets  
MIT Climate and Sustainability Consortium

Corporate commitments to net zero greenhouse gas (GHG) emission targets have increased dramatically in recent years. This has primarily been motivated by corporate social responsibility factors, but regulatory pressure is mounting. The process for setting these targets generally involves three steps: measuring corporate GHG emissions, setting targets, and developing pathways to achieve the targets. There is significant variation across these targets on the scope of operations included (scope 1, scope 2, and scope 3) and the timing.

This workshop will explore the process of setting and adopting net zero greenhouse gas targets. This includes the technical aspects of measuring GHG emissions and evaluating the potential for pathways to achieve targets, as well as the organizational aspects associated with setting targets, obtaining resources for achieving them, and adjusting implementation based on organizational and societal factors.
11:00 AM - 1:00 PM  Session 2: Managing Industrial Wastewater Through Research and Innovation

**MIT Abdul Latif Jameel Water and Food Systems Laboratory**

In this workshop, you will have the opportunity to discuss your companies’ hard-to-solve industrial water-related challenges. You will hear directly from professors across MIT to learn about the latest research and inventions in this space. We will also help you explore the topic of industrial process water in an unpressured, creative way that can catalyze meaningful, actionable research projects.

Stay after our session to meet J-WAFS professors from across MIT over a networking lunch.

MIT J-WAFS is an Institute-wide, cross-disciplinary research program with international reach. J-WAFS mobilizes MIT resources to bring scientific, technical, and business solutions to urgent global water and food challenges across the world.

12:30 PM - 1:00 PM  Adjournment with Bagged Lunch