

MIT Industrial Liaison Program Faculty Knowledgebase Report

2021 MIT Sustainability Japan Webinar

May 20, 2021 - May 21, 2021

DAY 1: May 20 (Thursday)

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9:00 AM - 9:05 AM

Welcome and Introduction
Keiji Yano
Program Director, MIT Corporate Relations
Associate Director, MIT-ILP, Japan
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Keiji Yano is a program director at MIT Corporate Relations and associate director of MIT-ILP, Japan in Tokyo. He has been associated with the office since September 2008 and has been enjoying connecting Japanese ILP member companies with the MIT community since then. He has been always fascinated by the risks companies are willing to take to make an impact in society.

Prior to joining the ILP, Yano managed his own consulting company while he was a visiting researcher at the MIT Whitehead Institute for three years. Prior to that, he was the technical area manager for the Asia/Pacific region at Coventor, an MIT-connected startup software company developing MEMS. While at Coventor he established many relationships with companies from all over the world. He provided services to help companies design and build prototypes for new devices or products. He started his career as a process engineer in the basic design group from concept design to preoperation test of the Nuclear Waste plant project for Tokai #2 Nuclear Power Plant in Japan.

He holds a B.S. in science and technology from Nihon University and Ph.D. in Fluid Dynamics in Aerospace Engineering from the Ohio State University.

[View full bio](#)

9:05 AM - 9:30 AM

The MIT Environmental Solutions Initiative (ESI)
John Fernández
Professor, Architecture, Building Technology and Engineering Systems
Director, Environmental Solutions Initiative



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Director, Environmental Solutions Initiative

John E. Fernández is a professor in the Building Technology Program of the Department of Architecture at MIT and a practicing architect. Fernández founded and directs the MIT Urban Metabolism Group, a highly multidisciplinary research group focused on the resource intensity of cities and design and technology pathways for future urbanization. He is also Director of the MIT Environmental Solutions Initiative; MIT's primary organization to enlist the capacity of the MIT community in the transition to a low-carbon and humane future. He is author of two books, numerous articles in scientific and design journals including *Science*, the *Journal of Industrial Ecology*, *Building and Environment*, *Energy Policy* and others, and author of nine book chapters. He is Chair of Sustainable Urban Systems for the International Society of Industrial Ecology and Associate Editor of the journal *Sustainable Cities and Society*.

[View full bio](#)

Today we are at the brink of an accelerating climate crisis while half the world lives in cities and rates of biodiversity loss and deforestation are at historic highs. We are also in a golden era of scientific and engineering breakthroughs and technology and market innovation. From advances in artificial intelligence to carbon capture we may be witnessing the emergence of a transformation of society and industry toward a sustainable, equitable and humane future. Prof. Fernandez will describe the mandate and work of MIT's primary environmental organization charged with creating solutions to climate change and other environmental challenges. The work of the ESI leverages key capacity of the entire MIT faculty, student body and staff across diverse topics in research, education and engagement. The expansion of the ESI bodes well for MIT's ever more targeted role in a sustainable future. In this mission we hope to partner with you.

9:30 AM - 9:55 AM

Current Business and R&D for Sustainable Society

Isamu Yashima
Fellow of Mitsui Mining & Smelting

9:55 AM - 10:05 AM

MIT Startup Exchange Lightning Talk

InEnTec: Gasifier technology that safely transforms waste into clean fuels and other valuable products

Jeffrey Surma
President and CEO
[InEnTec](#)

MIT Startup Exchange Lightning Talk

Renewlogy: Innovative solutions for renewing waste and creating circular economies

Priyanka Bakaya
Founder & CEO
[Renewlogy](#)

10:05 AM - 10:25 AM

Electrification and Decarbonization of Chemical Synthesis
Karthish Manthiram
Theodore Miller Career Development Chair and Assistant Professor, Chemical Engineering



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Theodore Miller Career Development Chair and Assistant Professor, Chemical Engineering

Karthish Manthiram is the Theodore T. Miller Career Development Chair and Assistant Professor in Chemical Engineering at MIT. The Manthiram Lab at MIT is focused on the molecular engineering of electrocatalysts for the synthesis of organic molecules, including pharmaceuticals, fuels, and commodity chemicals, using renewable feedstocks. Karthish received his bachelor's degree in Chemical Engineering from Stanford University and his Ph.D. in Chemical Engineering from UC Berkeley, where his dissertation research was focused on the development of nanoscale materials for storing solar energy in chemical bonds. Most recently, he was a postdoctoral researcher at the California Institute of Technology, where he worked on developing new ionically-conductive polymers using olefin metathesis. Karthish's research has been recognized with several awards, including the NSF CAREER Award, DOE Early Career Award, 3M Nontenured Faculty Award, American Chemical Society PRF New Investigator Award, Dan Cubicciotti Award of the Electrochemical Society, and Forbes 30 Under 30 in Science. Karthish's teaching has been recognized with the C. Michael Mohr Outstanding Undergraduate Teaching Award, the MIT ChemE Outstanding Graduate Teaching Award, and the MIT Teaching with Digital Technology Award. He serves on the Early Career Advisory Board for *ACS Catalysis* and on the Advisory Board for both *Trends in Chemistry* and the *MIT Science Policy Review*.

[View full bio](#)

Chemical synthesis is responsible for significant emissions of carbon dioxide worldwide. Using renewable electricity to drive chemical synthesis may provide a route to overcoming the carbon footprint, by enabling synthetic routes which operate at benign conditions and utilize sustainable inputs. We are developing an electrosynthetic toolkit in which distributed feedstocks, including carbon dioxide, dinitrogen, water, and renewable electricity, can be converted into diverse fuels, chemicals, and materials. In this presentation, we will first share recent advances made in our laboratory on nitrogen fixation to synthesize ammonia at ambient conditions. We will then discuss how to drive selective carbon dioxide reduction and use water as an oxygen-atom source for epoxidation reactions. These example reactions will illustrate how the modularity of chemical manufacturing could be enhanced through electrochemical routes which open up local and on-demand production of critical chemicals and materials.

10:25 AM

Closing Remarks

1???: 2021? 5? 20? (?)

???????????????????????????? (Download Speakers' Bio in Japanese)

9:00 Welcome and Introduction

AM -

9:05 ?? ????

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9:05 AM - 9:30 AM

When to Embrace Sustainability in a Business (and When Not To)

Yossi Sheffi

Elisha Gray II Professor, Engineering Systems

Director, Center for Transportation and Logistics (MIT CTL)

Professor, Civil and Environmental Engineering

Professor, Institute of Data Science and Society



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Elisha Gray II Professor, Engineering Systems

Director, Center for Transportation and Logistics (MIT CTL)

Professor, Civil and Environmental Engineering

Professor, Institute of Data Science and Society

Yossi Sheffi is an expert in systems optimization, risk analysis and supply chain management. He is author of a text book and four award-winning management books. His latest book is "The New Abnormal," came out on October 1, 2020

Under his leadership, MIT CTL has launched many educational, research, and industry/government outreach programs, including the MIT SCALE network involving six academic centers round the world. In 2015, CTL has launched the on-line Micromaster's program, enrolling 350,000 students in 196 countries.

Outside the institute, Dr. Sheffi has consulted with numerous organizations. He has also founded or co-founded five successful companies, all acquired by large enterprises.

Dr. Sheffi has been [recognized](#) in numerous ways in academic and industry forums and won dozens of awards.

He obtained his B.Sc. from the Technion in Israel in 1975, and Ph.D. from MIT in 1978.

For more information visit: <http://sheffi.mit.edu/>

[View full bio](#)

Despite the increasing evidence of climate change and its growing consequences, green promises have outpaced green actions. Most consumers, companies, and governments have made only minor, incremental changes to their behavior. Even the promised changes, if actually enacted, are at best ineffective and at worst will ensure that the planet continues on its current destructive path. The addition of billions of developing countries consumers to the world's idle class is likely to doom any small changes. My argument is that while current efforts should continue, the solution is technology for carbon sequestrations and storage (it the green movement will still stall the development of nuclear plants).

9:30 AM - 9:55 AM

Industry Talk

Yukiko Takatori

General Manager of Sustainability and Development, Ajinomoto

9:55 AM - 10:05 AM

MIT Startup Exchange Lightning Talk

[Sourcemap](#): Supply chain transparency platform

Leonardo Bonanni

Founder & CEO

[Sourcemap](#)

MIT Startup Exchange Lightning Talk

[Via Separations](#) - Membrane platform that transforms industrial separations by improving filtration materials and reducing energy

Brent Keller
Co-Founder & CTO
[Via Separations](#)

10:05 AM - 10:25 AM

Assessing the Environmental Benefits of Materials Recovery in Commodity Materials
Elsa Olivetti
Edgerton Associate Professor, Materials Science and Engineering



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Edgerton Associate Professor, Materials Science and Engineering

Elsa Olivetti is the Esther and Harold E. Edgerton Career Development Professor in the Department of Materials Science and Engineering (DMSE) at the Massachusetts Institute of Technology. Her research focuses on improving the environmental and economic sustainability of materials in the context of rapid-expanding global demand. Dr. Olivetti received her B.S. degree in Engineering Science from the University of Virginia and her Ph.D. in Materials Science Engineering from MIT.

[View full bio](#)

Environmental benefits attributed to recycling rely on the assumption that we are substituting energy intensive primary production for lower-impact secondary production. However, this argument tends to be a purely engineering lens on a complex socioeconomic system. This presentation will discuss whether closing material and product loops does, in fact, prevent primary production. The basis for this counter argument is that when secondary replaces primary, it decreases the price of secondary and thus more primary will switch to secondary if possible, causing primary price to drop, and driving up demand for more primary which may negate the potential for substitution. There is a strong parallel in this argument to the concept of energy efficiency rebound, and is also referred to as the potential for secondary material to displace primary production. The critical aspects that influence displacement are the ability of secondary products to substitute for primary products, and price effects. This presentation will describe tools and analytical modeling efforts that explore the potential for recycling displacement for the case of commodity materials such as paper, copper and aluminum. These approaches help to assess the contexts under which recycling may reduce a material or product footprint.

10:25 AM

Closing Remarks

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