2021 MIT Japan Virtual Conference

January 21, 2021 - February 5, 2021

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DAY 1: Jan. 21 (Thu) Future Perspectives on Energy, Innovation and Management

9:00am - 9:05am	Welcome and Introduction Gregory Ornatowski Senior Director, MIT Corporate Relations Director, MIT-ILP, Japan Gregory Ornatowski Senior Director, MIT Corporate Relations Director, MIT-ILP, Japan Dr. Ornatowski is currently a Senior Director in the Office of Corporate Relations (OCR) at MIT and the Director, MIT-ILP, Japan. He works with various companies in the automotive, electronics and materials industries. Prior to joining MIT, he worked as a consultant in the Boston area with Standard and Poor's DRI and Harbor Research. Previously he spent nine years with General Electric, where he held various management positions in business development, strategic planning and marketing in the U.S. and Asia and worked with several of GE's technology-focused businesses. Dr. Ornatowski began his professional career as a management consultant working with the Tokyo office of the Boston Consulting Group. In addition to his corporate experience, Dr. Ornatowski has taught at the MIT Sloan School of Management, Boston University, and Trinity College. He has also published articles in the Sloan Management Review, Far Eastern Economic Review, The Journal of the American Chamber of Commerce in Japan, and the Journal of Socio-Economics. He is fluent in Japanese, having lived and worked in Japan a total of 12 years, and has worked extensively with Asian and European companies as well.

9:05am - 9:25am	MIT Innovation Ecosystem Karl Koster Executive Director, MIT Corporate Relations Director, Alliance Management MIT Office of Strategic Alliances & Technology Transfer

Karl Koster
Executive Director, MIT Corporate Relations
Director, Alliance Management
MIT Office of Strategic Alliances & Technology Transfer

Karl Koster is the Executive Director of MIT Corporate Relations. MIT Corporate Relations includes the MIT Industrial Liaison Program and MIT Startup Exchange.

In that capacity, Koster and his staff work with the leadership of MIT and senior corporate executives to design and implement strategies for fostering corporate partnerships with the Institute. Koster and his team have also worked to identify and design a number of major international programs for MIT, which have been characterized by the establishment of strong, programmatic linkages among universities, industry, and governments. Most recently these efforts have been extended to engage the surrounding innovation ecosystem, including its vibrant startup and small company community, into MIT's global corporate and university networks.

Koster is also the Director of Alliance Management in the Office of Strategic Alliances and Technology Transfer (OSATT). OSATT was launched in Fall 2019 as part of a plan to reinvent MIT's research administration infrastructure. OSATT develops agreements that facilitate MIT projects, programs and consortia with industrial, nonprofit, and international sponsors, partners and collaborators.

He is past chairman of the University-Industry Demonstration Partnership (UIDP), an organization that seeks to enhance the value of collaborative partnerships between universities and corporations.

He graduated from Brown University with a BA in geology and economics, and received an MS from MIT Sloan School of Management. Prior to returning to MIT, Koster worked as a management consultant in Europe, Latin America, and the United States on projects for private and public sector organizations.

9:25am - 10:00am   Decarbonizing the Energy Sector: Making Better Decisions for the Energy Transition
Robert Armstrong
Chevron Professor of Chemical Engineering
Director, MIT Energy Initiative (MITEI)

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Chevron Professor of Chemical Engineering
Director
MIT Energy Initiative (MITEI)

Professor Robert C. Armstrong directs the MIT Energy Initiative, an Institute-wide effort at MIT linking science, technology, and policy to transform the world's energy systems. A member of the MIT faculty since 1973, Armstrong served as head of the Department of Chemical Engineering from 1996 to 2007. His research interests include polymer fluid mechanics, rheology of complex materials, and energy.

Armstrong has been elected into the American Academy of Arts and Sciences (2020) and the National Academy of Engineering (2008). He received the Founders Award for Outstanding Contributions to the Field of Chemical Engineering (2020), Warren K. Lewis Award (2006), and the Professional Progress Award (1992), all from the American Institute of Chemical Engineers. He also received the 2006 Bingham Medal from the Society of Rheology, which is devoted to the study of the science of deformation and flow of matter,

Armstrong was a member of MIT's *Future of Natural Gas* and *Future of Solar Energy* study groups. He advised the teams that developed MITEI's most recent reports, *The Future of Nuclear Energy in a Carbon-Constrained World* (2018) and *Insights into Future Mobility* (2019), and is co-chairing the new MITEI study, *The Future of Storage*. He co-edited *Game Changers: Energy on the Move* with former U.S. Secretary of State George P. Shultz.

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The world is confronted by a two-faceted energy challenge: on the one hand global energy demand is projected to grow significantly by mid-century and beyond, driven primarily by population growth and economic growth in developing countries. At the same time, meeting the threat of climate change requires dramatic, and rapid, reduction of CO_2 emissions economy wide – particularly in the energy sector. In this presentation, I will focus on the four segments of the energy sector: power, transportation, industry, and buildings.

Early successes in reducing CO2 emissions have focused largely on the power sector, where accelerating deployment of wind and solar have been leading successes. We are now beginning to make significant progress in other parts of the energy sector – transportation, industry, and residential and commercial buildings – by, for example, electrifying transportation. Hydrogen provides a particularly interesting example of a vehicle for minimizing CO_2 emissions, because of its ability to contribute across all parts of the energy sector and to meet energy needs that are difficult to do in other ways.

The cross-sectoral interactions within the energy sector provide a multitude of pathways for creating decarbonized energy systems. Because of variations in regional energy resources, different countries will no doubt select different pathways and energy systems to meet their needs for transportation, industry, and building energy needs. Here we illustrate the Sustainable Energy Systems Analysis and Modeling Environment (SESAME) for strategic planners and policy makers to use in evaluating and choosing among different possible future energy systems.

10:05am - 10:40am	Future Trends in Innovation Sanjay Sarma Vice President for Open Learning Fred Fort Flowers (1941) and Daniel Fort Flowers (1941) Professor of Mechanical Engineering

Sanjay Sarma
Vice President for Open Learning
Fred Fort Flowers (1941) and Daniel Fort Flowers (1941) Professor of Mechanical Engineering

Sanjay Sarma is the Fred Fort Flowers (1941) and Daniel Fort Flowers (1941) Professor of Mechanical Engineering at MIT. He is the first Dean of Digital Learning at MIT. He co-founded the Auto-ID Center at MIT and developed many of the key technologies behind the EPC suite of RFID standards now used worldwide. He was also the the founder and CTO of OATSystems, which was acquired by Checkpoint Systems (NYSE: CKP) in 2008. He serves on the boards of GS1, EPCglobal and several startup companies including Senaya and ESSESS.

Dr. Sarma received his Bachelors from the Indian Institute of Technology, his Masters from Carnegie Mellon University and his PhD from the University of California at Berkeley. Sarma also worked at Schlumberger Oilfield Services in Aberdeen, UK, and at the Lawrence Berkeley Laboratories in Berkeley, California. He has authored over 75 academic papers in computational geometry, sensing, RFID, automation and CAD, and is the recipient of numerous awards for teaching and research including the MacVicar Fellowship, the Business Week eBiz Award and Informationweek's Innovators and Influencers Award. He advises several national governments and global companies.

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My talk is about innovation and IoT. When confronted with a new technology, the first question people naturally ask is: how can I do what I usually do, but better. But over time, entirely new business narratives arise as others figure out how to deliver the same value in an entirely different way. One example is Uber, which solved the problem of transportation for many —and replaced the need for cars. Uber, I will explain, is an IoT company, and the innovation approach that they and other similar companies have taken: Amazon, Apple, Rolls Royce — is one of changing from a product mindset to an experience mind-set. We call this "Inversion." I will explain the principles and provide examples.

10:40am - 11:15am	Platform Thinking for the Present and Future Michael Cusumano SMR Distinguished Professor of Management Deputy Dean, MIT Sloan School of Management

Michael Cusumano
SMR Distinguished Professor of Management
Deputy Dean
MIT Sloan School of Management

Cusumano specializes in strategy, product development, and entrepreneurship in software, automobiles, and consumer electronics. He is a graduate of Princeton (A.B.) and Harvard (Ph.D.) as well as comnpleted two Fulbright Fellowships and a Japan Foundation Fellowship for research in Japan and a two-year postdoctoral fellowship in Production and Operations Management at Harvard Business School. He has been a Special Vice President and Dean at Tokyo University of Science, where he founded the Tokyo Entrepreneurship & Innovation Center. At MIT Sloan, he has recently taught classes on Platform Strategy & Entrepreneurship as well as Strategy and the CEO. He has published 14 books and more than 120 articles. His latest books are *The Business of Platforms: Strategy in the Age of Digital Competition, Innovation, and Power* (2019, with A. Gawer and D. Yoffie) and *Strategy Rules: Five Timeless Lessons from Bill Gates, Andy Grove, and Steve Jobs* (2015, with D. Yoffie, translated into 18 languages).

This talk will summarize key findings from a recent book, **The Business of Platforms: Strategy in the Age of Digital Competition, Innovation, and Power** by Michael A. Cusumano, Annabelle Gawer, and David B. Yoffie. The focus is on key features associated with today's digital platforms – businesses that connect two or more market sides, with supply or demand driven at least in part by network effects. Platforms now enable the most valuable companies in the world and the first trillion-dollar businesses. The talk will explain how these digital platforms differ from conventional product or service businesses, and why some markets produce spectacular winner-take-all-or-most outcomes while others result in spectacular financial losses. We will also briefly consider emerging platforms powered by new enabling technologies: artificial intelligence and machine learning in the home and elsewhere, self-driving cars, gene editing, and quantum computing.

11:15am	Closing Remarks

DAY 2: Jan. 22 (Fri) Hardware, Robotics and Space

9:00am - 9:05am	Welcome and Introduction Gregory Ornatowski Senior Director, MIT Corporate Relations Director, MIT-ILP, Japan Dr. Ornatowski is currently a Senior Director in the Office of Corporate Relations (OCR) at MIT and the Director, MIT-ILP, Japan. He works with various companies in the automotive, electronics and materials industries. Prior to joining MIT, he worked as a consultant in the Boston area with Standard and Poor's DRI and Harbor Research. Previously he spent nine years with General Electric, where he held various management positions in business development, strategic planning and marketing in the U.S. and Asia and worked with several of GE's technology-focused businesses. Dr. Ornatowski began his professional career as a management consultant working with the Tokyo office of the Boston Consulting Group. In addition to his corporate experience, Dr. Ornatowski has taught at the MIT Sloan School of Management, Boston University, and Trinity College. He has also published articles in the Sloan Management Review, Far Eastern Economic Review, The Journal of the American Chamber of Commerce in Japan, and the Journal of Socio-Economics. He is fluent in Japanese, having lived and worked in Japan a total of 12 years, and has worked extensively with Asian and European companies as well.
9:05am - 9:45am	Robotics after COVID-19 Julie Shah Interactive Robotics Group Leader, MIT CSAIL H.N. Slater Professor, [MIT Department of Aeronautics and Astronautics](#) Julie Shah Interactive Robotics Group Leader, MIT CSAIL H.N. Slater Professor [MIT Department of Aeronautics and Astronautics](#) Julie Shah is the H.N. Slater Professor of Aeronautics and Astronautics at MIT and leads the Interactive Robotics Group of the Computer Science and Artificial Intelligence Laboratory. Shah received her SB (2004) and SM (2006) from the Department of Aeronautics and Astronautics at MIT, and her PhD (2010) in Autonomous Systems from MIT. Before joining the faculty, she worked at Boeing Research and Technology on robotics applications for aerospace manufacturing. She has developed innovative methods for enabling fluid human-robot teamwork in time-critical, safety-critical domains, ranging from manufacturing to surgery to space exploration. Her group draws on expertise in artificial intelligence, human factors, and systems engineering to develop interactive robots that emulate the qualities of effective human team members to improve the efficiency of human-robot teamwork. In 2014, Shah was recognized with an NSF CAREER award for her work on "Human-aware Autonomy for Team-oriented Environments," and by the MIT Technology Review TR35 list as one of the world's top innovators under the age of 35. Her work on industrial human-robot collaboration was also recognized by the Technology Review as one of the 10 Breakthrough Technologies of 2013, and she has received international recognition in the form of best paper awards and nominations from the International Conference on Automated Planning and Scheduling, the American Institute of Aeronautics and Astronautics, the IEEE/ACM International Conference on Human-Robot Interaction, the International Symposium on Robotics, and the Human Factors and Ergonomics Society. [View full bio](#)

9:45am - 10:25am

Is Change Coming in the Space Enterprise?
Daniel E. Hastings

Interim Vice Chancellor
Cecil and Ida Green Education Professor of Aeronautics and Astronautics
President of the AIAA ~ American Institute of Aeronautics and Astronautics

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Cecil and Ida Green Education Professor of Aeronautics and Astronautics
President of the AIAA ~ American Institute of Aeronautics and Astronautics

Prof. Daniel Hastings is the Department Head of the MIT Department of Aeronautics and Astronautics. Previously he was the CEO and Director of the Singapore-MIT Alliance for Research and Technology (SMART) from 2014 to 2018.

Professor Hastings earned a PhD and an SM, from MIT in Aeronautics and Astronautics in 1980 and 1978 respectively, and received a BA in Mathematics from Oxford University in England in 1976. He joined the MIT faculty in 1985. With 35 years of experience in academia, Professor Hastings was MIT's Dean of Undergraduate Education from 2006 to 2013, head of the MIT Technology and Policy Program and director of the MIT Engineering Systems Division.

Professor Hastings was US Air Force Chief Scientist From 1997-1999 and chair of the Air Force Scientific Advisory Board from 2002-2005. He served on the Board of the Aerospace Corporation, the Board of the Draper Corporation and currently serves on the Advisory Board of MIT Lincoln Lab. He has served on several US National Research Council committees including the Aeronautics and Space Engineering Board and the Government University Industry Interactions Roundtable.

Professor Hastings is a Fellow of the American Institute of Aeronautics and Astronautics (AIAA), the International Astronautical Federation (IAF) and the International Council on Systems Engineering (INCOSE) and a member of the US National Academy of Engineering. He served on the NASA Advisory Council, the Air Force Scientific Advisory Board, the Defense Science Board, the National Science Board and several ad-hoc committees on space technology as well as on Science and Technology management and processes. He has published over 120 papers, written a book on spacecraft environment interactions and won 5 best papers awards. His recent research is focused on Complex Space System Design. His previous work was on spacecraft environment interactions and space propulsion.

View full bio

The space enterprise, broadly defined, is changing substantially. It is moving from a government dominated set of players to one where governments continue to play a role but there is growing entrepreneurial interest. This is being enabled by the rise and interests of the billionaires with space interests as well as the drop in launch costs and the growth of capable small satellites. The talk will review all of these and discuss some of the work at MIT in the Hastings research group to address some of the issues behind the changes in the space enterprise.

10:25am - 11:00am	MIT Startup Exchange

Marcus Dahllöf
Program Director, MIT Startup Exchange

Marcus Dahllöf
Program Director
MIT Startup Exchange

Marcus Dahllöf leads MIT Startup Exchange, which facilitates connections between MIT-connected startups and corporate members of the MIT Industrial Liaison Program (ILP). Dahllöf manages networking events, workshops, the STEX25 accelerator, opportunity postings, and helps define the strategic direction of MIT Startup Exchange. He is a two-time tech entrepreneur (one exit in cybersecurity), and has previously held roles in finance, software engineering, corporate strategy, and business development at emerging tech companies and Fortune 100 corporations in the U.S., Latin America, and Europe. Marcus was a member of the Swedish national rowing team and he is a mentor at the MIT Venture Mentoring Service.

- **Vecna Robotics:** Autonomous mobile robots for bulk materials handling
- **Akasha Imaging**: Imaging and AI for Manufacturing Automation
- **Veo Robotics**: Improving manufacturing flexibility by reducing cost and complexity of human-robot interaction
- **IndustrialML:** Making Factories Smarter with Machine Learning
- **Akselos**: Protecting the World's Largest Critical Asset with the World's Most Advanced Digital Twin Technology

Daniel Theobald
Founder & CEO, Vecna Robotics

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Founder & CEO
Vecna Robotics

Daniel Theobald is the Founder and Chief Executive Officer of Vecna Robotics. He's been at the forefront of robotics R&D for over 20 years, partnering with DARPA, DoD, NASA, NIH, and USDA among many others to develop robust and agile autonomous systems for real-world applications.

Daniel's deep industry knowledge and practice of continuous innovation has made Vecna Robotics a leading provider of autonomous material handling and workflow optimization solutions. Vecna Robotics offers a fleet of autonomous mobile robots (AMRs) and the Pivotal™ orchestration engine to optimize and orchestrate the movement of goods through industrial settings, including warehouses, distribution centers, and manufacturing facilities.

Theobald is a co-founder and President of MassRobotics and holds a bachelor's and master's degree in Mechanical Engineering from MIT. He has received the Henry Ford II Scholar Award, NSF Fellowships, and a Hertz Fellowship award.

Kartik Venkataraman
CEO & CTO, Akasha Imaging
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Kartik Venkataraman is CEO of Akasha Imaging, a computational imaging and deep learning startup in Palo Alto, California that is focused on robotic automation in manufacturing and inspection. His interests lie in commercializing deep technology in the areas of computer vision and imaging with specific focus on business development, product management, and strategic planning. He was previously CTO and Founder of Pelican Imaging that focused on computational array cameras for the mobile imaging market and which was later acquired by Xperi Corporation. Prior to founding Pelican, Kartik headed the Computational Camera group at Micron Imaging (Aptina), and held senior research roles at Intel in 3D and medical imaging where he worked on joint programs with Johns Hopkins Medical School, and the Institute for Systems Science in Singapore. He is a recognized

DAY 3: Jan. 28 (Thu) Life Science, Chemical Engineering and Materials

9:00am - 9:05am   Welcome and Introduction
John Roberts
Executive Director (Interim), MIT Corporate Relations

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.

9:05am - 9:45am   Crossing the membrane: Conformational dynamics in signal transduction
                       Gabriela Schlau-Cohen
                       Cabot Career Development Associate Professor, MIT Department of Chemistry

Gabriela Schlau-Cohen
Cabot Career Development Associate Professor, MIT Department of Chemistry

Prof. Schlau-Cohen joined the faculty at MIT in 2015 as an assistant professor in chemistry and was promoted to associate professor in 2020. She is a physical chemist whose research group uses single- molecule and ultrafast spectroscopy to explore the structural and energetic dynamics that underlie photosynthetic light harvesting. Research in Prof. Schlau-Cohen's lab focuses on the development of new approaches to probe these dynamics by combining tools from chemistry, optics, biology and microscopy. Her research team also seeks to characterize and optimize light harvesting in bio-inspired systems.

Prof. Schlau-Cohen received a B.S. with honors in chemical physics from Brown University in 2003. She completed her Ph.D. in chemistry in 2011 at the University of California, Berkeley, where she worked with Professor Graham R. Fleming as an American Association of University Women (AAUW) fellow. From 2011 to 2014, Prof. Schlau-Cohen was a Center for Molecular Analysis and Design (CMAD) postdoctoral fellow at Stanford University. There she worked with Professors W.E. Moerner and Ed Solomon on oxidative enzyme mechanisms, employing time-dependent, single-molecule spectroscopy and steady-state ensemble measurements to study the kinetics of electron transfer in Fet3p, the multi-copper oxidase responsible for iron uptake in yeast.

View full bio

In this talk, Prof. Schlau-Cohen will discuss two aspects of her work in which she uses a combination of single-molecule and ultrafast spectroscopies to explore the energetic and structural dynamics of biological systems. She will discuss application to trans-membrane proteins and then application to antibiotic resistance. Research in the Schlau-Cohen Group is inherently multidisciplinary, combining optics, biology, and microscopy to develop new approaches to probe dynamics. Her group studies dynamics in two classes of systems: biological and bio-inspired light-harvesting systems that are of interest to solar energy research and biomass production; and bacterial and mammalian receptor proteins that are targets for human therapeutics.

9:45am - 10:25am

Rapid response technologies for drug discovery
Bradley L. Pentelute
Professor, MIT Department of Chemistry

Bradley L. Pentelute
Professor
MIT Department of Chemistry

Brad Pentelute, Professor in the Department of Chemistry, modifies naturally occurring proteins to enhance their therapeutic properties for human medicine, focusing on the use of cysteine arylation to generate abiotic macromolecular proteins, the precision delivery of biomolecules into cells, and the development of fast flow platforms to rapidly produce polypeptides.

Pentelute earned a B.S. in chemistry and a BA in psychology at the University of Southern California, followed by a Ph.D. in organic chemistry at the University of Chicago. After a postdoc fellowship at Harvard Medical School, Pentelute joined the MIT faculty in 2011. His awards and honors include an Alfred P. Sloan Research Fellowship, a Novartis Early Career Award, and an Amgen Young Investigator Award.

View full bio

In this talk, Prof. Pentelute will discuss a key aspect of his group's work to rapidly discover selective affinity reagents to native proteins, a critical challenge in chemical biology and medicine. Throughout evolution, nature has developed molecular machines to rapidly manufacture, tailor, and deliver large functional biopolymers such as proteins into specific cells. The Pentelute group designs fully automated fast-flow machines to accelerate the chemical manufacture of sequence-defined biopolymers. Indeed, inspired by nature's ribosome, the group has built the world's fastest and most efficient machine for this purpose.

10:25am - 11:00am	MIT Startup Exchange

Marcus Dahllöf
Program Director, MIT Startup Exchange

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- **Uncountable:** AI Platform for Material Development
- **Sweetwater Energy:** Green no longer comes at a premium
- **Sourcemap:** Supply chain transparency platform
- **Syzygy Plasmonics:** Illuminating the future of the hydrogen industry
- **Lelantos:** Revolutionizing vapor sensing for threat detection, air quality monitoring and medical diagnosis

Will Tashman
Cofounder & Chief Revenue Officer, Uncountable

Will Tashman
Cofounder & Chief Revenue Officer
Uncountable

Will Tashman is cofounder and Chief Revenue Officer at Uncountable. In his role, he works closely with Uncountable's customers to implement the larger vision for material informatics across vastly different fields, delivering solutions that transform R&D organizations into a digital operations. Tashman graduated from MIT with a degree in materials science, and worked for Apple for 3 years on the Product Design team.

Jack Baron
President & Cofounder, Sweetwater Energy

Jack Baron
President & Cofounder
Sweetwater Energy

Jack Baron co-founded Sweetwater Energy as Chairman and CEO in March of 2009, and now serves as the company's President. Prior to Sweetwater, Mr. Baron served as President of PAETEC Holding Corp., a Fortune 1000 telecommunications company acquired in 2011 by Windstream Corp. (NASDAQ: WIN), one of the largest national telecom carriers. Mr. Baron co-founded PAETEC in 1998 with Arunas Chesonis.

Mr. Baron currently serves on the Board of Directors for Sweetwater Energy and he is

Day 4: Jan. 29 (Fri) Sustainable Computation in the Age of Artificial Intelligence

Artificial Intelligence (AI) promises to revolutionize our daily lives in many ways. The core of AI is advanced computational technique, which enables more personalized machine understanding – in healthcare, transportation, finance, security, even entertainment. However, AI is not free – it takes energy to power all of that computation, and producing that energy for lots of new applications is coming at an increasingly high cost- both financially, and environmentally. At a time when Japan has just pledged to go carbon-free by 2050, is it realistic to incorporate AI into everything we own? How can we make AI more efficient - not only for better performance, but also for a more sustainable ecosystem of intelligent things? How are some startup companies exploiting AI successfully, in the industrial, imaging, and inference spaces? Day 4 of the 2021 MIT in Japan Conference and Webinar series. Simulcast in English and Japanese.

9:00am - 9:05am   Welcome and Introduction
Corey Cheng
Program Director, MIT Industrial Liaison Program

Corey Cheng
Program Director
MIT Industrial Liaison Program

Dr. Corey Cheng joined the Office of Corporate Relations (OCR) as an Senior Industrial Liaison Officer in December 2011. He has broad interests in science and technology, and uses his technical research experience to better serve ILP members in Asia and the United States.

Cheng spent six years in industrial research at Dolby Laboratories, San Francisco, where he contributed to sound compression (Dolby Digital, AAC, MP3), wireless networking, fingerprinting, and spatial/"3-D audio" technologies. Later, he was Associate Professor and Director of the undergraduate and graduate programs in music engineering technology at the University of Miami, Florida, where he also held a dual appointment in Electrical and Computer Engineering. Cheng holds various U.S. and international patents, has published technical papers, and has presented at various conferences. His technical work includes collaborations and consulting work with the U.S. Naval Submarine Medical Research Laboratory, Fujitsu-Ten USA, Starkey Laboratories, America Online, and the Chicago Board of Trade (CBOT). Cheng was an IEEE Distinguished Lecturer for the Circuits and Systems Society from 2009-2010, and was a Westinghouse (Intel) Science Talent Search national finalist many years ago.

Cheng holds degrees in Electrical Engineering (Ph.D., M.S.E. University of Michigan), Electro-Acoustic Music (M.A. Dartmouth College), and physics (B.A. Harvard University).

Personally, Dr. Cheng is an American Born Chinese (ABC), serves as his family's genealogist, and traces his roots back to Toi San, Guang Dong Province and Xing Hua, Jiang Su Province, China. He also has a background in music, and his electro-acoustic compositions have been presented at various U.S. and international venues.

9:05am - 9:45am   The Computational Limits of Deep Learning
                    Neil Thompson

                    Director, MIT FutureTech Research Project at MIT's Computer Science and Artificial
                    Intelligence Lab (CSAIL)
                    Principal Investigator, MIT Initiative on the Digital Economy

Neil Thompson

Neil Thompson is the Director of the FutureTech research project at MIT's Computer
Science and Artificial Intelligence Lab and a Principal Investigator at MIT's Initiative on the
Digital Economy.

Previously, he was an Assistant Professor of Innovation and Strategy at the MIT Sloan
School of Management, where he co-directed the Experimental Innovation Lab (X-Lab), and
a Visiting Professor at the Laboratory for Innovation Science at Harvard. He has advised
businesses and government on the future of Moore's Law, has been on National Academies
panels on transformational technologies and scientific reliability, and is part of the Council on
Competitiveness' National Commission on Innovation & Competitiveness Frontiers.

He has a PhD in Business and Public Policy from Berkeley, where he also did Masters
degrees in Computer Science and Statistics. He also has a masters in Economics from the
London School of Economics, and undergraduate degrees in Physics and International
Development. Prior to academia, He worked at organizations such as Lawrence Livermore
National Laboratory, Bain and Company, the United Nations, the World Bank, and the
Canadian Parliament.

Kristjan Greenewald
Research Staff Member, MIT-IBM Watson AI Lab

Kristjan Greenewald
Research Staff Member, MIT-IBM Watson AI Lab

Kristjan Greenewald is a Research Staff Member at the MIT-IBM Watson AI Lab (IBM
Research), working broadly in optimal transport, causal inference, robustness, and applying
information theory and statistics to both practical and theoretical machine learning problems.
Dr. Greenewald received his PhD from the University of Michigan in 2017, and was a
postdoctoral research fellow at the Harvard University Statistics department prior to joining
IBM Research.

Deep learning's recent history has been one of achievement: from triumphing over humans
in the game of Go to world-leading performance in image recognition, voice recognition,
translation, and other tasks. But this progress has come with a voracious appetite for
computing power. This article reports on the computational demands of Deep Learning
applications in five prominent application areas and shows that progress in all five is strongly
reliant on increases in computing power. Extrapolating forward this reliance reveals that
progress along current lines is rapidly becoming economically, technically, and
environmentally unsustainable. Thus, continued progress in these applications will require
dramatically more computationally-efficient methods, which will either have to come from
changes to deep learning or from moving to other machine learning methods.

9:45am - 10:25am

Efficient AI: Reducing the Carbon Footprint of Artificial Intelligence in the Internet of Things (IoT)
Song Han
Assistant Professor, Department of Electrical Engineering and Computer Science, MIT EECS

Song Han
Assistant Professor, Department of Electrical Engineering and Computer Science
MIT EECS

Song Han is an assistant professor in MIT's Department of Electrical Engineering and Computer Science. His research focuses on efficient deep learning computing. He has proposed "deep compression" as a way to reduce neural network size by an order of magnitude, and the hardware implementation "efficient inference engine" that first exploited model compression and weight sparsity in deep learning accelerators. He has received best paper awards at the International Conference on Learning Representations and Field-Programmable Gate Arrays symposium. He is also a recipient of an NSF Career Award and MIT Tech Review's 35 Innovators Under 35 award. Many of his pruning, compression, and acceleration techniques have been integrated into commercial artificial intelligence chips. He earned a PhD in electrical engineering from Stanford University.

Deep learning is computation-hungry and data-hungry. We aim to improve the computation efficiency and data efficiency of deep learning. I will first talk about MCUNet that brings deep learning to IoT devices. The technique is tiny neural architecture search (TinyNAS) co-designed with a tiny inference engine (TinyEngine), enabling ImageNet-scale inference on an IoT device with only 1MB of FLASH. Next I will talk about TinyTL that enables on-device transfer learning, reducing the memory footprint by 7-13x. Finally, I will describe Differentiable Augmentation that enables data-efficient GAN training, generating photo-realistic images using only 100 images, which used to require tens of thousand. We hope such TinyML techniques can make AI greener, faster, and more sustainable.

10:25am - 11:00am

MIT Startup Exchange
Marcus Dahllöf
Program Director, MIT Startup Exchange

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- **Prescient Devices:** Build agile sensor-to-cloud IoT solutions without complexity
- **BlinkAI:** Imaging AI for autonomy, robotics and sensing
- **Leela AI:** AI that Understands "What's Going On" in Video Data, and Learns New Skills with a No-code User Interface
- **Nara Logics:** Digital Flywheel Platform for Retail
- **OnSpecta:** Unique Virtualization Technology for Best Inference Hardware Performance

Andy Wang
Founder & CEO, Prescient Devices

Andy Wang
Founder & CEO
Prescient Devices

Dr. Andy Wang is a technologist and entrepreneur with over 20 years of experience. He is the founder and CEO of Prescient Devices, an MIT start-up building low-code design automation software for enterprise IoT systems. Prior to founding Prescient Devices, Andy co-founded GTI IoT Technology, where he led the company as CTO and helped grow GTI from a 2-person founding team to a profitable company. Andy graduated with a Ph.D. degree from the Massachusetts Institute of Technology.

Bo Zhu
CTO, BlinkAI

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CTO
BlinkAI

Bo Zhu is the CTO of BlinkAI, a spinoff from imaging research he proposed as a postdoctoral research fellow at Harvard and published in *Nature*. This revolutionary technique rethinks the conventional image reconstruction signal processing pipeline with a fully automated deep learning approach based on human perceptual learning, significantly improving image quality from rapidly acquired low-quality raw data. Zhu received his SB and MEng in electrical engineering from MIT and PhD in biomedical engineering at the Harvard-MIT Division of Health Sciences and Technology (HST). At BlinkAI, he leads the development of machine learning techniques to accelerate high-fidelity CMOS image

11:00am	Closing Remarks

DAY 5: Feb. 4 (Thu) One on one meetings with MIT Startups

9:00am - 9:10am	Welcome and Introduction Marcus Dahllöf Program Director, MIT Startup Exchange Marcus Dahllöf Program Director **MIT Startup Exchange** Marcus Dahllöf leads MIT Startup Exchange, which facilitates connections between MIT-connected startups and corporate members of the MIT Industrial Liaison Program (ILP). Dahllöf manages networking events, workshops, the STEX25 accelerator, opportunity postings, and helps define the strategic direction of MIT Startup Exchange. He is a two-time tech entrepreneur (one exit in cybersecurity), and has previously held roles in finance, software engineering, corporate strategy, and business development at emerging tech companies and Fortune 100 corporations in the U.S., Latin America, and Europe. Marcus was a member of the Swedish national rowing team and he is a mentor at the MIT Venture Mentoring Service.
9:10am - 11:10am	One on one meetings with Day 2 Startups (separate signup)
9:10am - 11:10am	One on one meetings with Day 3 Startups (separate signup)
9:10am - 11:10am	One on one meetings with Day 4 Startups (separate signup)

DAY 6: Feb. 5 (Fri) Moving Research from the Lab to Commercialization

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9:00am - 9:05am	Welcome and Introduction Gregory Ornatowski Senior Director, MIT Corporate Relations Director, MIT-ILP, Japan Gregory Ornatowski Senior Director, MIT Corporate Relations Director, MIT-ILP, Japan Dr. Ornatowski is currently a Senior Director in the Office of Corporate Relations (OCR) at MIT and the Director, MIT-ILP, Japan. He works with various companies in the automotive, electronics and materials industries. Prior to joining MIT, he worked as a consultant in the Boston area with Standard and Poor's DRI and Harbor Research. Previously he spent nine years with General Electric, where he held various management positions in business development, strategic planning and marketing in the U.S. and Asia and worked with several of GE's technology-focused businesses. Dr. Ornatowski began his professional career as a management consultant working with the Tokyo office of the Boston Consulting Group. In addition to his corporate experience, Dr. Ornatowski has taught at the MIT Sloan School of Management, Boston University, and Trinity College. He has also published articles in the Sloan Management Review, Far Eastern Economic Review, The Journal of the American Chamber of Commerce in Japan, and the Journal of Socio-Economics. He is fluent in Japanese, having lived and worked in Japan a total of 12 years, and has worked extensively with Asian and European companies as well.

9:05am - 9:40am   The Innovation Ecosystem at MIT
                       Michael Cima
                       David H. Koch Professor of Engineering, MIT Koch Institute for Integrative Cancer Research
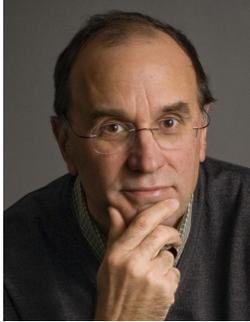
Michael Cima
David H. Koch Professor of Engineering, MIT Koch Institute for Integrative Cancer Research

Dr. Michael J. Cima is the David H. Koch Professor of Engineering, co-director of MIT's Innovation Initiative and Associate Dean of Innovation for the School of Engineering. He also holds the David H. Koch Chair of Engineering at MIT.

Prof. Cima was the recipient of the W. David Kingery Award in 2019, was elected to the National Academy of Inventors in 2016 and the National Academy of Engineering in 2011. He is faculty director of the Lemelson-MIT Program which inspires youth to be inventive and

Michael is author or co-author of over 250 peer-reviewed scientific publications and 80 US patents, and is a recognized expert in materials processing. He is the co-inventor of MIT's three-dimensional printing process.

Prof. Cima has extensive entrepreneurial experience. He co-founded SpringLeaf Therapeutics, a specialty pharmaceutical company, Taris Biomedical, a urology products company acquired by Johnson & Johnson, MicroChips Inc., a developer of microelectronic based drug delivery and diagnostic systems and T2 Biosystems, a medical diagnostics company for which he also serves as director.

View full bio

| 9:40am - 10:15am | Technology to the Marketplace: An Expanded Mission for Universities
Timothy Swager
John D. MacArthur Professor of Chemistry

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Timothy M. Swager is the John D. MacArthur Professor of Chemistry the Department of Chemistry at MIT and the Faculty Director of the Deshpande Center for Technological Innovation. In this latter role, Professor Swager works with the Center's Executive Director to define the Center's strategy for fostering innovation, assists with the commercialization of MIT technologies, and plays a key role in the grant selection process. Professor Swager also serves as the Center's liaison to the MIT academic community, and senior leadership, sitting on faculty and academic committees. Following Professor Swager's postdoctoral appointment at MIT, he joined the chemistry faculty at the University of Pennsylvania, returning to MIT in 1996 as a Professor of Chemistry, and served as the Head of Chemistry from 2005-2010. Professor Swager's research interests are in design, synthesis, and study of organic-based electronic, sensory, high-strength and liquid crystalline materials. He has published more than 400 peer-reviewed papers and more than 80 issued/pending patents. Professor Swager is the founder of four companies (DyNuPol, Iptyx, PolyJoule, and C2Sense) and has served on a number of corporate and government boards.He received a B.S. from Montana State University in 1983 and a Ph.D., from the California Institute of Technology in 1988.

View full bio

Future robust economies must be fueled by overt university led programs that translate our creative inventions and knowledge to the marketplace. To this end, I will describe MIT's efforts and activities, led by the Deshpande Center for Technological Innovation and enhanced by the MIT Industrial Liaison Program, for enhancing the commercialization of university research/inventions. A challenge for the Research University is to fund activities necessary to reduce risks (market risk as well as technical risk), prior to major investments that are needed to commercialize a technology. New funding models and deep engagement between MIT and industry partners can enhance the pace of innovation. |

| 10:15am | Closing Remarks
Gregory Ornatowski
Senior Director, MIT Corporate Relations
Director, MIT-ILP, Japan
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Senior Director, MIT Corporate Relations
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