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

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.

View full bio
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.

View full bio
Decarbonizing the Energy Sector: Making Better Decisions for the Energy Transition

Robert Armstrong
Director, MIT Energy Initiative (MITEI)
Chevron Professor of Chemical Engineering
MIT Department of Chemical Engineering

Robert 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 (2018), 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.

View full bio

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 CO₂ 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 CO₂ 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.
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.
Platform Thinking for the Present and Future

Michael Cusumano
Sloan Management Review Distinguished Professor of Management
Deputy Dean
Professor, Technological Innovation, Entrepreneurship, and Strategic Management

Michael A. Cusumano is the SMR Distinguished Professor of Management and Deputy Dean at the MIT Sloan School of Management. Previously he held a joint appointment in the School of Engineering. Professor Cusumano specializes in strategy, product development, and entrepreneurship in computer software as well as automobiles and consumer electronics. At MIT, he has recently taught Software & Internet Entrepreneurship as well as Advanced Strategic Management. During 2016-17, he was on leave as Special Vice President and Dean of Entrepreneurship and Innovation at the Tokyo University of Science, where he founded the Tokyo Entrepreneurship and Innovation Center and designed a new mid-career Management of Technology curriculum as well as a new business school that merged the Graduate School of Innovation and the School of Management.

Cusumano received a BA degree from Princeton 1976 and a PhD from Harvard in 1984, and completed a postdoctoral fellowship in Production and Operations Management at the Harvard Business School during 1984-86. He is fluent in Japanese and has lived and worked in Japan for more than eight years, with two Fulbright Fellowships and a Japan Foundation Fellowship for studying at Tokyo University. He has been a Visiting Professor at Imperial College, Tokyo University, Hitotsubashi University, the University of St. Gallen, the University of Maryland, and Ludwig Maximilian University of Munich. He has consulted and lectured for approximately 100 organizations, including Alcatel, Amadeus, AOL, ARM, AT&T, BMC Software, Business Objects, Cisco, Ericsson, Fiat, Ford, Fujitsu, GE, Fidelity, Hitachi, Huawei, i2 Technologies, IBM, Intel, Liberty Mutual, Lucent, Microsoft, Motorola, NASA, NEC, Nokia, NTT Data, Philips, Robert Bosch, Schlumberger, Siemens, Texas Instruments, Toyota, Toshiba, and Verizon. He is currently a director of two publicly listed financial services and technology companies: Orix Corporation in Japan and Ferratum Group in Europe. He is a former director of Patni Computer Systems in India (sold in 2011 for $1.2 billion) and Fixstars Corporation, a Japanese developer of high-performance software applications. He was recently a director of Zylotech, a predictive analytics company operating out of Cambridge, MA. He has served as editor-in-chief and chairman of the MIT Sloan Management Review and writes regularly on Technology Strategy and Management for Communications of the ACM. In 2009, he was named one of the most influential people in technology and IT by Silicon.com.


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

9:00am - 9:05am  Welcome and Introduction  
Keiji Yano  
Program Director, MIT Corporate Relations  
Associate Director, MIT-ILP, Japan  
Keiji Yano  
Program Director, MIT Corporate Relations  
Associate Director, MIT-ILP, Japan  

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.

9:05am - 9:45am  Robotics after COVID-19  
Julie Shah  
Associate Professor of Aeronautics and Astronautics  
Julie Shah  
Associate Professor of Aeronautics and Astronautics  

Julie Shah is an Associate Professor in the Department 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.

9:45am - 10:25am  Space Program TBD  
Daniel E. Hastings  
Aeronautics and Astronautics Department Head  
Cecil and Ida Green Education Professor  

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Mit Startup Exchange

- 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

Daniel Theobald
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

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 thought leader in the imaging field and holds more than 50 patents in the areas connected to computational imaging. He received his Ph.D. in Computer Science from University of California, Santa Cruz, MS in Computer Engineering from University of Massachusetts, Amherst, and B.Tech (Honors) in Electrical Engineering from the Indian Institute of Technology, Kharagpur.

Alberto Moel
VP of Strategy & Partnerships, Veo Robotics

Alberto is responsible for industry partnerships, intellectual property, and company strategy at Veo Robotics. Previously a Senior Research Analyst at Sanford C. Bernstein in Hong Kong, where he covered Asian high technology companies in the automation and robotics, artificial intelligence, cyber-physical systems, and robotics sectors. Before that, he was a research analyst at Raymond James Financial Services, where he covered technology equities in the U.S. and Asia. Alberto received his M.Eng. from the University of California, Berkeley, and his B.S. from the University of California, Santa Cruz.
DAY 3: Jan. 28 (Thu) Life Science, Chemical Engineering and Materials

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<td>Welcome and Introduction</td>
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John Roberts joined the Office of Corporate Relations in September, 2013 as Senior Industrial Liaison Officer. He was promoted to Associate Director, Corporate Relations in September 2016.

Roberts comes to OCR with many years of experience as an expert process chemist, a project manager, an alliance manager, and with cross-functional leadership experience in large pharmaceutical companies and biotech companies. In the five years prior to joining the OCR, he worked at Sirtris (a division of GlaxoSmithKline) in Cambridge as VP Pharmaceuticals & Strategy. Prior to that, he spent nine years in various roles including four years as Scientific Manager, Outsourced Projects US for GlaxoSmithKline in Research Triangle Park, North Carolina. Before that, he was at Eisai Research Institute in Andover as Senior Scientist and at Procept Inc. in Cambridge as Principal Investigator, Medicinal Chemistry.

Roberts holds a B.A. Chemistry from Clark University in Worcester, MA and a Ph.D. in Organic Chemistry from MIT where his advisor was the late Professor Satoru Masamune. His Thesis title was "Total Synthesis of Bryostatin 7." Roberts is fluent in Portuguese and has co-authored many publications and patents.

[View full bio]
9:05am - 9:45am

Single-molecule and ultrafast spectroscopies to explore the energetic and structural dynamics of biological systems (tbd)

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
Brad Pentelute, Associate 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
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 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 Chairman of the Board of Directors for Onestream Network Services. Mr. Baron is an active volunteer with a number of youth groups and schools, including BSA, Greentopia and Habitat for Humanity. Mr. Baron is an active musician in the Rochester, NY area, playing guitar and singing in his rock band, “Don’t Know Jack”.

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.
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.

Welcome and Introduction
Corey Cheng
Program Director, MIT Corporate Relations

Dr. Corey Cheng joined the Office of Corporate Relations (OCR) as a 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.
The Computational Limits of Deep Learning
Neil Thompson
Innovation Scholar, MIT's Computer Science and Artificial Intelligence Lab and the Initiative on the Digital Economy

Neil Thompson is an Innovation Scholar at MIT’s Computer Science and Artificial Intelligence Lab and the Initiative on the Digital Economy.

Dr. Thompson is also an Associate Member of the Broad Institute. Previously, Dr. Thompson 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. Dr. Thompson has advised businesses and government on the future of Moore’s Law and has been on National Academies panels on transformational technologies and scientific reliability.

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

View full bio
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. He received his PhD degree from Stanford University. His research focuses on efficient deep learning computing. He proposed "deep compression" technique that can reduce neural network size by an order of magnitude without losing accuracy, and the hardware implementation "efficient inference engine" that first exploited model compression and weight sparsity in deep learning accelerators, which impacted commercial AI chips designed by NVIDIA, Xilinx, Samsung, MediaTek, etc. His recent work on hardware-aware neural architecture search was highlighted by MIT News, Qualcomm News, VentureBeat, IEEE Spectrum, integrated in PyTorch and AutoGluon, and received many low-power computer vision contest awards in flagship AI conferences (CVPR'19, ICCV'19 and NeurIPS'19). Song received Best Paper awards at ICLR'16 and FPGA'17, Amazon Machine Learning Research Award, SONY Faculty Award, Facebook Faculty Award. Song was named "35 Innovators Under 35" by MIT Technology Review for his contribution on "deep compression" technique that "lets powerful artificial intelligence (AI) programs run more efficiently on low-power mobile devices." Song received the NSF CAREER Award for "efficient algorithms and hardware for accelerated machine learning."

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 photorealistic 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.
MIT Startup Exchange

- **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**

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**

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 acquisition and reconstruction in difficult environments using efficient inference that can be deployed on mobile and embedded systems.

Cyrus Shaoul
CEO, **Leela AI**

Dr. Cyrus Shaoul studied Brain and Cognitive Science at MIT, and then co-founded the Japanese Internet company Digital Garage which launched Infosellk Japan. He then went on to get his PhD in computational cognitive science, and worked in academia until 2017, when he co-founded Leela AI. He is an expert in machine learning with a focus on natural language understanding.

Jana Eggers
CEO, **Nara Logics**

Jana Eggers is CEO of the neuroscience-inspired artificial intelligence platform company, Nara Logics. Eggers is an experienced tech exec focused on inspiring teams to build great products. Eggers has started and grown companies and led large organizations at public companies. She is active in customer-inspired innovation, the artificial intelligence industry, the Autonomy/Mastery/Purpose-style leadership, as well as running and triathlons. Eggers has held technology and executive positions at Intuit, Blackbaud, Los Alamos National Laboratory (computational chemistry and super computing), Basis Technology (internationalization technology), Lycos, American Airlines, Spreadshirt (ecomm), and multiple startups.

Victor Jakubiuk
Co-founder & CTO, **OnSpecta**

Victor is a co-founder and CTO of OnSpecta. An engineer by training, and a deep-tech entrepreneur by choice, he's passionate about solving hard, technical problems. Prior to OnSpecta, Victor did research at MIT CSAIL, started a YCombinator-backed fintech company, and represented Great Britain at the International Olympiad in Informatics. Victor holds B.S. and M.S. degrees in Computer Science from MIT, where he was an Intel Research Scholar.
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 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.

View full bio

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
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.

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Dr. Michael J. Cima is the David H. Koch Professor of Engineering and a Professor of Materials Science and Engineering at the Massachusetts Institute of Technology and has an appointment at the David H. Koch Institute for Integrative Cancer Research. He earned a B.S. in chemistry in 1982 (phi beta kappa) and a Ph.D. in chemical engineering in 1986, both from the University of California at Berkeley. Prof. Cima joined the MIT faculty in 1986 as an Assistant Professor. He was promoted to full Professor in 1995. He was elected a Fellow of the American Ceramics Society in 1997. Prof. Cima was elected to the National Academy of Engineering in 2011. He now holds the David H. Koch Chair of Engineering at MIT. He was appointed faculty director of the Lemelson-MIT Program in 2009 which is a program to inspire youth to be inventive and has a nationwide reach. In 2018, Cima was named a co-director of MIT's Innovation Initiative and the associate dean of innovation for the School of Engineering.

Prof. Cima is author or co-author of over two hundred peer reviewed scientific publications, thirty seven US patents, and is a recognized expert in the field of materials processing. Prof. Cima is actively involved in materials and engineered systems for improvement in human health such as treatments for cancer, metabolic diseases, trauma, and urological disorders. Prof. Cima's research concerns advanced forming technology such as for complex macro and micro devices, colloid science, MEMS and other micro components for medical devices that are used for drug delivery and diagnostics, high-throughput development methods for formulations of materials and pharmaceutical formulations. He is a co-inventor of MIT's three dimensional printing process. His research has led to the development of chemically derived epitaxial oxide films for HTSC coated conductors. He and collaborators are developing implantable MEMS devices for unprecedented control in the delivery of pharmaceuticals and implantable diagnostic systems. Finally, through his consulting work he has been a major contributor to the development of high throughput systems for discovery of novel crystal forms and formulations of pharmaceuticals.

Prof. Cima also has extensive entrepreneurial experience. He is co-founder of MicroChips Inc., a developer of microelectronic based drug delivery and diagnostic systems. Prof. Cima took two sabbaticals to act as senior consultant and management team member at Transform Pharmaceuticals Inc. a company that he helped start and that was ultimately acquired by Johnson and Johnson Corporation. He is a co-founder and director at T2 Biosystems a medical diagnostics company. Most recently, Prof. Cima co-founded SpringLeaf Therapeutics a specialty pharmaceutical company and Taris Biomedical a urology products company.
This lecture will describe the use of molecular building blocks to create materials that have porous structures. Unlike conventional porous materials that use processing or phase separation processes to create porosity, the free volume is intrinsic in our materials. This concept was originated by our group some years ago and underpins the growing field of polymers of intrinsic microporosity (PIMs). The key design element is the incorporation of rigid bicyclic ring structures directly into polymer backbones and a variety of different structures will be presented. Membranes with enhanced ionic conductivities that can be used in fuel cells will be described. These studies demonstrate that the intrinsic free volume associated with the polymer structures produces higher conductivity with lower activation energies over all degrees of hydration and gives exceptional performance at low water concentrations. The designs presented are general and have been extended to anion exchange membranes to enable new fuel cell technologies. New cation designs are introduced that produce for improved membrane stability and the creation of ionic wires that provide new transport mechanisms. These latter materials display high hydroxide conductivity at very low levels of water and increasing conductivity with decreased ion exchange capacities. Lastly our free volume designs have been extended to membranes for gas separation. These technologies can offer economic and energy advantages in chemical production. Novel materials designs are shown that allow for exceptional transport of select gases and a resistance to plasticization, which provides improved stability that can enable commercial applications. This latter area is an expanding effort in our group and is in collaboration with Professor Zachary Smith (MIT Chem. Engr.).
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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.

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