November 15, 2022 - November 16, 2022

Day One: November 15, Tuesday | Plenaries | Grand Ballroom
Welcome and Introduction
John Roberts
Executive Director (Interim), MIT Corporate Relations

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

Rebekah Miller
Program Director, MIT Corporate Relations

Rebekah Miller joined the Office of Corporate Relations team as a Program Director in March 2022. Rebekah brings to the OCR expertise in the life sciences and chemical industries as well as in applications including sensors, consumer electronics, semiconductors and renewable energy.

Prior to joining the OCR, Rebekah worked for over a decade at Merck KGaA, most recently as a Global Key Account Manager in the Semiconductor division. Rebekah also served as Head of Business and Technology Development for the Semiconductor Specialty Accounts, during which time she led strategic planning and technology roadmapping.

While at Merck KGaA, Miller established a strong track record in industry-university partnerships, corporate entrepreneurship, and innovation management, with experience in roles spanning Technology Scouting, Alliance Management, and New Business Development. Early in her career, she led early phase R&D projects as a member of the Boston Concept Lab, which focused on technology transfer from academia.

Miller earned her B.A. in Chemistry and Biology from Swarthmore College and her Ph.D. in Chemistry, with a Designated Emphasis in Nanoscale Science and Engineering, from the University of California, Berkeley. She first joined MIT as a postdoctoral associate in the Bioengineering and Material Science Departments.

Randall Wright
Program Director, MIT Corporate Relations

Randall S. Wright is a program director with MIT's Industrial Liaison Program. He manages the interface between the managements of companies, headquartered in the United States and Europe, and the senior administration and faculty of MIT.

As a program director for MIT, he convenes teams of researchers and faculty members to provide on-going emerging technology intelligence and strategic advice for the world's leading technology companies. He is a sought-after speaker, delivering keynote speeches focused on emerging technology opportunities and challenges, and counter-intuitive insights in executive panels and discussions. Randall draws on extensive experience advising executives on a range of emerging technology areas including digital transformation, big data, robotics, green buildings, water efficiency, energy storage, biofuels, advanced materials, and manufacturing. He provides navigation and recommendations on the
What Makes MIT Unique?

Richard Lester
Japan Steel Industry Professor
Associate Provost

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

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

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

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

Professor Lester obtained his undergraduate degree in chemical engineering from Imperial College and earned his Ph.D. in nuclear engineering from MIT. He has been a member of the MIT faculty since 1979. He is an advisor to governments, corporations, foundations and non-profit groups, and he serves as chair of the National Academies’ Board on Science, Technology, and Economic Policy.
Panel: Transition or Transformation
Moderator:
Michael Schrage
Research Fellow, MIT Initiative on the Digital Economy, MIT Sloan School of Management

Michael Schrage is a research fellow with MIT Sloan School's Initiative on the Digital Economy. His research, writing, and advisory work focus on the 'behavioral economics' of models, experiments, and metrics as platforms for transforming customer lifetime value creation. In addition to his teaching and consulting, he is the author of 'The Innovator's Hypothesis' [MIT Press 2014], 'Who Do You Want Your Customers To Become?' [Harvard Business Review Press 2012] and 'Serious Play' [Harvard Business Review Press 2000]. His latest book, 'Recommendation Engines,' highlights the future of agency as digital media augment aspects, attributes, and talents of productive individuals. He is an angel investor and advisor to several start-ups in these digital spaces.

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Onshoring, Globalization, and Populism
Elisabeth B. Reynolds
Executive Director, Work of the Future Project
Lecturer, Urban Studies and Planning
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Executive Director, Work of the Future Project
Lecturer, Urban Studies and Planning

Elisabeth B. Reynolds works on issues related to systems of innovation, regional economic development and industrial competitiveness. She has focused in particular on the theory and practice of cluster development and regional innovation systems and advises several organizations in this area. Her current research focuses on the pathways that U.S. entrepreneurial firms take in scaling production-related technologies, as well as advanced manufacturing, including the globalization of the biomanufacturing industry. She is a member of the Massachusetts Advanced Manufacturing Collaborative Executive Committee.

Before coming to MIT for her Ph.D., Reynolds was the Director of the City Advisory Practice at the Initiative for a Competitive Inner City (ICIC), a non-profit founded by Professor Michael Porter focused on job and business growth in urban areas.

Reynolds has an A.B. from Harvard in Government and was the Fiske Scholar at Trinity College, Cambridge. She holds a MSc. from the University of Montreal in Economics and a Ph.D. from MIT in Urban and Regional Studies.

Michael Davies
Senior Lecturer
Chairman, Endeavour Partners
MIT System Design and Management
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Senior Lecturer
Chairman, Endeavour Partners
MIT System Design and Management

Michael A M Davies teaches the engineering and business elements of the Integrated Design and Management (IDM) program at MIT.

Michael A M Davies is the founder and chairman of Endeavour Partners, a boutique business strategy consulting firm that enables leaders in high-tech businesses and businesses being affected by technology worldwide to create value and drive growth through innovation. Endeavour Partners helps its clients anticipate, navigate, and innovate through insight and foresight in order to make better strategic decisions. Its clients include nearly all of the top-tier device vendors, network operators, service providers, and semiconductor businesses. Beyond high-tech, its clients include some of the world's leading e-commerce, information services, oil and gas, packaging and logistics businesses, along with world-class sports teams.

He is an expert on the connections between technology, innovation, product development, and business strategy.
9:55 AM - 10:35 AM
Fireside Chat: Forces of Change Converging On the Energy Sector; Strategy and Tools to Evolve (Role of ILP)
Moderator:
Michael Schrage
Research Fellow, MIT Initiative on the Digital Economy, MIT Sloan School of Management


Michael’s current research explores the future of KPIs, ‘performance management’ dashboards, and machine learning - in collaboration with Google, McKinsey, Cognizant, Deloitte, and the Sloan Management Review - paying special attention to how smarter metrics influence leadership style and substance. Other research examines the interplay of ‘network effects’ with human capital innovation. Schrage’s pioneering work in ‘selvesware’ highlights the future of agency as digital media augment aspects, attributes, and talents of productive individuals. He is an angel investor and advisor to several start-ups in these digital spaces.

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Mika Antonnen
St1 Founder and Chairman

Scott Kirsner
Editor & Cofounder
Innovation Leader

10:35 AM - 10:40 AM
MIT Professional Education
Myriam Joseph
Manager, Business Development and Marketing, MIT Professional Education

10:40 AM - 11:15 AM
Networking Break
Corporate Venture
Moderator:
David Martin
Program Director, MIT Corporate Relations

Mr. David Martin joined Corporate Relations on August 15, 2018 as Program Director for the ILP. Over time, Martin will take on more ILP members in the Middle East.

Martin comes to OCR with deep and broad knowledge and expertise in program management, innovation, commercial and government contracting, and strategic planning. In his most recent position at Altran (Burlington, MA) as the VP Programs, Dave had many major accomplishments including leading an innovation team to develop new technology in the beverage-filling industry, and managing client-facing relations supporting sales and execution of projects. Before that, he was at Windmill International as VP, Product Development, R&D. There he spearheaded the move into new markets for an innovative satellite communications product including through the SBIR program where he secured funding and sponsorship. Martin also leveraged other government programs collaborating with the DoD and congressional contacts. He began his career in the US Air Force as an Active Duty Captain and served for 10 years as an Acquisition Manager, Scientist, Test Director, and finally as Executive Officer in the Executive Office for Command, Control and Communications Systems in the Pentagon. Martin also served in the US Air Force Reserves before joining Windmill.

Mr. Martin earned his B.S., Physics from MIT, and his M.S., Systems Management from the University of Denver. He also earned a Certificate in Information Systems at the University of Denver.

Phil Budden
Senior Lecturer, Technological Innovation, Entrepreneurship, and Strategic Management, MIT Sloan School of Management

Dr Phil Budden is a Senior Lecturer at MIT’s Management School, in Sloan’s TIES (Tech Innovation, Entrepreneurship and Strategy) Group, where he focuses on ‘corporate innovation’ and multi-stakeholder innovation ecosystems, especially how corporates can get value from the latter (including start-up enterprises). He works closely with corporate executives and leaders of other large organisations on such strategies, through MIT Corporate Relations/ILP, the Corporate Innovation Program (https://corporateinnovation.mit.edu), Executive Education (https://executive.mit.edu/cgi) and MIT’s global REAP program (https://reap.mit.edu), as well as custom and consulting work.

Scott Kirsner
Editor & Cofounder, Innovation Leader

Scott Kirsner is a journalist who writes about innovation and entrepreneurship. His “Innovation Economy” column appears Sundays in the Boston Globe, and he is also editor of the site Innovation Leader (www.innovationleader.com), which focuses on R&D, product development, corporate venturing, and new initiatives within large companies. Scott has been a regular contributor to Fast Company, BusinessWeek, Variety, and Wired. His books include Fans, Friends & Followers: Building an Audience and a Creative Career in the Digital Age, a technological history of Hollywood. He can be reached at scott@innovationleader.com and his Twitter handle is @ScottKirsner.
Scott Kirsner is a journalist who writes about innovation and entrepreneurship. His “Innovation Economy” column appears Sundays in the Boston Globe, and he is also editor of the site Innovation Leader (www.innovationleader.com), which focuses on R&D, product development, corporate venturing, and new initiatives within large companies. Scott has been a regular contributor to Fast Company, BusinessWeek, Variety, and Wired. His books include Fans, Friends & Followers: Building an Audience and a Creative Career in the Digital Age, a technological history of Hollywood. He can be reached at scott@innovationleader.com and his Twitter handle is @ScottKirsner.

IHI Corporation
St1
Dr. Anthony is Associate Director of MIT.nano, Faculty Lead for the Industry Immersion Program in Mechanical Engineering, and Co-Director of the MIT Clinical Research Center. With over 25 years' experience in product realization—Dr. Anthony won an Emmy (from the Academy of Television Arts and Sciences) in broadcast technical innovation—Dr. Anthony designs instruments and techniques to monitor and control physical systems. His work involves systems analysis and design and calling upon mechanical, electrical, and optical engineering, along with computer science and optimization, to create solutions.

The focus of Dr. Anthony’s research is computational instrumentation—the design of instruments and techniques to measure and control complex physical systems. His research includes the development of instrumentation and measurement solutions for manufacturing systems and medical diagnostics and imaging systems. In addition to his academic work, he has extensive experience in market-driven technology innovation, product realization, and business entrepreneurship and commercialization at the intersection between information technology and advanced manufacturing. His teaching interests include the modelling of large-scale systems in a wide variety of decision-making domains and the development of optimization algorithms and software for analyzing and designing such systems. He has extensive experience in market-driven technology innovation as well as business entrepreneurship.

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2:30 PM - 3:00 PM  
Panel Discussion  
Brian Anthony  
Associate Director, MIT.nano  
Faculty Lead, Industry Immersion Program in Mechanical Engineering  
Co-Director, MIT Clinical Research Center  

Dr. Anthony is Associate Director of MIT.nano, Faculty Lead for the Industry Immersion Program in Mechanical Engineering, and Co-Director of the MIT Clinical Research Center. With over 25 years' experience in product realization—Dr. Anthony won an Emmy (from the Academy of Television Arts and Sciences) in broadcast technical innovation—Dr. Anthony designs instruments and techniques to monitor and control physical systems. His work involves systems analysis and design and calling upon mechanical, electrical, and optical engineering, along with computer science and optimization, to create solutions.

The focus of Dr. Anthony’s research is computational instrumentation—the design of instruments and techniques to measure and control complex physical systems. His research includes the development of instrumentation and measurement solutions for manufacturing systems and medical diagnostics and imaging systems. In addition to his academic work, he has extensive experience in market-driven technology innovation, product realization, and business entrepreneurship and commercialization at the intersection between information technology and advanced manufacturing. His teaching interests include the modelling of large-scale systems in a wide variety of decision-making domains and the development of optimization algorithms and software for analyzing and designing such systems. He has extensive experience in market-driven technology innovation as well as business entrepreneurship.

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BMW  
Startup
Duane S. Boning is Professor of Electrical Engineering and Computer Science at MIT, where he holds the Clarence J. LeBel chair. He is affiliated with the MIT Microsystems Technology Laboratories, where he serves as Associate Director for Computation and CAD. He also serves as Co-Director of the MIT Leaders for Global Operations (LGO) dual MBA/Engineering Master's degree program. He received SB, SM, and PhD degrees in electrical engineering and computer science from MIT. From 1991 to 1993 he was a Member Technical Staff at the Texas Instruments Semiconductor Process and Design Center in Dallas, Texas, before returning to MIT to join the EECS faculty.

At MIT, he served as Associate Head for Electrical Engineering in the EECS Department from 2004 to 2011, as Director of the MIT-Masdar Institute Cooperative Program from 2011 to 2018, and as Faculty Lead of the MIT-Skoltech Initiative from 2011 through 2013. From July 2019 to June 2021 he is Associate Chair of the MIT Faculty. Dr. Boning is a Fellow of the IEEE, and was Editor in Chief for the *IEEE Transactions on Semiconductor Manufacturing* from 2001 to 2011. His research interests include statistical and machine learning methods for the modeling and control of variation in IC and photonic processes, devices, and circuits. Particular emphases include modeling of chemical mechanical polishing (CMP), plasma etch, and embossing processes; and design for manufacturing (DFM) in IC and photonic technologies. He is co-editor of the book *Machine Learning in VLSI Computer-Aided Design* (Springer 2019).

**View full bio**
4:00 PM - 4:30 PM
Workforce of the Future
David Mindell
Dibner Professor, History of Engineering and Manufacturing
Professor, Aeronautics and Astronautics and Engineering Systems
Founder & CEO, Humatics

David Mindell is an engineer and historian. An expert in human relationships with robotics and autonomous systems, he has led or participated in more than 25 oceanographic expeditions. From 2005 to 2011 he was Director of MIT’s Program in Science, Technology, and Society. He is the author of five books and co-founder of Humatics Corporation, which develops technologies to transform how robots and autonomous systems work in human environments.

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4:30 PM - 5:00 PM
Social Contract
Wojciech Matusik
Professor, Electrical Engineering and Computer Science

Wojciech Matusik is a Professor of Electrical Engineering and Computer Science at the Computer Science and Artificial Intelligence Laboratory at MIT, where he leads the Computational Fabrication Group and is a member of the Computer Graphics Group. Before coming to MIT, he worked at Mitsubishi Electric Research Laboratories, Adobe Systems, and Disney Research Zurich. He studied computer graphics at MIT and received his PhD in 2003. He also received a BS in EECS from the University of California at Berkeley in 1997 and MS in EECS from MIT in 2001. His research interests are in computer graphics, computational design and fabrication, computer vision, robotics, and hci. In 2004, he was named one of the world’s top 100 young innovators by MIT’s Technology Review Magazine. In 2009, he received the Significant New Researcher Award from ACM Siggraph. In 2012, Matusik received the DARPA Young Faculty Award and he was named a Sloan Research Fellow. In 2014, he received Ruth and Joel Spira Award for Excellence in Teaching.

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Day One | Track 2: Climate and the Environment

2:00 PM - 2:30 PM
Climate-Economic Impact
John Sterman
An architect and engineer by training, Professor Carlo Ratti teaches at the Massachusetts Institute of Technology (MIT), where he directs the Senseable City Lab, and is a founding partner of the international design and innovation office Carlo Ratti Associati. He graduated from the Politecnico di Torino and the École Nationale des Ponts et Chaussées in Paris, and later earned his MPhil and PhD at the University of Cambridge, UK.

A leading voice in the debate on new technologies’ impact on urban life and design, Carlo has co-authored over 500 publications, including “The City of Tomorrow” (Yale University Press, with Matthew Claudel), and holds several technical patents. His articles and interviews have appeared on international media including The New York Times, The Wall Street Journal, The Washington Post, Financial Times, Scientific American, BBC, Project Syndicate, Corriere della Sera, Il Sole 24 Ore, Domus. His work has been exhibited worldwide at venues such as the Venice Biennale, the Design Museum Barcelona, the Science Museum in London, MAXXI in Rome, and MoMA in New York City.

Carlo has been featured in Esquire Magazine’s ‘Best & Brightest’ list and in Thames & Hudson’s selection of ‘60 innovators’ shaping our creative future. Blueprint Magazine included him as one of the ‘25 People Who Will Change the World of Design’, Forbes listed him as one of the ‘Names You Need To Know’ and Fast Company named him as one of the ‘50 Most Influential Designers in America’. He was also featured in Wired Magazine’s ‘Smart List: 50 people who will change the world’. Three of his projects – the Digital Water Pavilion, the Copenhagen Wheel and Scribit – have been included by TIME Magazine in the list of the ‘Best Inventions of the Year’.

Carlo has been a presenter at TED (in 2011 and 2015), program director at the Strelka Institute for Media, Architecture and Design in Moscow, curator of the BMW Guggenheim Pavilion in Berlin, and was named Inaugural Innovator in Residence by the Queensland Government. He was the curator of the Future Food District pavilion for the 2015 World Expo in Milan and chief curator of the “Eyes of the City” section at the 2019 UABB Biennale of Architecture and Urbanism of Shenzhen. He is currently serving as co-chair of the World Economic Forum’s Global Future Council on Cities and Urbanization.

View full bio
4:30 PM - 5:00 PM

Solar-Powered, Stratospheric Monitoring Vehicle
R. John Hansman

Professor of Aeronautics and Astronautics
Head, Division of Humans and Automation
Director, International Center for Air Transportation
MIT Department of Aeronautics and Astronautics

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Professor of Aeronautics and Astronautics
Head, Division of Humans and Automation
Director, International Center for Air Transportation
MIT Department of Aeronautics and Astronautics

R. John Hansman is the T. Wilson Professor of Aeronautics & Astronautics MIT, where he is the Director of the MIT International Center for Air Transportation. He conducts research in the application of information technology in operational aerospace systems. Dr. Hansman holds 6 patents and has authored over 250 technical publications. He has over 5800 hours of pilot in-command time in airplanes, helicopters and sailplanes including meteorological, production and engineering flight test experience. Professor Hansman chairs the US Federal Aviation Administration Research Engineering & Development Advisory Committee (REDA) as well as other national and international advisory committees. He is a member of the US National Academy of Engineering (NAE), is a Fellow of the AIAA and has received numerous awards including the AIAA Dryden Lectureship in Aeronautics Research, the ATCA Kristie Air Traffic Award, a Laurel from Aviation Week & Space Technology, and the FAA Excellence in Aviation Award.

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Day One | Track 3: Connected World

2:00 PM - 2:30 PM

Zero Energy Devices
Tomás Palacios
Professor, MIT Department of Electrical Engineering and Computer Science (EECS)

Tomás Palacios is a Professor in the Department of Electrical Engineering and Computer Science at MIT. He received his PhD from the University of California - Santa Barbara in 2006, and his undergraduate degree in Telecommunication Engineering from the Universidad Politécnica de Madrid (Spain). His current research focuses on new electronic devices and applications for novel semiconductor materials such as graphene and gallium nitride. His work has been recognized with multiple awards including the Presidential Early Career Award for Scientists and Engineers, the 2012 and 2019 IEEE George Smith Award, and the NSF, ONR, and DARPA Young Faculty Awards, among many others. Prof. Palacios is the founder and director of the MIT MTL Center for Graphene Devices and 2D Systems, as well as the Chief Advisor and co-founder of Cambridge Electronics, Inc. He is a Fellow of IEEE.

View full bio
2:30 PM - 3:00 PM
Bringing the Internet of Things to the Underwater World
Fadel Adib
Associate Professor, MIT Media Lab & Electrical Engineering and Computer Science, Electrical Engineering and Computer Science

Bringing massive connectivity to low-cost, low-power ocean sensors is important for numerous applications spanning marine sciences, sustainability, climatology, defense, robotics, geology, space exploration, and food security. However, standard IoT technologies (e.g., Bluetooth, WiFi, GPS) cannot operate underwater, which has left 70% of our planet (the ocean) beyond their reach. In this talk, I will describe how our research is changing this reality by inventing IoT technologies that are inherently designed for the ocean. Specifically, I will show how by rethinking the entire IoT technology stack in the context of oceans, my team introduced low-cost (< $100), net-zero-power, scalable connectivity technologies that seamlessly operate underwater and pave the way for massive underwater sensing, networking, localization, imaging, and machine learning. I will also discuss our recent explorations into a new technology for direct underwater-to-air communication. I will conclude the talk by describing how the fundamental innovations underlying our technologies extend beyond the ocean, and how my team also applies them to help address global problems in healthcare, robotics, and automation.

Fadel Adib
Associate Professor, MIT Media Lab & Electrical Engineering and Computer Science

Fadel Adib is the Doherty Chair at MIT and Associate Professor in the MIT Media Lab and the Department of Electrical Engineering and Computer Science. He is the founding director of the Signal Kinetics group which invents wireless and sensor technologies for networking, health monitoring, robotics, and ocean IoT. He is also the founder & CEO of Cartesian Systems, a spinoff from his lab that focuses on mapping indoor environments using wireless signals. Adib was named by Technology Review as one of the world’s top 35 innovators under 35 and by Forbes as 30 under 30. His research on wireless sensing (X-Ray Vision) was recognized as one of the 50 ways MIT has transformed Computer Science, and his work on robotic perception (Finder of Lost Things) was named as one of the 103 Ways MIT is Making a Better World. Adib’s commercialized technologies have been used to monitor thousands of patients with Alzheimer’s, Parkinson’s, and COVID19, and he has had the honor to demo his work to President Obama at the White House.

Adib is also the recipient of various awards, including the NSF CAREER Award (2019), the ONR Young Investigator Award (2019), the ONR Early Career Grant (2020), the Google Faculty Research Award (2017), the Sloan Research Fellowship (2021), and the ACM SIGMOBILE Rockstar Award (2022), and his research has received Best Paper/Demo Awards at SIGCOMM, MobiCom, and CHI. Adib received his Bachelors from the American University of Beirut (2011) and his Ph.D. from MIT (2016), where his thesis won the Sprowls award for Best Doctoral Dissertation at MIT and the ACM SIGMOBILE Doctoral Dissertation Award.

View full bio
Jelena Notaros is the Robert J. Shillman (1974) Career Development Assistant Professor of Electrical Engineering and Computer Science at the Massachusetts Institute of Technology, a Principal Investigator in the MIT Research Laboratory of Electronics, and a Core Faculty Member of the MIT Microsystems Technology Laboratories. She received her Ph.D. and M.S. degrees from the Massachusetts Institute of Technology in 2020 and 2017, respectively, and B.S. degree from the University of Colorado Boulder in 2015. Her research interests are in integrated silicon photonics devices, systems, and applications, with an emphasis on augmented-reality displays, LiDAR sensing for autonomous vehicles, free-space optical communications, quantum engineering, and biophotonics.

Jelena's work has been published in Nature, OSA, IEE, and SPIE journals and conference proceedings. She was one of three Top DARPA Risers, a 2018 DARPA D60 Plenary Speaker, a 2021 Forbes 30 Under 30 Listee, an MIT Herbert E. (1933) and Dorothy J. Grier Presidential Fellow, a National Science Foundation Graduate Research Fellow, a 2018 MIT EECS Rising Star, and an AIM Photonics Academy Supporting Instructor. Jelena was an invited speaker at 2022 OSA OFC, 2020 SPIE Photonics West, 2019 OSA CLEO, 2022 OSA COSI, 2020 OSA FIO, 2019 OSA IPR, 2020 OSA NETWORKS, 2021 OSA AIO, and 2019 IEEE Photonics North. She was the recipient of the MIT Robert J. Shillman (1974) Career Development Chair, 2020 MIT RLE Early Career Development Award, 2019 OSA CLEO Chair's Pick Award, 2014 IEEE Region 5 Student Paper Competition Award, 2019 MIT MARC Best Overall Paper Award and Best Pitch Award, 2018 and 2014 OSA Incubic Milton Chang Student Travel Grant, 2014 Sigma Xi Undergraduate Research Award, 2015 CU Boulder Chancellor's Recognition Award, 2015 CU Boulder College of Engineering Outstanding Graduate for Academic Achievement Award, and 2015 CU Boulder Electrical Engineering Distinguished Senior Award.

By enabling the integration of millions of micro-scale optical components on compact millimeter-scale computer chips, silicon photonics is positioned to enable next-generation optical technologies that facilitate revolutionary advances in numerous fields spanning science and engineering. In this talk, I will highlight our work on developing novel silicon-photonics-based platforms, devices, and systems that enable innovative solutions to high-impact problems in areas including augmented-reality displays, LiDAR sensing for autonomous vehicles, free-space optical communications, quantum engineering, and biophotonics.
The Current State and Future Direction of Satellite Communications

Bruce Cameron
Director, MIT System Architecture Lab

Bruce Cameron is the Director of the System Architecture Group at MIT. His research interests include technology strategy, system architecture, and the management of product platforms. Previously, Dr. Cameron ran the MIT Commonality study, a 30-firm investigation of platforming returns, which concluded that firms face systemic downward pressure on commonality, partially resulting from challenges capturing the costs of variety. Dr. Cameron has supervised over 50 graduate students and has directed research projects for Amazon, BP, Sikorsky, Nokia, Caterpillar, AMGEN, Verizon, and NASA. Current research efforts include:

- Platform management in large R&D organizations
- System architecture of complex systems
- Switching costs and retention incentives in ride-hailing firms
- Satellite mega-constellations in Lower Earth Orbit

Dr. Cameron is a co-founder of Technology Strategy Partners, a consultancy created to help firms to restructure product development organizations, build systems engineering functions, and identify new architectures. Dr. Cameron has led projects in Fortune 500 firms in high tech, medical devices, transportation, and consumer goods.

View full bio

The global market for SatCom is about to be flooded with supply from four new providers. The four major LEO Mega-Networks (SpaceX, OneWeb, Amazon, Telesat) have proposed thousands of satellites, but their network performance and capability are yet to be demonstrated. We review an apple-to-apples comparison of the four for total capacity and discuss an outlook for this market and emerging technology.
Inter-Nanosattelite Optical Communications
Paul Serra
Research Scientist, MIT Space Telecommunications, Astronomy and Radiation Laboratory (STAR Lab)

Paul Serra is a research scientist at the Space Telecommunications, Astronomy, and Radiation Laboratory at MIT and is working with Prof. Kerri Cahoy on the Cubesat Laser Infrared CrosslinK (CLICK) mission. His research includes the design, fabrication, and on-orbit characterization of timing instruments for compact spacecraft. Paul earned his Ph.D. in aerospace engineering at the University of Florida in 2018 on timing systems for CubeSats. He was a major contributor to the design of the instrument of the CubeSat Handling Of Multisystem Precision Time Transfer (CHOMPTT) mission, under the supervision of Prof. John Conklin. He received a MSc in aerospace engineering from University of Florida and a Graduate Engineering Degree from Arts et Métiers ParisTech, in France, in 2014.

Nanosatellites and CubeSats have drastically reduced the cost to access space and allowed several actors to launch entire fleets of satellites in a short span of time. Communications remain a challenge in terms of miniaturization and throughput, but also for regulatory and spectrum assignment reasons. Optical communication is a rapidly growing and maturing field that can deliver orders of magnitudes better data rate and Size, Weight, and Power (SWaP). For those reasons, optical communications are now the backbone of all major new constellation projects, both from private and government organizations. On top of raw numbers advantages, laser communication can greatly enhance RF-based navigation or time transfer methods, with position accuracy in the millimeter range.

The MIT Space Telecommunications, Astronomy and Radiation Laboratory (STAR Lab) has developed, in collaboration with the University of Florida (UF), and the NASA Ames Research Center, a series of lasercom payloads, as part of the CubeSat Laser Infrared Crosslink (CLICK) mission. The CLICK payloads employ technologies such as Micro-Electro-Mechanical System (MEMS) Fast Steering Mirror (FSM) and Chip-Scale Atomic Clocks (CSAC) to demonstrate robust optical communication in a less than 10 x 10 x 15 cm volume. The first satellite, CLICK-A, has been launched and is undergoing commissioning. CLICK-A can downlink data at 50 Mbps to a small portable ground station. The second flight, CLICK-BC, will demonstrate a crosslink between two cubesats, and feature enhanced navigation and ranging capabilities. CLICK-BC is expected to launch in Fall 2023. I will discuss the CLICK mission and laser communication, as well as future space optical navigation systems.

Day One | Track 4: The Brain/Body Connection

2:00 PM - 2:30 PM
Pawan Sinha is a tenured full professor of computational and visual neuroscience in the Department of Brain and Cognitive Sciences at MIT. He received his undergraduate degree in computer science from the Indian Institute of Technology, New Delhi and his Masters and doctoral degrees from the Department of Computer Science at MIT.

Using a combination of experimental and computational modeling techniques, research in Prof. Sinha’s laboratory focuses on understanding how the human brain learns to recognize objects through visual experience and how objects are encoded in memory. Prof. Sinha’s experimental work on these issues involves studying healthy individuals and also those with neurological disorders such as autism. The goal is not only to derive clues regarding the nature and development of high-level visual skills, but also to create better therapeutic routines to help children overcome visual impairments. Prof. Sinha founded Project Prakash in 2005 with the twin goals of providing treatment to children with disabilities and also understanding mechanisms of learning and plasticity in the brain. Project Prakash, which is a collaboration between MIT researchers and ophthalmologists in India, has provided insights into some of the most fundamental questions about brain function while also transforming the lives of many blind children by bringing them the gift of sight. This synthesis of immediate societal benefit with cutting-edge scientific inquiry has attracted international attention and merited several articles in the popular and scientific press.

Prof. Sinha is a recipient of the PECASE – the highest US Government award for young scientists, the Alfred P. Sloan Foundation Fellowship in Neuroscience, the John Merck Scholars Award for research on developmental disorders, the Jeptha and Emily Wade Award for creative research, the Troland Award from the National Academies, and the Distinguished Alumnus Award from IIT Delhi. He has published extensively in several of the world’s top-ranked scientific journals including Nature, Science, Nature Neuroscience, Proceedings of the National Academy of Sciences and Proceedings of the Royal Society. His work has been profiled in several media channels including the New York Times, The Washington Post, ABC News, National Public Radio and TIME magazine.

Prof. Sinha’s teaching has consistently been rated as amongst the best in the Department of Brain and Cognitive Sciences. He has received the Dean’s Award for Advising and Teaching at MIT. On a broader scale, he has written a series of articles on various aspects of normal and abnormal brain function towards the goal of bringing the latest findings in neuroscience to the attention of the general public.

Prof. Sinha has served on the program committees for prominent scientific conferences on object and face recognition and is currently a member of the editorial board of ACM’s Journal of Applied Perception. He is a founder of Imagen Inc, a company that applies insights regarding human image processing to challenging real-world machine vision problems. Imagen was the winner of the MIT $50K Entrepreneurship competition. Prof. Sinha was named a Global Indus Technovator, and was also inducted into the Guinness Book of World Records for creating the world’s smallest reproduction of a printed book.

View full bio
Day Two: November 16, Wednesday | Plenaries

9:00 AM, Welcome and Introduction

Rebekah Miller
Program Director, MIT Corporate Relations

Rebekah Miller joined the Office of Corporate Relations team as a Program Director in March 2022. Rebekah brings to the OCR expertise in the life sciences and chemical industries as well as in applications including sensors, consumer electronics, semiconductors and renewable energy.

Prior to joining the OCR, Rebekah worked for over a decade at Merck KGaA, most recently as a Global Key Account Manager in the Semiconductor division. Rebekah also served as Head of Business and Technology Development for the Semiconductor Specialty Accounts, during which time she led strategic planning and technology roadmapping.

While at Merck KGaA, Miller established a strong track record in industry-university partnerships, corporate entrepreneurship, and innovation management, with experience in roles spanning Technology Scouting, Alliance Management, and New Business Development. Early in her career, she led early phase R&D projects as a member of the Boston Concept Lab, which focused on technology transfer from academia.

Miller earned her B.A. in Chemistry and Biology from Swarthmore College and her Ph.D. in Chemistry, with a Designated Emphasis in Nanoscale Science and Engineering, from the University of California, Berkeley. She first joined MIT as a postdoctoral associate in the Bioengineering and Material Science Departments.

Randall Wright
Program Director, MIT Corporate Relations

Randall S. Wright is a program director with MIT's Industrial Liaison Program. He manages the interface between the managements of companies, headquartered in the United States and Europe, and the senior administration and faculty of MIT.

As a program director for MIT, he convenes teams of researchers and faculty members to provide on-going emerging technology intelligence and strategic advice for the world's leading technology companies. He is a sought-after speaker, delivering keynote speeches focused on emerging technology opportunities and challenges, and counter-intuitive insights in executive panels and discussions. Randall draws on extensive experience advising executives on a range of emerging technology areas including digital transformation, big data, robotics, green buildings, water efficiency, energy storage, biofuels, advanced materials, and manufacturing. He provides navigation and recommendations on the emerging technologies and adoption landscapes critical to future business growth, as well as creation, development, and execution of programs of research between industry and MIT.

Randall has been bestowed by Federal President of Austria Dr. Heinz Fischer with the decoration Cross of Honor in Gold for Services to the Republic of Austria for his "outstanding contribution to the development of relations between Austria and MIT".

Prior to MIT, Randall was a marketing manager for Pfizer, Inc., a major U.S. pharmaceuticals company. He was also a strategic planning analyst for Pennzoil Company--a Fortune 500 oil and natural resources company. Randall is an invited lecturer at Northeastern University's Executive M.B.A. Program where he lectures on innovation and corporate strategy. His column Innovation Counterculture looks at ideas and perspectives on strategy, organization, and thinking to help executives connect to the world of innovation outside their organizations and he is published regularly in Research-Technology Management, the award-winning journal of the Industrial Research Institute.
9:00 AM - 9:20 AM

Changes to National Research Priorities; NSF Translational Research and/or DARPA Priorities

David Goldston
Director, MIT Washington D.C. Office

David Goldston became Director of the MIT Washington Office in 2017, heading up MIT’s federal relations. For the eight prior years, he was the Director of Government Affairs at the Natural Resources Defense Council (NRDC), a leading environmental group. Prior to that, he spent more than 20 years on Capitol Hill in Washington, working primarily on science policy and environmental policy. He was Chief of Staff of the House Committee on Science from 2001 through 2006. For the next three years, he wrote a monthly column for Nature on science policy. He has served on several committees of the National Academy of Sciences. He holds a B.A. (1978) from Cornell University and completed the course work for a Ph.D. in American history at the University of Pennsylvania.

9:30 AM - 9:50 AM

Outsourced Mind: Human-AI Interactions

Renée Gosline
Senior Lecturer
Research Scientist
MIT Sloan School of Management

Renée Gosline
Senior Lecturer
Research Scientist
MIT Sloan School of Management

Renée Richardson Gosline is a Senior Lecturer and Research Scientist at the MIT Sloan School of Management. She has been named one of the World’s Top 40 Professors under 40 by Poets and Quants, an MIT “Iron Professor,” and a scholar at the MIT Center for Digital Business.

Her main interest is in how status-based bias and technology affect self-perceptions and behavior. Her research projects include: the positive impact of imitation on brand strength, the effect of social media storytelling on persuasion, the role of status dynamics in health and performance, and the use of wearable technology to aid willpower. In order to address these issues rigorously, she employs experimental methodology, both in the field and laboratory.

Prior to academia, she was a marketing practitioner at LVMH Moet Hennessy and Leo Burnett.

Gosline received her undergraduate and graduate training at Harvard University, including a Doctorate from the Harvard Business School.
Sertac Karaman is the Class of '48 Career Development Chair Associate Professor of Aeronautics and Astronautics at the Massachusetts Institute of Technology. He is a member of the Laboratory for Information and Decision Systems and the Institute for Data, Systems and Society. He has obtained B.S. degrees in mechanical engineering and in computer engineering from the Istanbul Technical University, Turkey, in 2007, an S.M. degree in mechanical engineering from MIT in 2009, and a Ph.D. degree in electrical engineering and computer science also from MIT in 2012. His research interests lie in the broad areas of robotics and control theory. In particular, he studies the applications of probability theory, stochastic processes, stochastic geometry, formal methods, and optimization for the design and analysis of high-performance cyber-physical systems. The application areas include driverless cars, unmanned aerial vehicles, distributed aerial surveillance systems, air traffic control, certification and verification of control systems software, among many others. His research and teaching won numerous awards, including the Army Research Office Young Investigator Program Award in 2015 and the NSF Faculty Career Development (CAREER) Award in 2014.

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Day Two | Track 5: Global Economy and Supply Chain

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<td>Networking Break</td>
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Day Two | Track 6: Sustainable Solutions
Roberto Rigobon is the Society of Sloan Fellows Professor of Management and a Professor of Applied Economics at the MIT Sloan School of Management.

He is also a research associate of the National Bureau of Economic Research, a member of the Census Bureau's Scientific Advisory Committee, and a visiting professor at IESA.

Roberto is a Venezuelan economist whose areas of research are international economics, monetary economics, and development economics. Roberto focuses on the causes of balance-of-payments crises, financial crises, and the propagation of them across countries—the phenomenon that has been identified in the literature as contagion. Currently he studies properties of international pricing practices, trying to produce alternative measures of inflation. He is one of the two founding members of the Billion Prices Project, and a co-founder of PriceStats.

Roberto joined the business school in 1997 and has won both the "Teacher of the Year" award and the "Excellence in Teaching" award at MIT three times.

He received his PhD in economics from MIT in 1997, an MBA from IESA (Venezuela) in 1991, and his BS in Electrical Engineer from Universidad Simon Bolivar (Venezuela) in 1984. He is married with three kids.

Josué Velázquez Martínez

Networking Break

AJ Parez
Professor John E. Fernández is Director of the Massachusetts Institute of Technology Environmental Solutions Initiative, enlisting the capacity of the MIT community in the transition to a net zero carbon, biodiverse and equitable future. He is a professor in the Department of Architecture at MIT, affiliated with the Department of Urban Studies and Planning and a practicing architect. Fernández founded and directs the MIT Urban Metabolism Group and is a member of the World Economic Forum Global Commission on BiodiverCities by 2030, the Urban Climate Change Research Network and the Leadership Team of Oceanvisions. He has published on a wide range of subjects from sustainable cities, urban biodiversity, design and more and 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 formerly Chair of Sustainable Urban Systems for the International Society of Industrial Ecology and Director of the MIT Building Technology Program from 2010 to 2015.

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Day Two | Track 7: Digital Worlds and the Metaverse

10:30 AM - 11:00 AM  DESCRIPTION
11:00 AM - 11:30 AM  DESCRIPTION
11:30 AM - 11:45 AM  Networking Break
11:45 AM - 12:15 PM  DESCRIPTION
12:15 PM - 12:45 PM  DESCRIPTION

Day Two | Track 8: Powering the Future

10:30 AM - 11:00 AM  Fusion/Nuclear Engineering
11:00 AM - 11:30 AM  Aluminum as a Source of Hydrogen and Heat
11:30 AM - 11:45  Networking Break
11:45 AM - 12:15 PM
12:15 PM - 12:45 PM  Drilling