2022 MIT Digital Technology and Strategy Conference

October 12, 2022 - October 13, 2022

Day 1: October 12 (Wednesday)

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

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

Graham Rong
Director, MIT Corporate Relations

Dr. Rong is Director of Corporate Relations at MIT. He currently supervises a group of ILP officers who promote and manage the interactions and relationships between the research at MIT and companies worldwide, particularly in greater China and extended Asian countries, to help them stay abreast of the latest developments in technology and business practices.

Previously, Dr. Rong founded IKA, LLC. He has led corporate development and product innovation, and provided strategic advices to companies in corporate strategy, IT leadership, digital transformation, AI, enterprise content management, and customer relationship. He held senior roles in Harte-Hanks and Vignette Corporation. He held an EU postdoctoral research fellowship in the University of Edinburgh in Scotland where he started global collaborative research.

Dr. Rong is on the board of multiple organizations, including 128CUTE since 2005 and MIT Sloan Alumni Association of Boston from 2009 to 2012. He chaired MIT Sloan CIO Symposium from 2009-2011. He is a senior expert invited by international organizations.

Dr. Rong holds a M.B.A. in global and innovation leadership from the MIT Sloan School of Management and Ph.D in numerical computing from University of Guelph in Canada.

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Keynote: Understanding Cloud Data Tools and Why Complexity still Defeats Good Teams
John Williams
Professor of Information Engineering, MIT Department of Civil and Environmental Engineering

John Williams holds a BA in Physics from Oxford University, a MS in Physics from UCLA, and a Ph.D. in Numerical Methods from University of Wales, Swansea. His research focuses on the application of large-scale computation to problems in cyber-physical security and energy. He is director of MIT’s Geospatial Data Center and from 2006-2012, was Director of the MIT Auto-ID Laboratory, where the Internet of Things was invented. He is author or co-author of over 250 journal and conference papers, as well as the books on Rock Mechanics and RFID Technology. He contributed to the 2013 report for the UK Office for Science Foresight Project- The Future of Manufacturing. Alongside Bill Gates and Larry Ellison, he was named as one of the 50 most powerful people in Computer Networks. He consults to companies including Accenture, Schlumberger, Shell, Total, Exxon, SAP Research, Microsoft Research, Kaijma Corp, US Lincoln Laboratory, Sandia National Laboratories, US Intelligence Advanced Research Projects Activity, Motorola, Phillip-Morris Inc., Ford Motor Company, Exxon-Mobil, Shell, Total, and ARAMCO. His international collaborations include Oxford and Cambridge Universities, HKUST, KACST, Alfaisal University, PolyU Hong Kong, Imperial College of Science and Technology UK, Malaysia University of Science and Technology (MUST), and Masdar Institute of Science and Technology Abu Dhabi. He organized the first Cyber-Physical Security Conference in the UK (2011), and along with Dr. Sanchez, he runs the MIT Applied Cyber Security Professional Education summer course. At MIT, he teaches courses Architecting Software Systems (MIT 1.125) and Engineering Computation and Data Science (MIT 1.00/1.001).

In data engineering and data science, early work included simulation of Ford’s global network, and analysis of SAP smart grid billing system. For Altria, he analyzed the performance of item level tagging and also their implementation of an anti-counterfeiting system using the Electronic Product Code (EPC).

In password security, Dr. Williams was a PI that developed the algorithms for a negative password authentication system for the Intelligence Advanced Research Projects Activity (IARPA) agency.

Dr. Williams advises companies in the Americas, Europe, the Middle East, and Asia.

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Last year I was really pleased that I could load a 1 million row table into a Pandas DataFrame on my Mac. This year I could rip through a 12 billion row table in a couple of seconds using Google’s BigQuery. That’s a 10,000 times improvement in one year. Oh, and it cost me nothing. So what’s the problem? Why are companies still struggling with their Digital Transformations? Why is there no silver bullet? In this talk, we'll look at the modern data stack offerings on AWS, Google, Azure, Databricks, and Snowflake and talk about why other companies, such as dbt, Fivetran, Confluent and Apollo solve problems with your APIs and data pipelines. We’ll see that ultimately its still a “people problem” and that our experience with DevOps, LeanDevOps and Agile teams show that C2 Command and Control is giving way to other organizational structures that leverage SO, Self-Organization, and our knowledge of Complex Adaptive Systems.
Federico Casalegno will discuss the evolution of interaction in digital environments, including the promises of the Metaverse, virtual and augmented reality, digital twins, and ambient computing, among others. He will present ideas about the future of interaction, and how the design of Synthetic Realities will be the next big challenge to craft innovation for human benefits.

Metaverse and Synthetic Realities are not about mere technologies. We are designing new powerful hybrid human environments that support social interaction. And the future of interaction will require that we shift our thinking beyond simple interaction with a single device or service to design interaction with a constellation of devices, ecosystems of services, and connected learning systems who proactively takes autonomous decisions.

In these new digital environments, before focusing on products and technologies, we need to focus on the experiences that we want to have in these new spaces. Today we have the opportunity to design a humanity-centered Metaverse with purpose, good for humans and the planet.
Ben Armstrong is the executive director of MIT's Industrial Performance Center. His research and teaching examine how workers, firms, and regions adapt to technological change. In his work, Ben has collaborated with governments, non-profit organizations, and firms to understand how scholarship and education can be useful to practitioners and policymakers. Previously, he worked for Google Inc. and served on the board of an open-source hardware non-profit. Ben received his PhD from MIT.

What firms gain from automation in productivity they often risk losing in flexibility. When firms make this tradeoff, we call it zero-sum automation. But this doesn't have to be the case. How technologies are designed, who is involved in implementing them, and the ways that organizations define success can all shape the eventual impact that an automation technology has. There's an emerging set of technologies and management approaches that can enable firms to automate flexibly. This presentation focuses on how low-code programming interfaces, bottom-up approaches to integrating new technologies, and a new way of thinking about the role of automation within the firm can contribute to automation that improves productivity and flexibility.
Catarina Madeira joined Corporate Relations in May 2021 as Program Director, Startup Exchange.

Madeira has been working with the Cambridge/Boston startup ecosystem for the past 10 years and joins Corporate Relations with a solid network in the innovation and entrepreneurial community. In 2010, she joined the startup accelerator IUL MIT Portugal working in Lisbon and working with the Cambridge team on all aspects related to the accelerator's launch. She held positions including Operations Coordinator, Program Manager, and Business Developer. The accelerator soon achieved steady growth in large part due to the partnerships that Catarina led with regional and global startup ecosystems. Most recently she worked at NECEC, leading a program that connects cleantech startups and industry. In this role, she developed and built a pipeline of startups and forged strong relationships with both domestic and European companies. She has also held positions in Portugal and France including at L'Oréal and Saboaria e Perfumaria Confiança as Pharmacist and Technical Director.

Madeira earned her Bachelor in Chemistry at the University of Porto and her Bachelor in Pharmaceutical Sciences at the University of Coimbra in Portugal. She went on to earn her Master of Engineering for Health and Medicines at University Lyon 1 and EM Lyon in France.

Vishal (Vish) Punwani
CEO and Co-Founder
SoWork

Di Wu
CEO and Co-Founder
OmniML

Carter Prince
Head of Business Development
Syntegra

Michele Cardello
Head of Sales for the Americas
Ennoventure

Max Kleiman-Weiner
CEO & Co-Founder
Common Sense Machines (CSM)

Piali De
CEO
Senscio Systems

Chad Spensky
Founder and CEO
Allthenticate

Andy Wang
CEO
Prescient Devices
The ‘Intelligent’ Future of KPIs: [Machine] Learning to Optimize Key Performance

Michael Schrage
Research Fellow, MIT Sloan School's Initiative on the Digital Economy


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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This brief talk describes a research and innovation trajectory combining digital instrumentation, machine learning and portfolio management to redefine how organizations measure and manage key performance. Drawing on the insight that ‘KPIs’ and other metrics can be recast as ‘software agents,’ this talk suggests that successful ‘digital transformations’ will be organized around the measures that matter most. This disruptive shift poses unique risks and opportunities for leaderships and boards alike.
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]. 'Recommendation Engines,' his latest book, was published in September 2020 by MIT Press.

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Peter Evans is the Managing Partner at the Platform Strategy Institute, a consultancy dedicated management strategy and application of platform business models across a wide range of sectors. Peter has over 20 years of experience leading teams in identifying, framing, assessing, and communicating high-priority marketplace trends and disruptions that support business planning and investment prioritization. He has specialized in helping companies see around corners, anticipate key market trends and craft seminal thought leadership that framed major multi-year growth initiatives.

At KPMG, he was a Partner in the Innovation and Enterprise Solution group responsible market and emerging technology sensing, innovation portfolio management and business development. To support the firm’s intelligent automation strategy, he led a major study of how the world’s largest enterprises are adopting artificial intelligence.

Prior to joining KPMG, Dr. Evans was Vice President at the Center for Global Enterprise a nonprofit established by Sam Palmisano, former Chairman and CEO of IBM. He was instrumental in framing and delivering on the Center’s research, business education, and global CEO engagements.

Previously, Dr. Evans held key strategy and market intelligence roles at General Electric. He was the lead author of GE’s seminal white paper ‘Industrial Internet: Pushing the Boundaries of Minds and Machines,” which articulated the macro trends behind GE’s shift to a ‘digital industrial’ enterprise and led to the establishment of Predix.

He also worked as an independent consultant for a variety of corporate and government clients, including the US Department of Energy, the OECD and the World Bank.

He received his master’s degree and PhD degree from the Massachusetts Institute of Technology. He is a lifetime member of the Council on Foreign Relations and an International Academy of Management Fellow. He is the co-chair of the MIT Platform Strategy Summit and the Founder of MusicTech Connect in Atlanta.

A shift to a more decentralized, blockchain-based internet will have important implications for the enterprise. The next phase of the internet, often referred to as Web3, will require adapting to a shifting external environment. Changes to customer identity and data sovereignty will have important implications for marketing, product design and data analytics. Web3 will also require internal adjustments. These changes include developing new business processes that are more on-chain and involve new technologies like NFTs, the Metaverse, and tokenized digital twins. A shift from static to dynamic certificates will change internal training and development in ways that will incentivizes and reward continuous learning. In short, web3 will create a new enterprise frontier, requiring a new wave of innovation and investment to keep pace.
Stephanie Woerner is a Research Scientist at the Center for Information Systems Research (CISR) at the MIT Sloan School of Management. Stephanie is an expert on how companies use technology and data to create more effective business models and her research centers on how companies manage organizational change caused by the digitization of the economy. In 2016, she was a subject matter expert on enterprise digitization for the Wall Street Journal CEO Council Conference. She has a passion for measuring hard-to-assess digital factors such as connectivity and customer experience, and linking them to firm performance. Recent articles (with Peter Weill) include “Thriving in an Increasingly Digital Ecosystem,” and “Is Your Company Ready for a Digital Future?”, in Sloan Management Review. Stephanie is the coauthor, with Peter, of What's Your Digital Business Model? Six questions to help you build the next generation enterprise, (Harvard Business Review Press, 2018).
9:10 AM Automation of Operations with Organizations using AI and Data
Devavrat Shah
Andrew (1956) and Erna Viterbi Professor, MIT Department of Electrical Engineering and Computer Science

Devavrat Shah is Andrew (1956) and Erna Viterbi Professor of AI and Decisions at MIT where he is currently the faculty director of Deshpande Center for Technology Innovation as well as founding director of Statistics and Data Science Center. His research focuses on algorithms for Statistics and Machine Learning. He is a Kavli Fellow of National Academy of Sciences, distinguished alumni of his alma mater IIT Bombay. Previously he co-founded retail analytics start-up Celect which is now part of Nike since 2019. Currently, he is focused on making AI functionalities accessible. Towards that, he co-founded Ikigai Labs in 2019 with the mission of enabling the use of AI with the ease of spreadsheets.

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Physical to digital transformation has led to the rise of business “data operators”: individuals in organizations, from the ground level to the C-suite, who are using data as their primary “sensors” to run mission-critical operations. The day-to-day workflow of such a data biz operator requires accessing data from multiple sources, “stitching” them together, extracting current status as well as insights, making decisions and communicating to the downstream task in a collaborative manner. While there are a number of tools for data analysts, data scientists and data engineers, the tool-set for data operators has been absent and subsequently leading to widespread reliance on spreadsheets.

In this talk, we shall discuss how AI-native cloud-data platform can enable such data operators to “program” their biz ops seamlessly. We shall discuss how AI can enables stitching disparate data sources seamlessly with human-in-the-loop workflows. We shall also discuss the opportunities that can be realized by recent advances in causal inference and reinforcement learning for “what if” scenario analysis.

9:50 AM Towards Teleportation and Telepathy: Imaginaries and Futures of Metaverse
Cagri Hakan Zaman
Director, MIT Virtual Experience Design Lab
Lecturer of Design and Computation
MIT Department of Architecture

Originally introduced in a sci-fi novel, the term Metaverse has become a popular term in recent years to describe infinitely many possibilities brought forward by emerging technologies of virtual and augmented reality, high speed networking, and blockchain technology. You are probably familiar with the promise that you will soon teleport to any place you want –real or imaginary- with a click of a button, and meet with your friends and colleagues as if they are just across the room. The idea of metaverse comes with a lot of fantasies and hype just like these. How much of these are actually true and impactful? How should we design these digital immersive spaces and integrate them to the physical space? We study and develop immersive media technologies that tackle these questions. Putting the human factor to the center, we explore many exciting futures such as remote training and maintenance, human- AI collaborative spaces, intelligence augmentation, and more.

10:30 AM Networking Break
Digitalization in manufacturing and human health from sensors, to data, to AR/VR

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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Digital technologies are changing the world, the way we live, manufacture, and learn!

You are likely familiar with digital technologies in the home. Voice technology assistants, thermostats, light bulbs, robotic vacuum systems. These devices collect data using sensors to perform tasks and provide automated responses to changing conditions.

New types of Computation, enable new opportunities in the manufacturing and process controls industry. New types of Displays, Sensors, and Algorithms... these digital technologies serve to help automate and improve manufacturing processes and to bring better products to market faster and cheaper! Smart technologies perform similar tasks on the factory floor, monitoring processes, troubleshooting on-the-fly, monitoring the condition of the factory, worker, and supply chain.

Similarly, digital technologies are changing the way that humans monitor their personal health.

We explore concepts driving the digitalization of manufacturing and healthcare -- the convergence of automation, data analytics and machine learning from the machine to the supply chain, from the individual to the health-care system. We will explore cases that will help you innovate now and in the future.
Ending the Arms Race with Security by Construction
Adam Chlipala
Professor, MIT Electrical Engineering & Computer Science Department

Adam Chlipala has been on the faculty in computer science at MIT since 2011. He did his undergrad at Carnegie Mellon and his PhD at Berkeley, and his research focuses on clean-slate redesign of computer-systems infrastructure, typically taking advantage of machine-checked proofs of functional correctness. Much of his work uses the Coq proof assistant, about which he has written a popular book, “Certified Programming with Dependent Types.” He most enjoys finding opportunities for drastic simplification over incumbent abstractions in computer systems, and some favorite tools toward that end are object-capability systems, transactions, proof-carrying code, and high-level languages with whole-program optimizing compilers. Some projects particularly far along the real-world-adoption curve are Fiat Cryptography, for proof-producing generation of low-level cryptographic code, today run by Chrome for most HTTPS connections; and Ur/Web, a production-quality domain-specific language for Web applications.

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Most of cybersecurity at today’s typical large corporation is reactive: we accept that the computer systems we deploy will be riddled with security vulnerabilities, so we focus on rapid response as individual issues are discovered. It’s a cutthroat arms race against bad actors, who work to find new vulnerabilities as quickly as we can patch them. The venerable idea of formal verification offers a more principled solution: if we can build our systems alongside mathematical proofs of security, then we get out of the business of being surprised by specific vulnerabilities. The 21st century has actually seen very good progress on real-world realization of this idea, and I will give some examples from my work at MIT CSAIL, including our Fiat Cryptography project, which is used by all major web browsers to provide proved-correct code for cryptographic arithmetic. I will also explain the bigger-picture promise and remaining challenges of related technology.

12:20 PM
Adjournment with Bagged Lunch