MIT Industrial Liaison Program Faculty Knowledgebase Report

Future of Manufacturing @MIT

March 2, 2021 10:00 am - 12:35 pm

10:00am

Welcome and Introduction
Randall Wright
Program Director, MIT Corporate Relations

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.

10:05am

MIT’s ecosystem develops the future tools and approach for our future manufacturing needs
Brian W Anthony

Associate Director, MIT.nano
Director, Immersion Lab
Co-Director, Advanced Manufacturing and Design Program
Technology Director, MIT Center for Clinical and Translational Research

Brian W Anthony

Associate Director, MIT.nano
Director, Immersion Lab
Co-Director, Advanced Manufacturing and Design Program
Technology Director, MIT Center for Clinical and Translational Research

Dr. Anthony is an expert in designing instruments and techniques to monitor, measure, and control complex physical systems. His work integrates mechanical, electrical, and optical engineering with computer science and optimization to deliver innovative solutions across various manufacturing industries.

The core of Dr. Anthony’s research lies in *computational instrumentation*—the development of tools and methods to monitor and control intricate systems in fields like manufacturing and medical diagnostics. His work includes creating advanced measurement and instrumentation solutions for both manufacturing systems and medical imaging technologies.

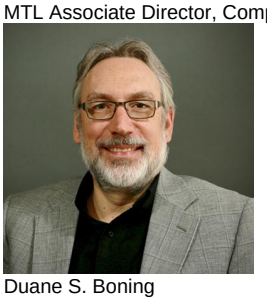
Beyond academia, Dr. Anthony brings extensive experience in technology innovation, product realization, and business entrepreneurship, particularly at the convergence of information technology and advanced manufacturing. He has over 25 years of experience driving market-driven technology solutions from concept to commercialization. His achievements include winning an Emmy Award from the Academy of Television Arts and Sciences for broadcast technical innovation.

In the classroom, Dr. Anthony focuses on teaching the modeling of large-scale systems for decision-making across various domains. He is also deeply involved in developing optimization algorithms and software for analyzing and designing these systems. His dual experience in academia and industry positions him as a leader in translating cutting-edge research into practical, impactful technologies.

View full bio
View on LinkedIn

10:20am

AI and Manufacturing
Duane S. Boning
Professor, Electrical Engineering and Computer Science
Engineering Faculty Co-Director, Leaders for Global Operations (LGO) Program
MTL Associate Director, Computation and CAD



Duane S. Boning
Professor, Electrical Engineering and Computer Science
Engineering Faculty Co-Director, Leaders for Global Operations (LGO) Program
MTL Associate Director, Computation and CAD

Dr. Duane S. Boning is the Clarence J. LeBel Professor in Electrical Engineering, and Professor of Electrical Engineering and Computer Science in the EECS Department at MIT. He is affiliated with the MIT Microsystems Technology Laboratories, and serves as MTL Associate Director for Computation and CAD. He is also the Engineering Faculty Co-Director of the MIT Leaders for Global Operations (LGO) program, serving in that role since September 2016. From 2004 to 2011, he served as Associate Head of the EECS Department at MIT. From 2011 through 2013 he was the Director/Faculty Lead of the MIT Skoltech Initiative, and from 2011 through July 2018, he was the faculty Director of the MIT/Masdar Institute Cooperative Program.

Dr. Boning received his S.B. degrees in electrical engineering and in computer science in 1984, and his S.M. and Ph.D. degrees in electrical engineering in 1986 and 1991, respectively, all from the Massachusetts Institute of Technology. He was an NSF Fellow from 1984 to 1989, and an Intel Graduate Fellow in 1990. From 1991 to 1993 he was a Member Technical Staff at the Texas Instruments Semiconductor Process and Design Center in Dallas, Texas, where he worked on semiconductor process representation, process/device simulation tool integration, and statistical modeling and optimization.

Dr. Boning is a Fellow of the IEEE, and has served as Editor in Chief for the IEEE Transactions on Semiconductor Manufacturing, and as chairman of the CFI/Technology CAD Framework Semiconductor Process Representation Working Group. He is a member of the IEEE, Electrochemical Society, Eta Kappa Nu, Tau Beta Pi, Materials Research Society, Sigma Xi, and the Association of Computing Machinery.

View full bio

10:35am

MIT Startup Exchange Lightning Talks

Meter: Next-generation volumetric imaging for manufacturing inspection

Eduardo Torrealba
Co-Founder and CEO
Meter

10:40am

Advanced processes applied to industrial needs

Katrin Ellen Daehn
Postdoctoral Associate, Department of Materials Science and Engineering

10:55am

Future skills for the manufactures and industries of tomorrow
David E. Hardt
Ralph and Eloise Cross Professor, Mechanical Engineering
Professor, Engineering Systems
David E. Hardt
Ralph and Eloise Cross Professor, Mechanical Engineering
Professor, Engineering Systems

Professor Hardt is a graduate of Lafayette College (BSME, 1972) and MIT (SM, PhD, 1978). He has been a member of the Mechanical Engineering faculty at MIT since 1979. His teaching focuses on control, dynamics and manufacturing processes. His disciplinary focus is system dynamics and control, as applied to manufacturing at both the process and system level.

Dr. Hardt has served as Director of the MIT Laboratory for Manufacturing and as Engineering Co-Director for the MIT Leaders for Manufacturing Program. He is currently leader of the Manufacturing Systems and Technology Program, part of distance teaching and research collaboration between MIT and Singapore.

Dr. Hardt also serves as the Graduate Officer for the Department of Mechanical Engineering.

View full bio

11:10am

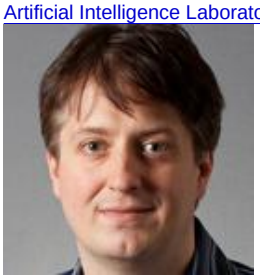
MIT Startup Exchange Lightning Talks

Eureka Robotics: Enabling High Accuracy – High Agility automation

Cuong Pham
Co-Founder
Eureka Robotics

11:15am

Processes and Artificial Intelligence in Design
Wojciech Matusik
Professor, Electrical Engineering and Computer Science , MIT Computer Science and Artificial Intelligence Laboratory



Wojciech Matusik
Professor, Electrical Engineering and Computer Science
MIT Computer Science and Artificial Intelligence Laboratory

Wojciech Matusik is a professor in MIT's Department of Electrical Engineering and Computer Science, and leads the Computational Fabrication Group at the Computer Science and Artificial Intelligence Laboratory. His research interests are in computer graphics, computational design and fabrication, computer vision, robotics and human-computer interaction. Before coming to MIT, he worked at Mitsubishi Electric Research Laboratories, Adobe Systems and Disney Research Zurich. He has received a Ruth and Joel Spira Award for Excellence in Teaching, a DARPA Young Faculty Award and a Sloan Foundation fellowship. He has been named one of the world's top 100 young innovators by MIT Technology Review and received a Significant New Researcher Award from ACM Siggraph. He earned a PhD in computer graphics at MIT.

View full bio

11:30am

Workforce of the Future
Elisabeth B. Reynolds

Professor of the Practice, MIT Department of Urban Studies and Planning
Former Executive Director, MIT Task Force on the Work of the Future and IPC
Former Special Assistant to the President for Manufacturing and Economic Development

Elisabeth B. Reynolds

Professor of the Practice, MIT Department of Urban Studies and Planning
Former Executive Director, MIT Task Force on the Work of the Future and IPC
Former Special Assistant to the President for Manufacturing and Economic Development

Elisabeth B. Reynolds, Ph.D., is Professor of the Practice at the MIT Department of Urban Studies and Planning. She was Special Assistant to President Biden for Manufacturing and Economic Development at the National Economic Council (NEC, 2021-2022) where she helped lead the Administration's work on national manufacturing strategy, supply chain resilience, and industrial strategy. Before working at the NEC, Reynolds was a Principal Research Scientist and executive director of the MIT Industrial Performance Center (2010-2021), an interdisciplinary research center focused on systems of innovation and industrial transformation. She also co-led the MIT Task Force on the Work of the Future (2018-2021) which examined the relationship between emerging technologies and work. Reynolds' work and research focus on systems of innovation and manufacturing including growing innovative firms to scale and digital technology adoption.

Reynolds has worked on rebuilding manufacturing capabilities in the U.S. in a number of capacities including advising three Massachusetts governors. She is on the board of the non-profits, Advanced Functional Fabrics of America (AFFOA) and the Advanced Regenerative Manufacturing Institute (ARMI) as well as an advisor to the Special Competitive Studies Project, a Washington think tank focused on national security and critical technologies.

11:45am

MIT Startup Exchange Lightning Talks

Realtime Robotics: Autonomous Motion Planning and Spatial Perception for Industrial Automation

Tom Munger
Director of Sales
Realtime Robotics

11:50am

Using AI and Machine learning in product and process design
Richard Braatz
Edwin R. Gilliland Professor, MIT Department of Chemical Engineering

Richard Braatz
Edwin R. Gilliland Professor
MIT Department of Chemical Engineering

Dr. Richard D. Braatz is the Edwin R. Gilliland Professor of Chemical Engineering at MIT, where he conducts research into advanced biomanufacturing systems. He is the Director of the Center on Continuous mRNA Manufacturing and leads process data analytics, mechanistic modeling, and control systems for projects on vaccine, monoclonal antibody, and gene therapy manufacturing. Dr. Braatz received an M.S. and Ph.D. from the California Institute of Technology and was the Millennium Chair and Professor at the University of Illinois at Urbana-Champaign and a Visiting Scholar at Harvard University before moving to MIT. Dr. Braatz has collaborated with more than 20 companies, including Novartis, Pfizer, Merck, Bristol-Myers Squibb, Biogen, Amgen, Takeda, and Abbott Labs. He has published over 300 papers and three books. Dr. Braatz is a Fellow of IEEE, IFAC, AIChE, and AAAS and a member of the U.S. National Academy of Engineering.

View full bio

12:05pm

Project Manus: MIT's campus makerspaces and student maker communities
Martin Culpepper
Professor, Mechanical Engineering

Martin Culpepper
Professor, Mechanical Engineering

Marty Culpepper, a Professor of Mechanical Engineering, is MIT's first Maker Czar. He leads MIT's effort to upgrade legacy spaces/equipment, introduce new technologies, create new campus makerspaces, foster maker communities, and collaborate with peer universities, alumni, government, and industry. Professor Culpepper is the recipient of an NSF Presidential Early Career Award, two R&D 100 awards, a TR100 award, and a Joel and Ruth Spira Teaching Award. His areas of expertise are in Precision Engineering, Manufacturing, and Thermo/Fluid system design.

He is a self-described gear head who loves working on his Ducati and Mustang, but not as much as riding/driving them. He loves building things at MIT and at home in his own shop. His favorite maker tools are mills and waterjets, though he's become fond of glass blowing.

View full bio

12:15pm

MIT Startup Exchange Lightning Talks

Akasha Imaging: "See it, Build it!" Perception Solutions for Manufacturing

Kartik Venkataraman
CEO
Akasha Imaging

12:20pm

Teaching Predictive Multiscale Materials Design
Markus J. Buehler

Jerry McAfee Professor of Engineering, MIT Department of Civil and Environmental Engineering and MIT Department of Mechanical Engineering

Markus J. Buehler

Jerry McAfee Professor of Engineering, MIT Department of Civil and Environmental Engineering and MIT Department of Mechanical Engineering

Dr. Markus J. Buehler, Jerry McAfee Professor of Engineering at MIT, is a leading researcher in computational modeling across domains, from materials to biology to physics. Markus' expertise bridges AI to multi scale materials modeling. He recently co-developed a method that uses artificial intelligence to generate new protein designs with specific strengths, mimicking natural materials like silk. This approach, which uses computer simulations for testing, allows the creation of proteins with desired mechanical properties, such as strength and flexibility, beyond what is naturally available. Markus earned a Ph.D. at the Max Planck Institute for Metals Research at the University of Stuttgart and held post-doctoral appointments at both Caltech and MIT. Buehler has received many awards, including the Feynman Prize, the Drucker Medal, and the Washington Award. He is a member of the National Academy of Engineering.

View full bio

12:30pm

MIT Professional Education
Myriam Joseph

Manager, Business Development and Marketing, MIT Professional Education

12:35pm

Closing Remarks