

# 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 Anthony

Faculty Lead, Industry Immersion Program in Mechanical Engineering

Co-Director, MIT Clinical Research Center

Associate Director, [MIT.nano](#)



Brian Anthony

Faculty Lead, Industry Immersion Program in Mechanical Engineering

Co-Director, MIT Clinical Research Center

Associate Director

[MIT.nano](#)

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.

[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

Former Special Assistant to the President for Manufacturing and Economic Development

Former Executive Director, MIT Task Force on the Work of the Future and IPC

Lecturer, MIT Department of Urban Studies and Planning

Partner, [Unless](#)



Elisabeth B. Reynolds

Former Special Assistant to the President for Manufacturing and Economic Development

Former Executive Director, MIT Task Force on the Work of the Future and IPC

Lecturer, MIT Department of Urban Studies and Planning

Partner

[Unless](#)

Elisabeth Reynolds is a Partner in Unless, an investment firm focused on industrial transformation, and a Lecturer in the MIT Department of Urban Studies and Planning. She was Special Assistant to the President for Manufacturing and Economic Development at the National Economic Council until October, 2022. During her time at the White House, she helped lead the Administration's work on supply chain challenges, national manufacturing strategy, regional economic development and the broader industrial policy agenda. Before working in the Biden Administration, Reynolds was the executive director of the MIT Industrial Performance Center and co-led, with Professors David Autor and David Mindell, the MIT Task Force on the Work of the Future. In both roles, she worked on manufacturing-related issues including growing innovative firms to scale and technology adoption by small and large firms.

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 materials science and the mechanics of natural and biological protein materials. Markus' expertise spans large-scale atomistic modeling, the interaction of chemistry and mechanics, and the development of multiscale simulation tools. 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.

[View full bio](#)

12:30pm

MIT Professional Education  
Myriam Joseph

Manager, Business Development and Marketing, [MIT Professional Education](#)

12:35pm

Closing Remarks