

MIT Industrial Liaison Program Faculty Knowledgebase Report

2017 MIT Europe Conference in Vienna

March 29, 2017 - March 30, 2017

Day One

8:00am

Registration

9:00am

Welcome and Introduction
Harald Mahrer
President, [Austrian Federal Economic Chamber](#)



Harald Mahrer
President
[Austrian Federal Economic Chamber](#)

Harald Mahrer (born 1973) is President of the Austrian Federal Economic Chamber and was appointed President of the Austrian National Bank (Oesterreichische Nationalbank) in September 2018. He was Austrian Federal Minister for Education, Science and Business until December 2017. Prior to that, he was State Secretary in the same department from September 1st 2014. As graduate of the Vienna University of Economics and Business, he gained political experience as chairperson of the Austrian National Union of Students and subsequently completed a Doctorate in Social and Economic Science. After several years as a research assistant focussing on information systems and digital businesses he founded Austria's first incubator and his first company, legend consulting. He then took over as managing partner of Austria's leading PR & strategic communications agency, Pleon Publico. For more than 15 years, he has been an active business angel and promoted startups in different industries. From 2011 to 2015, he was also President of the Julius Raab Foundation – one of Austria's leading think tanks. He founded the Austrian Association of Philanthropic Foundations, worked intensively in the area of disruptive innovation, corporate social responsibility, social entrepreneurship, and individual freedom and establishing new strategic priorities for the development of Austria and Europe.

Christoph Leitl
President, [Austrian Federal Economic Chamber](#)
Christoph Leitl
President
[Austrian Federal Economic Chamber](#)

Personal Details

Born 29 March 1949 in Linz, Austria
Married, two children, two grandchildren

Education

1967 Matura, High School, Linz Fadingerstrasse
1971 Degree in Economics, Johannes Kepler University Linz
1973 PhD, Economic and Social Sciences, Johannes Kepler University Linz
1974 Hernstein Management Academy
1975 Internships at Zürcher Ziegeleien and Wienerberger Baustoffindustrie (brickworks)

Professional Background

1977 - 1990 Managing Director, family company Bauhütte Leitl-Werke (brickworks)
Vice President, Austrian Association of Brick Manufacturers
1986 Established Baustoff Interhandel GmbH
Supervisory Board Member, Oberbank AG, Isoroc Holding AG,
MTB Beteiligungen AG, Bauhütte Leitl-Werke

Political Career

1966 Founding Chairman, European Youth (Europajugend), Linz
1976 Chairman, European Federal Movement, Upper Austrian Region
Vice Chairman, European Federal Movement of Austria
1982 - 1990 Chairman, 'Young Industry Austria'
1985 - 1990 Elected Representative, Upper Austrian Regional Parliament
1990 - 2000 Member of the Government of the Federal State of Upper Austria with portfolio for economy, tourism, technology, energy, vocational training, regional planning and Europe.
1995 - 2000 Deputy Governor and Treasurer of the Federal State of Upper Austria
1995 - 2000 Member, Committee of the Regions (CoR), SME Division
2000 - Member, Executive Committee, Austrian People's Party (ÖVP)

Austrian SME Union (ÖVP Wirtschaftsbund)

1999 - Chairman, Wirtschaftsbund — Upper Austrian Branch
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2005 - 2009 President of the European SME Union
Austrian Federal Economic Chamber
1980 - 1990 Member, Executive Committee, Austrian Association for Building Materials and the Ceramics Industry
2000 - President, Austrian Federal Economic Chamber
2004 - Chairman, Social Insurance Institution for Trade & Industry

9:30am

Can We Be Everywhere, All the Time, with Small Autonomous Satellites?

Kerri Cahoy

Associate Professor of Aeronautics and Astronautics

Co-Director, Small Satellite Center

Bisplinghoff Faculty Fellow



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Associate Professor of Aeronautics and Astronautics

Co-Director, Small Satellite Center

Bisplinghoff Faculty Fellow

Kerri Cahoy is an Associate Professor of AeroAstro at MIT. Cahoy received a B.S. in electrical engineering from Cornell University, Ithaca, NY, USA, in 2000, and M.S. and Ph.D. degrees in electrical engineering from Stanford University, Stanford, CA, USA, in 2002 and 2008, respectively. Cahoy currently is the Co-Director of the Small Satellite Center, and leads the Space Telecommunications, Astronomy, and Radiation (STAR) Laboratory. Cahoy's research focuses include nanosatellite atmospheric sensing, optical communications, and exoplanet technology demonstration missions.

[View full bio](#)

What if you could view and connect with any place on Earth at any time you wanted without any restrictions? The small satellite revolution is making rapid global access a reality. It all started with the idea that you could put a tiny "stowaway" CubeSat in a spring-loaded box on a rocket, keeping it safely contained on an otherwise unaffordable ride to space. The resulting paradigm shift in the satellite industry has slashed the cost of access to space over the past decade, enabled rapid innovation and miniaturization of space technology, and upended an industry once legendary for its reliance on heritage, risk-aversion, and glacial pace of technology development. Constellations of hundreds of small satellites are soaring above us, replenished regularly with even more advanced units. We are quickly working to teach them to communicate with each other, self-organize, and efficiently manage their limited onboard resources. Trailblazing efforts to automate spacecraft operations and data recovery, network with crosslinks between spacecraft, move decision-making processes from humans on the ground to intelligent onboard algorithms, and reduce the cost of ground stations are catapulting us toward real-time global access. What if you could monitor your crop growth and harvest times, optimize product transportation, analyze and adapt in real time to customer demands and response to incentives, gather and make decisions on embedded sensor data over a wide region, keep tabs on the competition, and securely exchange financial and logistical information? Imagine the commercial and personal benefits, as well as risks, of having the power to inexpensively be everywhere, all the time.

10:15am

Innovation & Failure. The Basis for Building the Future

Bernd Ebersberger

Professor for Innovation Management & Economics, [MCI Management Center Innsbruck](#)

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Professor for Innovation Management & Economics

[MCI Management Center Innsbruck](#)

Currently Prof. Ebersberger holds a professorship for economics and management of innovation with the Management Center Innsbruck MCI in Innsbruck, Austria. Additionally, he held an interim professorship for economics with the department of economics at the Johannes Kepler University in Linz from Oct 2014-Feb 2015. His positions involve teaching, curriculum development, coordination of R&D activities and research. Additionally, since September 2013 he has been research fellow with the Berlin University of Technology, Faculty of Economics and Management — Innovation Economics. His research focusses on the quantitative analysis of international, interactive, and open innovation strategies with a strong focus on supporting strategic decisions of corporate and policy decision makers.

11:00am

Networking Break

11:30am

Additive Manufacturing Across Scales

John Hart

Department Head and Professor, [MIT Department of Mechanical Engineering](#)



John Hart

Department Head and Professor

[MIT Department of Mechanical Engineering](#)

[John Hart](#) is Professor of Mechanical Engineering and Head of the Department of Mechanical Engineering at MIT. He is also the Director of the MIT Laboratory for Manufacturing and Productivity and the [Center for Advanced Production Technologies](#). John's [research group](#) focuses on the science and technology of production, including work on additive manufacturing, materials processing, automation, and computational methods. John has been recognized by awards from the United States NSF, ONR, AFOSR, DARPA, SME, and ASME, along with two R&D 100 awards. He has also received the MIT Ruth and Joel Spira Award for Distinguished Teaching in Mechanical Engineering and the MIT Keenan Award for Innovation in Undergraduate Education, for his leadership in undergraduate manufacturing education using new pedagogical models and digital resources. John is a co-founder of [Desktop Metal](#) and [VulcanForms](#), and a Board Member of [Carpenter Technology Corporation](#).

[View full bio](#)

Advances in automation, computation, and global connectivity are enabling us to scale-up new products more quickly, and to more rapidly commercialize new materials and processes. In the coming years, continued population growth and resource pressures will drive compound interest in additive manufacturing for local and customized production, and printed electronics for ubiquitous sensing. These dynamics present tremendous opportunities for innovation which span from academia to the marketplace and demand new modes of learning that combine digital media with hands-on experience. Motivated by this vision I will describe initiatives from my group at MIT, including: a high-speed flexographic printing process for ultrathin electronic materials; a high-speed desktop 3D printer that can produce a handheld object in 5-10 minutes; a toolkit for modular microfluidic devices; quantitative models for the assessment and deployment of additive manufacturing; and the first massive open online course (MOOC) on manufacturing processes (2.008x).

12:15pm

What If Your Smart Phone Didn't Need The Cloud?

Vivienne Sze

Associate Professor of Electrical Engineering and Computer Science, [MIT Department of Electrical Engineering and Computer Science](#)



Vivienne Sze

Associate Professor of Electrical Engineering and Computer Science

[MIT Department of Electrical Engineering and Computer Science](#)

Vivienne Sze is an Associate Professor in the Electrical Engineering and Computer Science Department at MIT. She works on computing systems that enable energy-efficient machine learning, computer vision, and video compression/processing for a wide range of applications, including autonomous navigation, digital health, and the internet of things. She is widely recognized for her leading work in these areas and has received many awards, including the AFOSR and DARPA Young Faculty Award, the Edgerton Faculty Award, several faculty awards from Google, Facebook, and Qualcomm, the 2018 Symposium on VLSI Circuits Best Student Paper Award, the 2017 CICC Outstanding Invited Paper Award, and the 2016 IEEE Micro Top Picks Award. As a member of the JCT-VC team, she received the Primetime Engineering Emmy Award for the development of the HEVC video compression standard. She is a co-editor of High Efficiency Video Coding (HEVC): Algorithms and Architectures (Springer, 2014) and co-author of Efficient Processing of Deep Neural Networks (Synthesis Lectures on Computer Architecture, Morgan Claypool, 2020). For more information about Prof. Sze's research, please visit <http://sze.mit.edu>.

[View full bio](#)

What if you could bring the functionality of a neural network running on a high power GPU to your cell phone or embedded devices, and you could still operate even if you didn't have a Wi-Fi connection? What if vehicles, appliances, civil-engineering structures, manufacturing equipment, and even livestock would have sensors that report information directly to networked servers aiding with maintenance and task coordination? And, what if with powerful artificial-intelligence algorithms on board, networked devices could make important decisions locally, entrusting only their conclusions, rather than raw personal data, to the Internet? MIT researchers have created a new chip designed specifically to implement neural networks that is 10 times more efficient than a mobile GPU, so it can enable mobile devices to run powerful artificial-intelligence algorithms locally, rather than uploading data to the Internet for processing. The new chip, dubbed "Eyeriss," is a potentially game-changing advance that stands to usher in the age of the "Internet of Things" and a revolution to truly autonomous battery-powered robots.

1:00pm

Lunch

2:30pm

Engineering Reverse Innovations: Using Emerging Markets Constraints to Drive the Creation of High-Performance, Low-Cost, Global Technologies
Amos Winter

Ratan N. Tata Career Development Assistant Professor
Director, Global Engineering and Research (GEAR) Laboratory
Department of Mechanical Engineering, MIT

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Department of Mechanical Engineering, MIT

Amos Winter is the Ratan N. Tata Career Development Assistant Professor of Mechanical Engineering at MIT. His research focuses on machine and product design for developing and emerging markets. Prof. Winter earned a BS from Tufts University (2003) and an MS (2005) and PhD (2011) from MIT, all in mechanical engineering.

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This presentation will cover principles of engineering reverse innovations, which entails leveraging the constraints of emerging markets to design high-performance, low-cost solutions that can impact poor and rich countries alike. For decades, multinational corporations have tried to sell their wealthy market technologies in poor countries. This has often resulted in failure, by either engaging only a small, wealthy subset of a poor market, or by removing so many features of a technology to reduce its cost that the resulting product loses its core functionality or desirability. To successfully engage emerging markets, companies must read their unique socioeconomic and technical landscape to design new products that offer the same core functionality as their wealthy market counterparts, but at a fraction of the price. If done successfully, this process will lead to product families that provide affordable solutions in poor countries and disruptive technologies in wealthy markets. This talk will review a number of examples of how this process was successfully executed by corporations, and how engineering reverse innovations led to disruptive insights in Prof. Winter's research on drip irrigation and water purification.

3:15pm

Digital Twins: Do you have ghosts in your portfolio?
Donna Rhodes

Principal Research Scientist, Sociotechnical Systems Research Center
Director, Systems Engineering Advancement Research Initiative
MIT Sociotechnical Systems Research Center (SSRC)

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Dr. Donna H. Rhodes is a principal research scientist in the Sociotechnical Systems Research Center (SSRC) within IDSS. She is the director of the MIT Systems Engineering Advancement Initiative (SEArI). Prior to joining MIT in 2003, Dr. Rhodes held senior management positions in systems engineering and enterprise practices at IBM Federal Systems, Lockheed Martin, and Lucent Technologies.

Dr. Rhodes conducts research on human-model interaction, decision-making in model-centric environments, innovative approaches and methods for architecting and design of complex systems and enterprises, including predictive indicators of performance, empirical studies of engineering systems thinking and practice, and designing for uncertain futures. Her research is driven by the desire to more predictively architect socio-technical systems to address significant societal needs in a dynamic world. She is involved in research across multiple sectors including defense, aerospace, transportation, energy and commercial products.

Dr. Rhodes received her Ph.D. in Systems Science from the T.J. Watson School of Engineering at Binghamton University. She serves on industry and government advisory boards focused on advancement of systems practice and education, as well as on study panels for issues of national and international importance. She engages with government and industry leaders through collaborative research, consulting engagements and executive courses. She has been very involved in the evolution of the systems engineering field, including development of several university graduate programs. Dr. Rhodes is a past president and fellow of the International Council on Systems Engineering, and a recipient of INCOSE's Founders Award and several distinguished service awards. She serves on the INCOSE Systems Engineering journal editorial board.

[View full bio](#)

Envision a future where every product has a digital equivalent. This is already a reality for some products and systems, such as jet aircraft, wind turbines, and commercial ships. This digital replica, or Digital Twin, radically changes how products are designed, maintained and operated. Rather than using traditional documents and drawings, a product emerges as a result of weaving the digital thread of models, data and knowledge. Once operational, any upgrades or maintenance activities are conducted first in the digital twin, tested and validated, and then implemented in the product. And with the availability of big data and the science of visual analytics, real-time analysis of behavior can be used to make operational decisions regarding the product. Under this new paradigm, the digital twin possesses all of the encoded knowledge concerning the product from its inception to current use—and this inverts the relative value of model and product. A competitor can re-engineer a product to some degree, but possessing a digital twin allows it to be replicated exactly. The most valuable IP, then, becomes the digital twin rather than the products themselves. This brings into question whether the digital model exists independently of the physical product, as a “ghost in the machine”, or that model and product co-exist, essentially as conjoined twins. Many benefits arise from this coupling, including efficiencies and effectiveness. The promise of the digital twin means that competitive advantage will go to those who eliminate the ghosts in the portfolio, by treating assets as the inseparable coupling of the product with its digital twin.

4:00pm

Networking Break

4:30pm

SCARLETRED@VISION -Enabling Objective Skin Drug Research and Augmented
Dermatology
Harald Schnidar
CEO & Founder, [SCARLETRED](#)

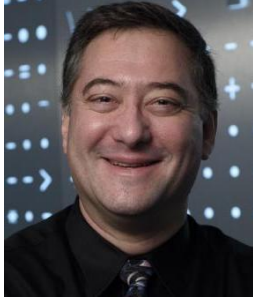


Harald Schnidar
CEO & Founder
[SCARLETRED](#)

Harald started his career in academic skin cancer research. He switched later into biopharma industry, where initially as a project head he managed the preclinical and clinical development of a topical skin drug. During that time he invented also SCARLETRED's main technologies and attracted the companies first investments.

5:15pm

Wire Less Sensors
Steven Leeb
Professor of Mechanical and Electrical Engineering and Computer Science



Steven Leeb
Professor of Mechanical and Electrical Engineering and Computer Science

Steven B. Leeb received his doctoral degree from the Massachusetts Institute of Technology in 1993. He has served as a commissioned officer in the USAF reserves, and he has been a member of the M.I.T. faculty in the Department of Electrical Engineering and Computer Science since 1993. He also holds a joint appointment in MIT's Department of Mechanical Engineering. He currently serves as MacVicar Fellow and Professor of Electrical Engineering and Computer Science in the Laboratory for Electromagnetic and Electronic Systems. In his capacity as a Professor at M.I.T, he is concerned with the design, development, and maintenance processes for all kinds of machinery with electrical actuators, sensors, or power electronic drives. A major thrust in his current research is the development of power electronic drives and supplies for servomechanical and industrial applications, including medical drug delivery devices, battery chargers, motion controllers and fluorescent lamp ballasts. Another research interest related to power quality issues and on-line machine diagnostics involves the development of a Nonintrusive Load Monitor (NILM). The NILM determines the operating schedule of the major electrical loads in a commercial or industrial building from measurements made solely at the electrical utility service entry. He is currently working to develop the NILM into a virtually sensorless platform to determine power quality, perform critical load diagnostics, and monitor manufacturing processes and actuator performance on ships, aircraft, automobiles, and satellites. He is the author or co-author of over 200 publications and 20 US Patents in the fields of electromechanics and power electronics.

[View full bio](#)

When did it become normal for unprecedented quantities of data about you to automatically become the property of others? Why have we returned to a "server" model of information exchange for so many of our data services, reminiscent in ways of the early days of mainframe computing, where "someone else" is responsible for data security and service availability? Much of the current thinking for making systems "smart" about their operation and energy consumption recapitulates old ideas with new technological varnish. Most approaches involve a *decentralized* network of sensors, and an old dilemma is becoming increasingly apparent. While networking provides remote access to information and control inputs, gathering useful information may require the installation of an expensive and intrusive array of sensors. And delivering actionable information economically to the right eyes while preventing revelations to the wrong eyes has become an endemic problem. The laboratory of Professor Steven Leeb is considering approaches for developing nonintrusive sensors that are relatively easy to install. He will explore approaches for deploying and coordinating the operation of new sensors to secure data, minimize the need for communication bandwidth, and ensure the presentation of actionable information for enhancing system operation. The approaches are provocative and suggest alternative approaches for commercial products and services.

6:00pm

Move to Reception and Dinner via Charter Bus

6:30pm

Networking Reception and Dinner at Palais Niederösterreich (Herrengasse 13, A-1010 Vienna, Austria)
Christoph Leitl
President, [Austrian Federal Economic Chamber](#)
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President
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Personal Details

Born 29 March 1949 in Linz, Austria
Married, two children, two grandchildren

Education

1967 Matura, High School, Linz Fadingerstrasse
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1985 - 1990 Elected Representative, Upper Austrian Regional Parliament
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2000 - President, Austrian Federal Economic Chamber
2004 - Chairman, Social Insurance Institution for Trade & Industry
2001 - 2005 President, Eurochambres (Association of European Chambers of Commerce and Industry)
2006 - Honorary President of Eurochambres
2006 - Honorary President, Global Chamber Platform

Honorary Posts

- President, Austrian Institute of Economic Research (WIFO)
- President, OIER (Organisation for International Economic Relations) with consultative status with the UN Economic & Social Council and the Council of Europe
- President, Raiffeisen Economic Forum, Upper Austria
- Member of the Foundation Board, Julius Raab Foundation
- Member, National Olympic Committee
- Vice President, Austrian Sports Aid Foundation (Österreichische Sporthilfe)
- Member of the Board, Austrian Academy of Sciences
- Co-President, AlpEuregio.BusinessClub
- Member of the Honorary Board, Energy Globe Foundation
- Member of the Foundation Committee, Foundation PRO ORIENTE
- President, International Forum for Culture and Economy, Linz (IKW)

Academic Posts

- Visiting Professor at the Vienna University of Economics & Business Administration (International Trade Department)
- Princeton University
- Fudan University, Shanghai
- University of Cape Town
- T.C. Istanbul Commerce University and Marmara University
- MIT, Massachusetts Institute of Technology
- Harvard University
- University of Lagos
- Stanford University

Awards

- Honorary Senator, Johannes Kepler University, Linz
- Honorary Senator, Vienna University of Economics & Business Administration
- Declaration of Honour of the City of New York
- Upper Austrian Grand Decoration of Honour in Gold
- Recipient of the Honorary Ring of the provincial hospital of Linz

Day Two

8:30am

Registration

9:00am

Opening Remarks
Walter Koren
Director General
AUSSENWIRTSCHAFT AUSTRIA, [Austrian Federal Economic Chamber](#)
Walter Koren
Director General
AUSSENWIRTSCHAFT AUSTRIA
[Austrian Federal Economic Chamber](#)

2002 – Director General, Austrian Federal Economic Chamber – Advantage Austria
1997 - 2002 Trade Commissioner at the Austrian Trade Commission in Mexico Area of Jurisdiction: Mexico, Central America, Panama, Cuba
1994 - 1996 Managing Director, Office of the President, Austrian Federal Economic Chamber
1992 - 1994 Special Assistant to Leopold Maderthaner, President of the Austrian Federal Economic Chamber
1988 - 1992 Deputy Trade Commissioner at the Austrian Trade Commission in Tokyo
1988 Interim Commercial Attaché at the Austrian Trade Commission in Seoul
1985 - 1988 Commercial Attaché at the Austrian Trade Commission in Tehran
1982 - 1985 Commercial Attaché at the Austrian Trade Commission in Guatemala, Area of Jurisdiction: Central America
1981 Joined the Austrian Federal Economic Chamber (WKÖ) Advantage Austria, Austria's official Foreign Trade Promotion Organisation
1977 - 1982 Studies of law at the Universities of Vienna, Graz and Salzburg Degree: Doctor of Law, Ph.D.
1974 - 1980 Studies of Commerce at the University of Graz and at the Vienna University of Economics and Business Administration
Degree: Masters in Economics, MSc.

Karl Koster
Executive Director, MIT Corporate Relations
Director, Alliance Management
MIT Office of Strategic Alliances & Technology Transfer



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Executive Director, MIT Corporate Relations
Director, Alliance Management
MIT Office of Strategic Alliances & Technology Transfer

Karl Koster is the Executive Director of MIT Corporate Relations. MIT Corporate Relations includes the MIT Industrial Liaison Program and MIT Startup Exchange.

In that capacity, Koster and his staff work with the leadership of MIT and senior corporate executives to design and implement strategies for fostering corporate partnerships with the Institute. Koster and his team have also worked to identify and design a number of major international programs for MIT, which have been characterized by the establishment of strong, programmatic linkages among universities, industry, and governments. Most recently these efforts have been extended to engage the surrounding innovation ecosystem, including its vibrant startup and small company community, into MIT's global corporate and university networks.

Koster is also the Director of Alliance Management in the Office of Strategic Alliances and Technology Transfer (OSATT). OSATT was launched in Fall 2019 as part of a plan to reinvent MIT's research administration infrastructure. OSATT develops agreements that facilitate MIT projects, programs and consortia with industrial, nonprofit, and international sponsors, partners and collaborators.

He is past chairman of the University-Industry Demonstration Partnership (UIDP), an organization that seeks to enhance the value of collaborative partnerships between universities and corporations.

He graduated from Brown University with a BA in geology and economics, and received an MS from MIT Sloan School of Management. Prior to returning to MIT, Koster worked as a management consultant in Europe, Latin America, and the United States on projects for private and public sector organizations.

9:15am

Let's Get Personal: Millennials and Custom Consumer Experiences

Federico Casalegno

Executive Vice President at Samsung Electronics

Former MIT Associate Professor of the Practice



Federico Casalegno

Executive Vice President at Samsung Electronics

Former MIT Associate Professor of the Practice

Federico is Executive Vice President of Design at Samsung Electronics. He heads the Samsung Design Innovation Center (SDIC) in San Francisco CA Next-Generation Experience Planning Team in Seoul and Experience and Insights teams within Samsung Research. Federico leads global multidisciplinary teams in the USA Asia and Europe to design new generation of experiences and envision future products. As a designer innovator and social scientist he focuses on the impact of networked digital technologies on human behavior and society and designs products services and meaningful experiences to improve people's lives. Before joining Samsung Federico was an Associate Professor of the Practice at the Massachusetts Institute of Technology teaching at MIT and MIT Media Lab. He also founded and directed the MIT Design Lab and the MIT Mobile Experience Lab. He previously worked at Motorola Inc. and Philips Design envisioning and creating innovative product experiences. He has been awarded honorary professorships at the Glasgow School of Art University of Glasgow and the Jiangnan University School of Design in Wuxi China. He has published several scientific papers in peer-reviewed journals along with books and articles and he has won several awards for his design and innovation work. Federico earned the PhD degree in Sociology of Culture and Communication from the Sorbonne University Paris V with a focus on mediated communication and social interaction in networked communities and smart cities.

Empowered by ubiquitous information technology, the generation that has come of age in the digital era has learned a very different consumer experience than their parents. From media and financial services to hospitality and transportation, Millennials expect flexibility and responsiveness across sectors to customize their transactions to fit their needs as individuals. Those expectations may only grow as the exchange of data between consumers and sellers continues expanding, fostering even greater personalization through the emergence of bioproducts.

10:00am

Cities That Learn About Us
Carlo Ratti
Director, [MIT Senseable City Lab](#)



Carlo Ratti
Director
[MIT Senseable City Lab](#)

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](#)

The increasing deployment of sensors and hand-held electronics in recent years is allowing a new approach to the study of the built environment. The way we describe and understand cities is being radically transformed - alongside the tools we use to design them and impact on their physical structure. The contribution from Prof. Carlo Ratti will address these issues from a critical point of view through projects by the Senseable City Laboratory, a research initiative at the Massachusetts Institute of Technology, and the design office Carlo Ratti Associati.

10:45am

Networking Break

11:15am

TRANSFORM: Beyond Pixels, Towards Radical Atoms
Hiroshi Ishii
Jerome B. Wiesner Professor of Media Arts and Sciences
Head of Tangible Media Group
Associate Director, [MIT Media Lab](#)



Hiroshi Ishii
Jerome B. Wiesner Professor of Media Arts and Sciences
Head of Tangible Media Group
Associate Director
[MIT Media Lab](#)

[Hiroshi Ishii](#) is the Jerome B. Wiesner Professor of Media Arts and Sciences at the MIT Media Lab. He was named Media Lab Associate Director in May 2008. He is the director of the [Tangible Media Group](#), which he founded in 1995 to pursue new visions in Human-Computer Interaction (HCI): "[Tangible Bits](#)" and "[Radical Atoms](#)." Ishii and his team have presented their research at a variety of scientific, design, and artistic venues (including ACM SIGCHI, SIGGRAPH, Cooper Hewitt Design Museum, Milan Design Week, Cannes Lions Festival, Aspen Ideas Festival, Industrial Design Society of America, AIGA, Ars Electronica, Centre Pompidou, Victoria and Albert Museum and NTT ICC) **emphasizing that the development of a vision requires the rigors of both scientific and artistic review**. In 2006 Ishii was elected to the CHI Academy by ACM SIGCHI, and received the [SIGCHI Lifetime Research Award in 2019](#).

Prior to joining the MIT Media Lab, from 1988-1994, Ishii led the CSCW research group at NTT Human Interface Laboratories Japan, where he and his team invented TeamWorkStation and ClearBoard.

Whereas today's mainstream Human Computer Interaction (HCI) research addresses functional concerns – the needs of users, practical applications, and usability evaluation – [Tangible Bits and Radical Atoms](#) are driven by vision. This is because today's technologies will become obsolete in one year, and today's applications will be replaced in 10 years, but true visions – we believe – can last longer than 100 years.

Tangible Bits seeks to realize seamless interfaces between humans, digital information, and the physical environment by giving physical form to digital information, making bits directly manipulable and perceptible. Our goal is to invent new design media for artistic expression as well as for scientific analysis, taking advantage of the richness of human senses and skills – as developed through our lifetime of interaction with the physical world.

Radical Atoms takes a leap beyond Tangible Bits by assuming a hypothetical generation of materials that can change form and properties dynamically, becoming as reconfigurable as pixels on a screen. Radical Atoms is the future material that can transform its' shape, conform to constraints, and inform the users of their affordances. Radical Atoms is a vision for the future of human-material interaction, in which all digital information has a physical manifestation so that we can interact directly with it.

I will present the trajectory of our [vision-driven design research](#) from Tangible Bits towards Radical Atoms, and a variety of interaction design projects that were presented and exhibited in Arts, Design, and Science communities.

Noon

Autonomy in the Open - [Click Here to Download](#)
Michael Benjamin
Research Scientist, Mechanical Engineering
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Research Scientist, Mechanical Engineering

Michael Benjamin is a research scientist in the Center for Ocean Engineering, a part of the Department of Mechanical Engineering at MIT. He is also a member of the Laboratory for Autonomous Marine Sensing Systems and the Marine Robotics Group in the Computer Science and Artificial Intelligence Laboratory. Until December 2010, he was with the Naval Undersea Warfare Center in Newport Rhode Island.

Benjamin's work is focussed on algorithms and software for autonomous marine vehicles, some of which are shown to the right. In 2007 he founded moos-ivp.org at MIT, hosting the MOOS-IvP open source project in marine autonomy software. A key part of this project is the use of a behavior based architecture for autonomous decision-making using multi-objective optimization with interval programming for reconciling competing behaviors. This work is driven by the belief that multi-objective optimization is a fundamental component of robust decision-making. Formulating a decision-making problem into distinct specialized components also promotes the development of an autonomous system with contributions from varied developers and organizations. It also allows for a system comprised of public open source general-purpose code alongside non-public specialized code.

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A "Next Generation" of autonomous system - cheaper robots you program from downloads on the web that also have the capacity to be quickly augmented by their owners - will soon be everywhere. But, the concepts behind these "Next Generation" autonomous robots are coming from a place "out there" that for many is unexpected - marine robotics. Why? Because unlike aerial drones and land-based robots, marine robots must navigate complex environments that are beyond sensing and intervention by humans. Fifteen years ago marine robotic systems were still a relative novelty. Software options were limited to what came with the vehicle and running the same software on different vehicle types was unheard of. But, today, echoing the rapid evolution from mainframe to personal computing in the eighties, marine robots have become smaller, cheaper, more powerful, more ubiquitous, and more easily networked. In this talk we discuss an open source marine autonomy project launched at MIT in 2006, moos-ivp.org [[moos-ivp.org](#)], with the goal of empowering marine robot owners with the ability to explore the ocean on their own terms - and the implications of this open source project for all forms of autonomy.

12:45pm

Wrap Up & Adjournment
Michael Friedl
Austrian Trade Commissioner for the US, [ADVANTAGE AUSTRIA](#)
Michael Friedl
Austrian Trade Commissioner for the US
[ADVANTAGE AUSTRIA](#)

Michael Friedl has been the Austrian Trade Commissioner for the US since September 2014. In this function he heads the office of ADVANTAGE AUSTRIA for the US, which is based in New York. Prior to this posting, he was Deputy Trade Commissioner in Johannesburg and Abu Dhabi. Later he headed the offices in Washington DC and Tehran before being in charge of HR and personnel development at the ADVANTAGE AUSTRIA head office in Vienna. Michael holds an MBA from the Vienna University of Economics and a Master degree in International Public Policy from Johns Hopkins, SAIS in Washington DC. In his spare time Michael loves to cook, run and read books on architecture.

ADVANTAGE AUSTRIA is Austria's official trade promotion authority. Outside of Austria, it operates with more than 110 offices in over 70 countries. ADVANTAGE AUSTRIA provides a broad range of intelligence and business development services for Austrian companies and their international business partners. Its goal is to generate more international business opportunities by promoting the products and services of Austrian businesses around the world, by helping companies and organizations outside of Austria to build strong relationships with Austrian companies and by promoting Austria as a place to invest in. The offices of ADVANTAGE AUSTRIA in the U.S. (New York, Chicago, Los Angeles, Washington D.C. and Atlanta) support Austrian companies in doing business in the U.S. For U.S. partners, ADVANTAGE AUSTRIA provides the local link to Austrian companies, products and services and Austria as an investment location in the heart of Europe. As official trade representations, ADVANTAGE AUSTRIA offices provide a reliable source of information and help to reduce time, cost and risk of doing business with Austrian companies (see [www.advantageaustria.org/us](#)).