MIT Industrial Liaison Program Faculty Knowledgebase Report

2017 MIT Information and Communication Technologies Conference

April 12, 2017 - April 13, 2017

Day One

8:00am	Registration & Continental Breakfast
9:00am	Welcome and Introduction Karl Koster Executive Director, MIT Corporate Relations Director, Alliance Management MIT Office of Strategic Alliances & Technology Transfer

Karl Koster
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

Cyber Security of IoT
John Williams
Professor of Information Engineering, MIT Department of Civil and Environmental Engineering

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, Kajima 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.

Dr. Williams affiliations include:

- MIT Department of Civil and Environmental Engineering
- MIT Center for Computational Science and Engineering (CCSE)
- MIT Geospatial Data Center (GDC)
- MIT Auto-ID Laboratory
- MIT Center for Complex Engineering Systems (CCES)
- MIT Consortium for Improving Critical Infrastructure Cybersecurity (IC3)

View full bio

How can you protect yourself against threats you don't know about? What measures can you take to assess your risk before a breach? How can you protect yourself against an attack that originates in an innocuous object like a toaster? Professor John Williams will discuss how organizations can prepare themselves to defend against cybersecurity threats to protect their enterprises. He will discussrisk a modeling and data analytics tool (Saffron), that helps to identify risk tolerance and strategies for assessing, responding to, and monitoring cyber security risks.

9:55am

Some Simple Economics of the Blockchain
Christian Catalini

Fred Kayne (1960) Career Development Professor of Entrepreneurship
Assistant Professor of Technological Innovation, Entrepreneurship, and Strategic Management
MIT Sloan School of Management

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Christian's main areas of interest are the economics of entrepreneurship, innovation, and scientific productivity.

His research focuses on crowdfunding and online entrepreneurial finance, blockchain technology, digital currencies, how proximity affects the recombination of ideas, the adoption of technology standards, science and technology interactions.

Christian is one of the principal investigators of the MIT Digital Currencies Research Study, which gave access to all MIT undergraduate students to a digital currency in the Fall of 2014. He is also involved in the MIT Initiative on the Digital Economy and the recently launched Digital Currency Initiative.

He holds a PhD from the University of Toronto (Rotman School of Management), and MSc (summa cum laude) in Economics and Management of New Technologies from Bocconi University, Milan. In 2009-10 he was a visiting student at Harvard University.

His work has been featured in Nature, the New York Times, the Wall Street Journal, the Economist, WIRED, NPR, Forbes, Bloomberg, the Chicago Tribute, the Boston Globe, and VICE news among others.

He has presented his research at a variety of institutions including Harvard University, MIT, Yale University, London Business School, New York University, UC Berkeley, the Federal Reserve Bank, the US Treasury, the World Bank, and the White House OSTP.

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Blockchain technology and cryptocurrencies are poised to influence the rate and direction of innovation. By allowing firms to perform costless verification, blockchain lowers the cost of auditing transaction information and allows new marketplaces to emerge. Adding a distributed ledger to the mix allows marketplaces to be bootstrapped without the need for traditional intermediaries. How will this technology challenge existing revenue models? What impact will it have on the regulation, auction, and provision of public goods, software, identity, and reputation systems? With research grounded in economic theory, Catalini will discuss how blockchain is poised to upset the global market.

10:35am

MIT Professional Education
Bhaskar Pant

Executive Director
MIT Professional Education

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Executive Director
MIT Professional Education

Bhaskar Pant is the Executive Director of MIT Professional Education, the arm of MIT that provides technical professionals a gateway to MIT expertise via education courses and programs designed for them. More than 1,500 professionals from over sixty countries arrive on the MIT campus in Cambridge, Massachusetts, every summer to attend courses of a diverse set of technical disciplines. In addition, over 10,000 professionals worldwide are now attending MIT's online professional courses that include topics such as Big Data. MIT Professional Education is also offering select MIT courses in locations in Asia, Latin America, and Europe

Prior to joining MIT, Mr. Pant held several leadership positions such as serving as Managing Director, Asia Pacific, for the Educational Testing Service (ETS), the world's foremost academic testing organization headquartered in Princeton, N.J. As managing director, he was responsible for overseeing the company's English language testing operations throughout Asia. This included the opening of a subsidiary in China that administered the TOEIC English proficiency test for engineers and other working professionals in the nation.

Previously, Mr. Pant led the global corporate training arm of the World Learning Graduate Institute in Vermont and held senior management positions at media and media technology companies such as Sony Corporation and Turner Broadcasting/CNN. Mr. Pant was the first President of Turner Broadcasting's subsidiary in India.

Mr. Pant holds an undergraduate degree in electrical engineering from the University of Rochester and a graduate degree in communications and management from Indiana University in Bloomington. Besides managing MIT Professional Education, Mr. Pant teaches intercultural communication to engineering students at MIT and management students at the Harvard University Extension School.

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Solve
Bruna Braga

Partnerships Manager at Solve

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Bruna Braga serves as the Partnerships Manager at Solve. In this capacity, Bruna leads fundraising and partnership efforts, developing and managing relationships with sponsors and partners to contribute to the advancement of Solve's mission of solving the world's biggest challenges through collaboration. Bruna also oversees the relationships between Solve and its advisors and other members of the MIT community. Prior to joining Solve, Bruna served as an International Manager at the Clinton Global Initiative (CGI), where she worked on CGI's expansion into Latin America, the Middle East, and Africa. She holds an MS in Marketing from New York University, where she graduated with distinction, and a BA in Business Administration from the Escola de Administração de Empresas de São Paulo - Fundação Getulio Vargas (EAESP-FGV) in São Paulo, Brazil. Bruna is fluent in English, Portuguese, and Spanish.

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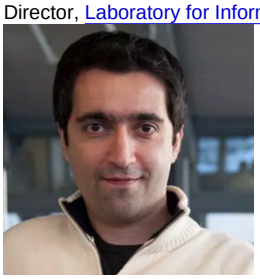
10:45am	Networking Break

11:10am

On the Future of Autonomous Vehicles: From fleets of self-driving cars to tiny consumer drones

Sertac Karaman
Associate Professor of Aeronautics and Astronautics at the Massachusetts Institute of Technology
Director, Laboratory for Information and Decision Systems (LIDS)



Sertac Karaman
Associate Professor of Aeronautics and Astronautics at the Massachusetts Institute of Technology
Director
Laboratory for Information and Decision Systems (LIDS)

Sertac Karaman is the director of the Laboratory for Information and Decision Systems, and an associate professor of Aeronautics and Astronautics at MIT. His research areas are robotics and control theory, particularly the applications of probability theory, stochastic processes, stochastic geometry, formal methods, and optimization for the design and analysis of high-performance cyber-physical systems. The applications of this research include driverless cars, unmanned aerial vehicles, distributed aerial surveillance systems, air traffic control, and certification and verification of control systems software. Karaman received a PhD in electrical engineering and computer science and an SM in mechanical engineering from MIT and BS degrees in mechanical engineering and in computer engineering from the Istanbul Technical University.

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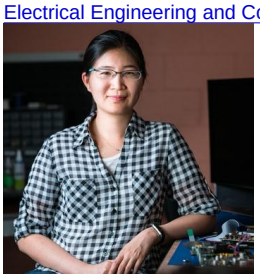
In the next five years, autonomous vehicle technology may finally blossom and enter our lives. The first applications of intelligent self-driving vehicles may embark on highways, campuses, and warehouses. Bottlecap-size consumer drones may roam around, filming the next big hit video on social media. What are some of the technical challenges and technological enablers? How will the new technology impact new products, markets, businesses, and ultimately our lives? Professor Sertac Karaman's research is enabling new ways of designing autonomous vehicles with the help of rigorous, mathematical thinking that leads to valuable insights.

11:50am

Energy-Efficient Hardware for Embedded Vision and Deep Neural Networks

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.

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Visual object detection and recognition are needed for a wide range of applications including robotics/drones, self-driving cars, smart Internet of Things, and portable/wearable electronics. For many of these applications, local embedded processing is preferred due to privacy or latency concerns. In this talk, we will describe how joint algorithm and hardware design can be used to reduce the energy consumption of object detection and recognition while delivering real-time and robust performance. We will discuss several energy-efficient techniques that exploit sparsity, reduce data movement and storage costs, and show how they can be applied to popular forms of object detection and recognition, including those that use deep convolutional neural nets (CNNs). We will present results from recently fabricated ASICs (including our deep CNN accelerator named "Eyeriss" which is 10x more energy efficient than a mobile GPU) that demonstrate these techniques in real-time computer vision systems.

12:30pm

MIT’s Global Internship Program (MISTI)
April Julich Perez

Executive Director
MISTI

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Executive Director
MISTI

As executive director, April Julich Perez oversees the MISTI country programs, seed funds and partnerships that create opportunities for MIT students and faculty to learn and collaborate abroad.

Julich Perez has worked on the editorial support staff of the International Herald Tribune and the parisavenue.com division of Le Figaro in France, and in Boston as Assistant Cultural Attachée for the French Consulate. Prior to joining MISTI in 2005, she was Program Associate in MIT's Office of the Arts.

While completing a BA in French at the University of Nebraska, Julich Perez earned certificates in European studies and French linguistics from the University of Antwerp, Belgium, and the Center for Applied Linguistics in Besançon, France. She holds an MA in French Cultural Studies from Columbia University.

Julich Perez serves on the policies and procedures group of MIT's International Coordinating Committee. She participated in MIT's Leader to Leader program and is a recipient of the MIT Excellence Award.

A member of NAFSA, the Association of International Educators, Julich Perez authored a case study about MIT's pioneering international education model in the NAFSA publication "Internships, Service Learning & Volunteering Abroad." She has spoken about MISTI at venues such as the American Society for Engineering Education International Forum, the Annual Colloquium on International Engineering Education and the Global Internship Conference.

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MIT Technology Licensing Office
Lesley Millar-Nicholson
Executive Director, MIT Technology Licensing Office (TLO)

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Lesley Millar-Nicholson is the Executive Director of MIT's Technology Licensing Office (TLO) and was part of the Founding Leadership team of MIT Office of Strategic Alliances and Technology Transfer (OSATT) formed in 2019. As TLO Executive Director, she leads a team of technology transfer professionals. Together, they manage MIT's intellectual assets and technology transfer process involving over 11,000 unique pending and issued US and foreign patents, and hundreds of copyright and open source assets. The team engages broadly with stakeholders to facilitate engagements leading to licenses for qualified third parties to deliver on the TLO mission to have impact through technology commercialization.

Prior to arriving in Cambridge Ms. Millar-Nicholson had served for ten years as Director of the Office of Technology Management (OTM) at the University of Illinois, Urbana/Champaign.

Ms. Millar-Nicholson is a past President Board of Governors of Certified Licensing Professionals Inc, a member of AUTM and the Licensing Executive Society, and a past Board Member of Cambridge Enterprise, UK. A native of Scotland, Ms. Millar-Nicholson has a B.Ed., M.Ed., MBA and is a Certified Licensing Professional.

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12:40pm

STEX Introduction with Lightning Talks
Trond Undheim
Lead, Startup Exchange
MIT Industrial Liaison Program
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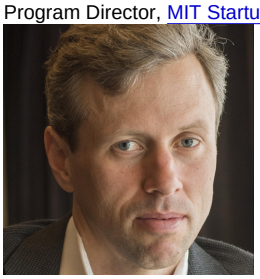
Lead, Startup Exchange
MIT Industrial Liaison Program

Trond heads up the Startup Initiative at MIT's Industrial Liaison Program (ILP), facilitating productive relationships between industry and MIT's startup ecosystem. He is a former Senior Lecturer at the MIT Sloan School of Management. Trond is a serial entrepreneur with Scandinavian roots, and is currently the Founder of Yegii, Inc., the insight network, and Managing Director of Tautec Consulting.

Trond is a leading expert on technology development across industries such as IT, Energy, and Healthcare. His knowledge spans entrepreneurship, strategy frameworks, policy making, action learning, virtual teamwork, knowledge management, standardization, and e-government. He wrote the book Leadership From Below (2008). Trond speaks six languages and is a frequent public speaker on business, technology, and wine.

Trond was a Strategy/business development executive at Oracle Corp. (2008-12), and a policy maker in the EU (2004-8) where he built the ePractice.eu web platform with 120,000 members. He has worked with multinational companies, with mid-caps and startups in Brazil, China, Colombia, France, Indonesia, Norway, the UK, and the US. He has a PhD in Multidisciplinary Technology Studies from the Norwegian University of Science and Technology.

Marcus Dahllöf
Program Director, MIT Startup Exchange



Marcus Dahllöf
Program Director
MIT Startup Exchange

Marcus Dahllöf leads MIT Startup Exchange, which facilitates connections between MIT-connected startups and corporate members of the MIT Industrial Liaison Program (ILP). Dahllöf manages networking events, workshops, the STEX25 accelerator, opportunity postings, and helps define the strategic direction of MIT Startup Exchange. He is a two-time tech entrepreneur (one exit in cybersecurity), and has previously held roles in finance, software engineering, corporate strategy, and business development at emerging tech companies and Fortune 100 corporations in the U.S., Latin America, and Europe. Marcus was a member of the Swedish national rowing team and he is a mentor at the MIT Venture Mentoring Service.

- **Shashi Kant**, CTO & Founder, Netra
- **Jeff Orkin**, CEO & Founder, GiantOtter
- **Josh Kanner**, CEO & Founder, Smartvid.io
- **Catherine Havasi**, CEO & Co-Founder, Luminoso
- **Alan Ringvald**, CEO, Relativity6
- **Ali Merchant**, President and Founder, CADNexus
- **Abhi Yadav**, CEO & Founder, ZyloTech
- **AJ Perez**, Chairman, New Valence Robotics
- **Jacob Rosen**, Co-Founder & CTO, Legit Patents

1:10pm Lunch with Startup Exchange and MIT's Global Internship Program (MISTI) Exhibit

Meet students from the MIT International Science and Technology Initiatives (as they/who will) talk about their internship projects in global companies.
- **Arjun Khandelwal**, developed a new "buybox" to optimize revenue and conversion rate for an e-commerce company in Brazil
- **Celia Han**, worked in IT projects in China and Hong Kong
- **Evan Denmark**, developed a tool to read text information from photographic data in India
- **Ji Seok Kim**, worked in social data analytics in Korea
- **Marie Menshova**, worked to anonymize sensitive data information from datasets in France
- **Michael McGraw**, worked at a global automotive manufacturer in Germany

2:40pm

Moving from Hype to Impact with Digital Health
Zen Chu

Co-Founder and Faculty Director, MIT Hacking Medicine
Senior Lecturer, MIT Sloan School of Management

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Senior Lecturer, MIT Sloan School of Management

Zen Chu serves as Faculty Director of MIT's Hacking Medicine Initiative, and is a Senior Lecturer in Healthcare Innovation for both the MIT Sloan School of Management and Harvard-MIT Health Sciences & Technology program.

In partnership with Professors Martha Gray and Bill Aulet, Zen created and directs HST.978 MIT Healthcare Ventures, a graduate course that teaches entrepreneurship, business models, and venture creation around technology that can transform healthcare. Zen actively consults companies in pharma, health tech, and healthcare systems struggling to adapt to global digital healthcare transformation and emerging markets.

As managing director of Accelerated Medical Ventures, Zen specializes in building early-stage medical technology and healthcare service companies, usually serving as cofounder and first investor. AMV's portfolio spans Boston, Silicon Valley, and China, including PillPack.com, Call9.com, Figure1.com, NuRx.com, 3D-Matrix Medical [JASDAQ: 7777], Sofi.com, Curoverse Genomics (acq Veritas Genomics), BitGym.com, DirectDermatology.com, and a few companies still in stealth mode.

Alongside MIT professors Shuguang Zhang, Alex Rich, Alan Grodzinsky, and Bob Langer, Zen cofounded and served as ceo for 3D-Matrix Medical Inc., a venture-backed MIT regenerative medicine company with a successful IPO in 2011. 3D-Matrix has wound-healing and drug-delivery products on the market outside of the US and multiple human clinical trials in process.

He has managed and led new ventures for Harvard Medical School, Harvard's Wyss Institute for Bioengineering, NetVentures, and Hewlett-Packard. Zen earned a BS in biomedical/electrical engineering from Southern Methodist University and an MBA from Yale University. He is married to Katie Rae, a serial entreprenuer and CEO of MIT's Engine Fund. They are raising three aspiring entrepreneurs in Brookline, MA.

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Ayesha Khalid
Clinical Instructor, Harvard Medical School
Co-founder, Hacking Medicine Institute
VP of Business Development, Doctella

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Ayesha N. Khalid is a practicing sinus surgeon and Clinical Instructor at Harvard Medical School with 15 years experience in the healthcare industry. As an ear, nose and throat surgeon, Ayesha pioneered groundbreaking research in sinus inflammation and clinical outcomes in sinus disease.

As a healthcare innovation specialist, Ayesha completed an MBA at the MIT Sloan School of Management focused on Global Leadership and Innovation. During her tenure at Sloan, Ayesha assessed mechanisms to increase adoption of adaptive clinical trials at academic medical centers. She joined MIT H@cking Medicine and helped organize several innovation events in Boston, BIO 2014, and in Doha, Qatar. Ayesha co-founded the Hacking Medicine Institute to engage stakeholders interested in compelling conversations to accelerate paradigm shifts in healthcare service delivery.

3:40pm

Extremely cost-effective semiconductor layer-transfer process via graphene & Highly uniform advanced RRAM

Jeehwan Kim
Associate Professor, MIT Mechanical Engineering
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Associate Professor, MIT Mechanical Engineering

Prof. Jeehwan Kim's group at MIT focuses on innovations in nanotechnology for next generation computing and electronics. Prof. Kim joined MIT in September 2015. Before joining MIT, he was a Research Staff Member at IBM T.J. Watson Research Center in Yorktown Heights, NY since 2008 right after his Ph.D. He worked on next generation CMOS and energy materials/devices at IBM. Prof. Kim is a recipient of 20 IBM high value invention achievement awards. In 2012, he was appointed a “Master Inventor” of IBM in recognition of his active intellectual property generation and commercialization of his research. After joining MIT, he continuously worked nanotechnology for advanced electronics/photonics. As its recognition, he received LAM Research foundation Award, IBM Faculty Award, DARPA Young Faculty Award, and DARPA Director’s Fellowship. He is an inventor of > 200 issued/pending US patents and an author of > 50 articles in peer-reviewed journals. He currently serves as Associate Editor of *Science Advances*, AAAS. He received his B.S. from Hongik University, his M.S. from Seoul National University, and his Ph.D. from UCLA, all of them in Materials Science.

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As a strategy to save the cost of expensive substrates in semiconductor processing, the technique called “layer-transfer” has been developed. In order to achieve real cost-reduction via the “layer-transfer”, the following needs to be insured: (1) Reusability of the expensive substrate, (2) Minimal substrate refurbishment step after the layer release, (3) Fast release rate, and (4) Precise control of a released interface. Although a number of layer transfer methods have been developed including chemical lift-off, optical lift-off, and mechanical lift-off, none of those three methods fully satisfies conditions listed above. In this talk, we will discuss our recent development in a “graphene-based layer-transfer” process that could fully satisfy the above requirements, where epitaxial graphene can serve as a universal seed layer to grow single-crystalline GaN, III-V, II-VI and IV semiconductor films and a release layer that allows precise and repeatable release at the graphene surface. We will further discuss about cost-effective, defect-free heterointergration of semiconductors using graphene-based layer transfers.

Lastly, I will introduce our new research activities in developing advanced RRAM devices. Resistive switching devices have attracted tremendous attention due to their high endurance, sub-nanosecond switching, long retention, scalability, low power consumption, and CMOS compatibility. RRAMs have also emerged as a promising candidate for non-Von Neumann computing architectures based on neuromorphic and machine learning systems to deal with “big data” problems such as pattern recognition from large amounts of data sets. However, currently reported RRAM devices have not shown uniform switching behaviors across the devices with high on-off ratio which holds up commercialization of RRAM-based data storages as well as demonstration of large-scale neuromorphic functions. Recently, we redesigned RRAM devices and this new device structure exhibits most of functions required for large-array memories and neuromorphic computing, which are (1) excellent retention with high endurance, (2) excellent device uniformity, (3) high on/off current ratio, and (4) current suppression in low voltage regime. I will discuss about the characterization results of this new RRAM device.

4:20pm	Platform Revolution: How Networked Markets Are Transforming the Economy Geoffrey Parker Professor of Engineering, Dartmouth College Visiting Scholar and Research Fellow, MIT Initiative for the Digital Economy MIT Sloan School of Management

Geoffrey Parker
Professor of Engineering, Dartmouth College
Visiting Scholar and Research Fellow, MIT Initiative for the Digital Economy
MIT Sloan School of Management

Geoffrey Parker is a professor of engineering at Dartmouth College where he also serves as Director of the Master of Engineering Management Program. In addition, he is a research fellow at MIT's Initiative for the Digital Economy where he leads platform industry research studies and co-chairs the annual MIT Platform Strategy Summit. Prior to joining Dartmouth, Parker was a professor of business at Tulane University. He received a B.S.E. from Princeton and M.S. and Ph.D. from MIT. Parker has made significant contributions to the field of network economics and strategy as co-developer of the theory of "two-sided" markets. He is co-author of the book "Platform Revolution." His current research includes studies of platform business strategy, data governance, smart cities and energy systems, financial services, and electronic healthcare record systems. Parker's research has been funded by grants from the National Science Foundation, the Department of Energy, the Sloan Foundation, the states of Louisiana and New York, and numerous corporations. He serves or has served as department editor and associate editor at multiple journals and as a National Science Foundation panelist. Parker won the Thinkers50 2019 Digital Thinking Award, along with Marshall Van Alstyne, for the concepts of the inverted firm, two-sided markets, and how firms can adapt and thrive in a platform economy. In Spring 2020, he was elected as a Fellow of the Production and Operations Management Society. In Fall 2020 he joined the World Economic Forum's Global Future Council on Advanced Manufacturing and Production. Parker is a frequent keynote speaker and advises senior leaders on their organizations' platform strategies. Before attending MIT, he held positions in engineering and finance at GE Semiconductor and GE Healthcare. Additional information can be found at ggparker.net, @g2parker, and Stern Strategy Group.

View full bio

Platform firms are coming and will impact you in ways that you cannot control. The successful business models of the last generation are no longer sufficient and corporations must adapt to the multi-sided markets that are the hallmark of the platform business model. How quickly an industry adapts to and utilizes platforms depends on regulation, cost, and risk. Join Geoff Parker to explore why platform firms are a threat, how they will affect your business, and how you can transform your business model to compete.

5:00pm	Networking Reception

Day Two

8:30am	Registration & Continental Breakfast
9:00am	Welcome and Introduction

9:10am

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

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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.

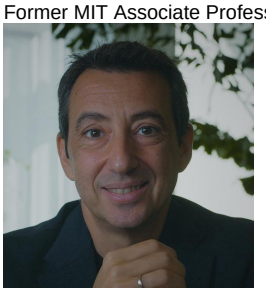
Tangible Bits seeks to realize seamless interfaces between humans, digital information, and the physical environment by giving physical form to digital information, making bits directly manipulable and perceptible. Our goal is to invent new design media for artistic expression as well as for scientific 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.

9:50am

From Transaction to Conversation: How Technology is Changing Our World
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 improves 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.

Twenty years ago the idea of speaking with a chatbot to resolve a problem was unheard of. Today we can ask Siri to make us a reservation for a nearby restaurant with the touch of a button. Artificial intelligence, wearables, virtual reality, and the Internet of Things are rapidly changing the world around us. From clothing that can track your fatigue to the changes in the process of booking a hotel room, Professor Casalegno will discuss the future of these technologies and where they will take us.

10:30am

Networking Break

11:00am

Open Algorithms for Privacy-Preserving Data Sharing
Thomas Hardjono

Technology Officer, Internet Trust Consortium
CTO, Connection Science and Engineering
MIT Sociotechnical Systems Research Center (SSRC)

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Thomas Hardjono is the CTO of MIT Connection Science and Engineering. He leads technical projects and initiatives around identity, security and privacy in emerging technologies such as IoT, smart contracts and blockchain systems, and engages industry partners and sponsors on these fronts. Thomas is also the technical director for the Internet Trust Consortium under MIT Connection Science that implements open source software based on cutting edge research at MIT. Prior to this Thomas was the Director of the MIT Kerberos Consortium, developing the famous MIT Kerberos authentication software currently used by millions of users around the world.

As an industry expert he has been active in the areas of security, applied cryptography and identity management for nearly two decades now, starting from the mid-1990s working in the emerging PKI industry as Principal Scientist at VeriSign, which became the largest PKI provider in the world. His work included devices certificates for DOCSIS cable modems, WiFi devices and the Trusted Platform Module (TPM) security hardware. He has led a number of key industry technical groups within the IETF, OASIS, Trusted Computing Group, Kantara and other organizations. At MIT Thomas has also been instrumental in the development of the OpenID-Connect 1.0 identity protocol (OIDC), standing-up the first OIDC service at a major university (oidc.mit.edu). Over the years he has published four books and over sixty technical papers in journals and at conferences. He holds 19 patents in the areas of security and cryptography. Thomas has a BSc degree in Computer Science with Honors from the University of Sydney, and PhD degree in Computer Science from the University of New South Wales in Australia.

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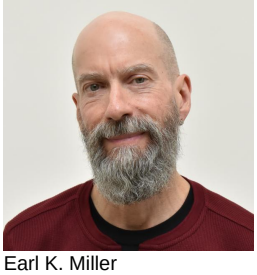
OPAL/Enigma is a new paradigm for data sharing across organizations in a privacy-preserving manner. OPAL (Open Algorithms) allows for scalable querying of data-sets that are physically spread across the Internet, and owned by different organizations. Rather than moving data to a centralized querier location, it is the query (algorithm) that is sent to the data repository. Raw data never leaves its repository, and it is in an encrypted at all times -- during storage and computation. The Enigma phases consist of using the nodes of the P2P network, such as in a blockchain, to split encrypted data and storing these pieces on the nodes of the P2P network. Computation is then based on these pieces of encrypted data stored on the nodes.

11:40am

Cognitive Capacity: You don’t always see what’s in front of you and what we can do about that

Earl K. Miller
Professor, MIT Department of Brain and Cognitive Sciences
Picower Professor of Neuroscience, The Picower Institute for Learning and Memory



Earl K. Miller
Professor, MIT Department of Brain and Cognitive Sciences
Picower Professor of Neuroscience
The Picower Institute for Learning and Memory

Earl K. Miller is the Picower Professor of Neuroscience in The Picower Institute for Learning and Memory at the Massachusetts Institute of Technology. He received his B.A. (summa cum laude, with honors) in Psychology from Kent State University in 1985. He received an M.A. (in 1987) and Ph.D. (in 1990) in Psychology and Neuroscience from Princeton University. Professor Miller was awarded an honorary doctorate (Doctor of Science, honoris causa) from Kent State University in 2020. Professor Miller studies the neural basis of executive brain functions, the ability to carry out goal-directed behavior using complex mental processes. Research topics include working memory, attention, decision-making and learning. The Miller Lab has shown how categories and concepts are learned, how multifunctional “mixed-selectivity” neurons endow the cortex with computational horsepower and flexibility, and how neural oscillations regulate neural communication and consciousness. This work has established a foundation upon which to construct more detailed, mechanistic accounts of cognition and its dysfunction in diseases such as autism, schizophrenia, and attention deficit disorder. Professor Miller is the recipient of a variety of awards and serves as editor, and on the editorial boards of, major journals in neuroscience, and on international advisory boards. His paper with Jonathan Cohen, (Miller and Cohen, 2001), which presented a new framework for understanding the prefrontal cortex, ranks fifth all-time in citations in neuroscience.

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Did you know that your ability to see, pay attention, and remember is not the same everywhere in your line of sight? New ground-breaking science from the Miller Lab at MIT has shown that our brains have our own individual cognitive sweet spots and blind spots, where we have high bandwidth and low bandwidth. SplitSage's cognitive analytics profile each person's unique abilities. Heads-up displays can be individualized to maximize information and minimize distractions for each user. The location of key data can be based on an operator’s cognitive sweet spots and blind spots. Each person can build on their own strengths and address their weaknesses to improve situational awareness, performance and safety.

12:20pm

Millimeter Wave Networks for Virtual Reality and other High Data Rate Applications
Dina Katabi
Thuan and Nicole Pham Professor
MacArthur Fellow
Leader of NETMIT Research Group
Director of the MIT Center for Wireless Networks and Mobile Computing

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Dina Katabi is the Thuan and Nicole Pham Professor of Electrical Engineering and Computer Science, and the director of MIT's Center for Wireless Networks and Mobile Computing (Wireless@MIT). Katabi is also a MacArthur Fellow and a Member of the National Academy of Engineering. She received her PhD and MS from MIT and her BS from Damascus University. Katabi has received the ACM Grace Murray Hopper Award, the Faculty Research Innovation Fellowship, the Sloan Fellowship, the NBX Career Development chair, and the NSF CAREER award. Katabi's doctoral dissertation won an ACM Honorable Mention award and a Sprowls award for academic excellence. Further, her work was recognized by the IEEE William R. Bennett prize, three ACM SIGCOMM Best Paper awards, an NSDI Best Paper award, the SIGCOMM Test-of-Time award, and a TR10 award for her work on the sparse Fourier transform. Several start-ups have been spun out of Katabi's lab, such as PiCharging and Emerald.

View full bio

The ever-increasing demand for mobile and wireless data has placed a huge strain on today's WiFi and cellular networks. Millimeter wave frequency bands address this problem by offering multi-GHz of unlicensed bandwidth – 200 times more than the bandwidth allocated to today's WiFi and cellular networks. In this talk, I describe the opportunities and challenges brought in by this technology, and its applications in enabling untethered virtual reality headsets and high throughput multi-media applications.

1:00pm

Adjournment with Bagged Lunch

1:30pm

Post ICT Conference STEX Workshop: Killer Apps in the Internet of Things

The Internet of Things (IoT) is marching ahead at full speed. No longer theoretical, massive possibilities are emerging from the data streams being collected through connected sensors, devices, and networks. With that comes security challenges, industry disruption, new business models, and an array of new startups. What are some emerging IoT killer apps? Who are the players? What will this world look like for industry, startups, governments, and consumers?

Startups are launching emerging technologies that will change how people, devices, and our environment interact, from understanding big data analytics and IoT devices security, to understanding how we interact with public spaces and natural language processing.