IAB2021:

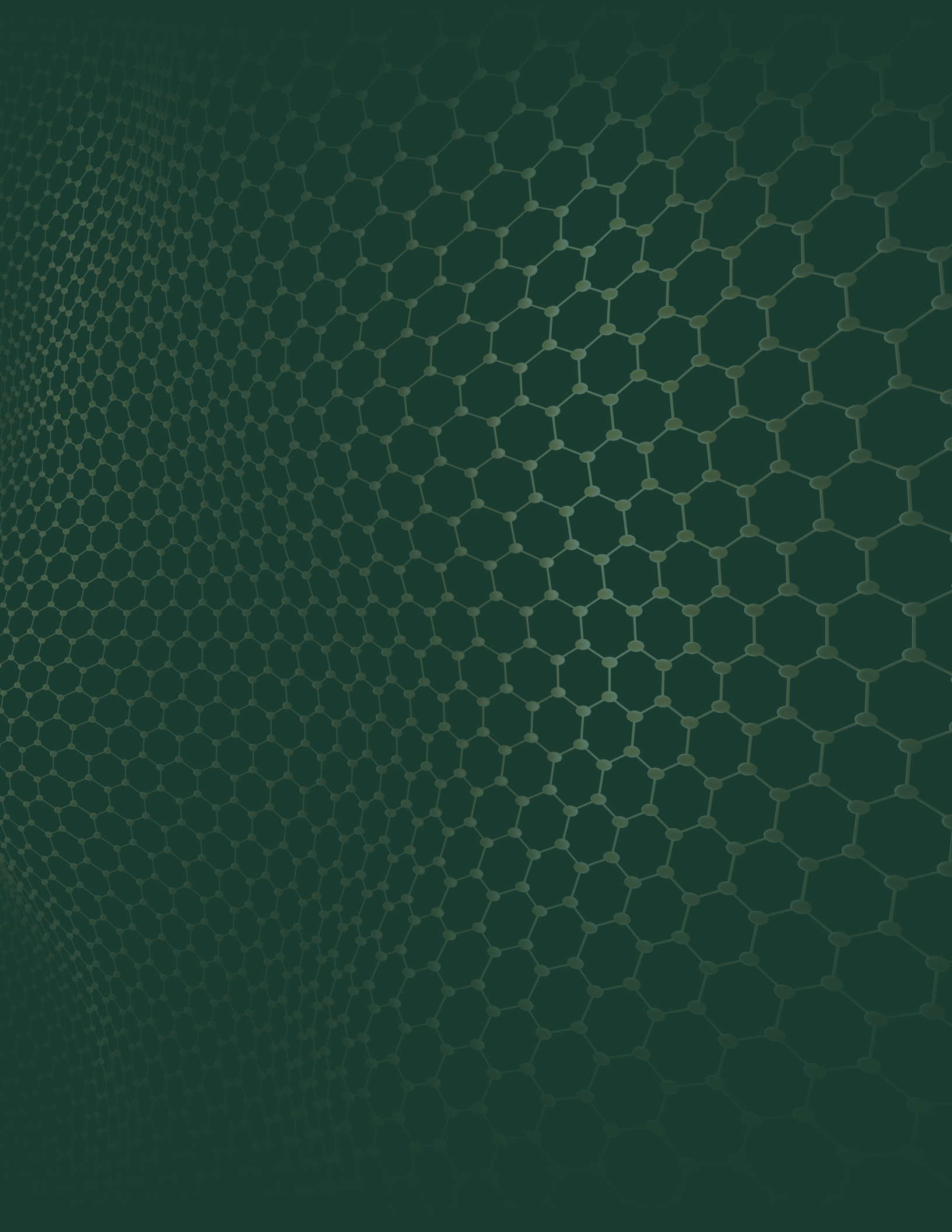
INDUSTRIAL ADVISORY BOARD ANNUAL MEETING

MTLEXPO:

MICROSYSTEMS TECHNOLOGY LABORATORIES ANNUAL EXPO 2021

MTL MICROSYSTEMS TECHNOLOGY LABORATORIES

January 28, 2021
Virtual Annual Meeting



IAB2021

INDUSTRIAL ADVISORY BOARD
ANNUAL MEETING
JANUARY 28, 2021

AGENDA

6:00pm	**Prof. Harry Lee:** "MTL Director's Update"
6:45pm	**Prof. Vladimir Bulović:** "MIT.nano Update"
7:15pm	**Prof. Marc Baldo:** "MTL/RLE Integration"
7:45pm	Break
8:00pm	**Prof. Dave Perreault: "Powering the Future: A Research Overview of the MIT Power Electronics Research Group"**
8:30pm	**Prof. Polina Anikeeva:** "Electrical, Optical, and Magnetic Approaches for Body-Machine Interfaces"
9:00pm	**Dr. Vicky Diadiuk, Dr. Jorg Scholvin, Nick Menounos, Prof. Duane Boning:** "Facilities and Servies Update"
9:45pm	Discussion
10:00pm	Adjourn

MIG MEMBER BIOGRAPHIES

Susan Feindt
Fellow & Advanced Process Development Director
Analog Devices

Chorng-Ping Chang
Senior Director
Applied Materials

Susan is an ADI fellow and Director of Analog's Advanced Process Development Group in Wilmington, MA. She has been with Analog Devices for over 30 years. Susan has led process development efforts for integrated circuits used in various applications and markets including automotive, communications, industrial and healthcare. She focuses on silicon based Bipolar and BiCMOS processes, Gallium Nitride and Heterogeneous Integration. Before joining Analog Device, Susan worked for Harris Semiconductor in Melbourne, Florida. Susan received her BS in Chemical Engineering from the Massachusetts Institute of Technology.

Dr. Chorng-Ping Chang is Senior Director of Strategic External Research in the office of CTO, Applied Materials. Prior to joining Applied Materials in 2004, Dr. Chang was a Distinguished Member of Technical Staff at Bell Laboratories, Murray Hill, New Jersey, where he had done extensive R&D on advanced plasma sources, processing technology, CMOS integration, and novel device architecture. He received his B.S. degree from National Tsing Hua University and Ph.D. degree from University of California at Berkeley. He has authored or co-authored over 120 conference and journal papers and has filed over 20 patents. Dr. Chang is a fellow of IEEE. He also served on the editorial board of IEEE.

Philip A. Kraus
Appointed Vice President
Head of Core R&D
Semiconductor Products Group
Applied Materials, Inc.

David Carter
Laboratory Technical Staff
Materials Science and Chemistry Group Leader
Draper

Dr. Philip Kraus is appointed vice president of Engineering and the Head of Core R&D for the Semiconductor Products Group at Applied Materials, Inc. He oversees the development of innovative technologies and prototype products for the semiconductor wafer fab equipment market.

An industry expert in both reactor design and materials synthesis, Dr. Kraus has championed new processing capability by working at the intersection of these two fields. He has led the development of new capabilities in plasma treatments, large-area evaporation, reactive ion etch, atomic layer deposition, chemical vapor deposition, and physical vapor deposition systems.

Dr. Kraus rejoined Applied Materials in 2015 after 10 years working in start-up companies across various industries that leverage solid-state physics. From 2012 to 2015, he was CEO of Ultora, a manufacturer of carbon nanotube electrochemical energy storage devices. Prior to that he held leadership roles at materials synthesis, light emitting diodes, and thin film photovoltaics companies. Previously at Applied Materials from 1999 to 2006, Dr. Kraus developed FEOL plasma nitridation systems—the first widespread use of plasma processing in transistor formation.

Dr. Kraus is the inventor of more than 20 issued patents and the author of more than 40 publications. He earned a Ph.D. in Physics from the University of Minnesota and a B.S. in Engineering Science from the Pennsylvania State University.

Dr. David Carter is Laboratory Technical Staff and the Materials Science and Chemistry Group Leader at Draper Laboratory. He has been at Draper for 18 years, where he has led efforts to apply nanofabrication and nanotechnology in a variety of areas including RF MEMS, integrated optics, plasmonic devices, and carbon nanotube MEMS/NEMS integration. His work in molded nanoscale polymers led to the first-ever demonstration of human climbing using biomimetic synthetic gecko adhesion. He has advised several graduate Draper fellows and has initiated multiple collaborations with university researchers while at Draper.

Prior to Draper, he held a research staff position at MIT, where he led the development of zone-plate-array lithography (ZPAL). Before MIT, he held a staff position at Harvard University, where he managed the cleanroom facility. Dr. Carter received his Ph.D. in Electrical Engineering from MIT and his A.B. and M.S. degrees in Engineering Sciences from Dartmouth College. He has co-authored 32 journal and conference papers and has 17 patents in micro/nanofabrication, nanotechnology, and materials.

George Courville
Business Development Manager, Technology Partnerships
Edwards Vacuum

Mr. Courville has over 25 years of experience as a marketing and business development professional. His career has included senior management positions with both large, multi-national corporations as well as small, nanotechnology startups. He has led global business development teams offering high performance materials and equipment for many uses in semiconductor, display, solar and other high technology markets. He was responsible for managing a marketing and applications team that introduced and supported the first dry vacuum pumps for the semiconductor market.

Mr. Courville received his Bachelor of Science degree in Chemical Engineering from Tufts University, and an MBA from Boston University.

Anthony Taylor
Applications Technologist
Edwards Vacuum

Anthony has over 30 years' experience working in the semiconductor industry and conducting research in thin film technology and microsystems. He has been with Edwards, Sanborn, New York, as an Applications Engineer and Applications Technologist for the past 27 years and a visiting scientist at MIT since 2014. His work at MIT has focused on novel fabrication methods of micro and nano-systems, specifically graphene-based gas sensors for vacuum and exhaust management applications, and 3D-printed miniature vacuum and liquid pumps. Anthony received the Bachelors of Science in Physics (cum laude) from Saint Lawrence University, Canton, New York in 1985, the M.S. degree in Physics from the University of Arizona, Tucson, Arizona in 1988, and the Doctorate of Philosophy in Physics from Rensselaer Polytechnic Institute (RPI), Troy, New York in 1993.

Vivek Dave
Director of Technology Development
HARTING, Inc. of North America

Takanobu Haga
Manager, Innovation Promotion Group
Hitachi High-Tech Corporation

Vivek Earned his Bachelor's degree in Engineering his Applied Science with Honor from the California Institute of Technology, and his Master's and Doctorate degrees in Materials Engineering from the Massachusetts Institute of Technology. He has worked at Fortune 50 aerospace companies, National Labs, various startups in three states, and presently serves as the Director of Technology for North America for HARTING Inc., family-owned private company based in Espelkamp, Germany with North American headquarters in Elgin, IL.

His current focus is on the Industrial Internet of Things (IIoT) and specifically how to provide Edge-level hardware and software solutions that will truly enable IIoT to reach its full potential. He is additionally a technical expert in problems pertaining to sensing, control, data analytics, manufacturing, quality control, understanding and eliminating sources of process variance, and the impact of manufacturing problems or defects on downstream product performance and process reliability. Sgnificant experience as an Entrepreneur working with early-stage advanced technologies encompassing manufacturing, materials, and algorithms.

Dr. Takanobu Haga is a member of Innovation Promotion Group of Hitachi High-Tech America. He is based in Boston to scout innovative technologies and startups in life science.

He started his career as a research scientist and an optical engineer at Central Research Laboratory, Hitachi, in 2005. During his nine-year of professional experience at Hitachi, he achieved various advancements in DNA sequencing technologies: he published a number of research findings and patents related to sequencing instruments and methods; as the optical engineer of Hitachi High-Technologies, he also joined collaboration projects with Life Technologies (now Thermo Fisher Scientific) in commercialization of Next Generation DNA Sequencer. After his experience at Hitachi, he worked at a venture capital firm in Tokyo for two years and joined Hitachi High-Technologies in 2018.

He graduated from Tokyo University of Agriculture and Technology with PhD in optical engineering during his placement at Hitachi in 2013; he received his master of science in biophysics from Osaka University in 2005 and his bachelor of science in chemistry from Tohoku University in 2003. He earned MBA from IE Business School, Spain, in 2015.

Hiroshi Suzuki
General Manager, Technology Innovation Division
Hitachi High-Tech Corporation

Dirk Pfeiffer
Sr. Manager, Microelectronics Research Laboratory
IBM

Dr. Hiroshi Suzuki is the General Manager of the Technology Innovation Division of Hitachi High-Tech (HHT) headquarters in Tokyo and is responsible for the technology strategy of the HHT group.

He joined Central Research laboratory (CRL), Hitachi Ltd. in 1989, and researched electron-beam instruments for improving yields of semi-conductor and/or magnetic devices. He developed several methods and apparatuses to characterize the electrical properties of LSIs and to analyze the magnetic properties of several magnetic devices used in HDDs. He received academic awards including the Technology Development Award (JIM, 1999) and the Technology Award (JSPE, 2003). As a part of his carrier in Hitachi, he worked in research planning at CRL for several years, and he was temporary transferred to the corporate venture capital (CVC) of Hitachi's R&D division from 2004 to 2005.

He moved to Hitachi High-Technologies Corporation in 2011, where he was in charge of R&D planning and strategy, and he was temporary transferred to the HHT's subsidiary company to develop new technologies for inspection of social infrastructure from 2016 to 2018.

He graduated with his Bachelor's and Master's degrees in precision engineering from Tohoku University in 1987 and 1989. He obtained a Ph.D. in engineering from Tohoku University in 2007 when he worked for CRL, Hitachi Ltd..

Dr. Dirk Pfeiffer currently manages the Microelectronics Research Laboratory (MRL) at the IBM TJ Watson Research Center which is part of IBM Research. The MRL consists of 40000sf of clean room space plus offline laboratories with a staff of 200+ engineers and scientist and a fleet of 150+ processing tools as well as a model- and electronics shop. In addition, Dr. Pfeiffer also manages the nanofabrication facilities at IBM Research Almaden, San Jose, CA and Zurich, Switzerland The MRL has the full range of 200mm silicon wafer semiconductor processing tools including ebeam/optical lithography, reactive ion etching, films, wets, CMP, plating, materials characterization (TEM, SEM etc.), packaging tools such as wafer/chip bonding, deep silicon etch, others. The MRL supports a wide variety of device prototype and development projects including Quantum devices and systems, neuromorphic devices for AI applications, non-volatile memory, devices and sensors for IoT with focus on supply chain and health care and many others.

Prior to management, Dr. Pfeiffer had been the PI of several government projects within IBM research related to hard based security and anti-tampering. Dr. Pfeiffer started his career at IBM in the lithography group as a polymer chemist where he ran a joint development project with commercial partners to develop new polymer films for high-resolution lithography. He also worked as the technical assistant to the director of silicon technology at IBM prior to becoming an IBM manager. Dr. Pfeiffer holds a Ph.D. in organometallic chemistry from Wayne State University and completed a postdoctoral assignment at the University of Pennsylvania working in organic synthesis and catalysis. Dr. Pfeiffer has authored and co-authored over 80 patents and received several IBM outstanding technical achievement awards.

Nerissa Draeger
Director of Global University Engagements
Lam Research Corp.

Akihiro Kirihara
Senior Manager, System Platform Research Laboratories
NEC Corporation

Dr. Nerissa Draeger is a technology strategist with a passion for guiding cutting-edge research to make industry impact. In 2017, she joined the Strategy & Innovation team as Director of Global University Engagements where she enables innovative solutions for semiconductor fabrication through external research collaborations and drives academic partnerships to create diversity in Lam's technology and talent pipelines. Prior to this role, Dr. Draeger led various programs at Lam Research in advanced materials for electronic devices, ALD/CVD product development, and strategic business and intellectual property development.

Dr. Draeger has over 20 years of experience in thin film deposition and surface science and has authored over 30 patents and numerous technical publications. She earned her Ph.D. in materials science and engineering from the University of Illinois, Urbana-Champaign where she received the department's 2020 Alumni Loyalty Award, and her B.S.E. in the same field from the University of Michigan. She is a founding member of a book club that has been active for two

Mr. Akihiro Kirihara is a Senior Manager in NEC System Platform Research Laboratories, and is responsible for managing research projects on nano and quantum devices (e.g. quantum atomic clocks and nano-carbon sensors), and data-driven material R&D.

After he obtained B. Eng. (in 2002) and M. Eng. (in 2004) from the University of Tokyo, he joined NEC Corporation in 2004. Since then, he has studied on quantum-dot emitters, spintronic devices, and quantum atomic clocks. From 2013 to 2014, he was a visiting researcher in Technische Universitaet Kaiserslautern. His current interest is highly accurate sensing and positioning based on quantum effects.

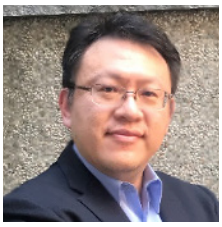
Tomo Tanaka
Researcher, System Platform Research Laboratories
NEC Corporation

Jim Wieser
Director of University Research and Technology
Texas Instruments

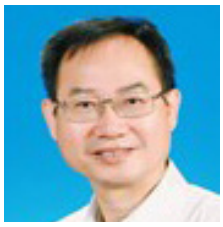
Tomo Tanaka received his Ph.D. in Engineering from Hokkaido University. He joined the Smart Energy Research Laboratories of NEC Corporation in 2014, and he was engaged in the R&D of infrared photodetectors. From 2018 to 2019, he was a visiting scientist at MIT. From 2019, he has been at NEC System Platform Research Laboratories in Japan. His current research interests are emerging quantum devices.

Jim serves Texas Instruments as Director of University Research and Technology within the university relations organization in close collaboration with the CTO Office. In this role he identifies and drives strategic technology initiatives, research strategy and aligns university research to the needs of the company. His semiconductor experience spans over 40 years in the areas of design, product development management and technologist. He is an IEEE Senior Member and SRC Executive Technical Advisory Board member for TI.

Jim received his BSEE and MSEE from University of Michigan and joined National Semiconductor starting his career in the semiconductor industry. He began as a circuit designer in the pioneering days of analog CMOS, including switched capacitor filters and data converters. Jim developed circuits and managed design of telecom products, including voice band codecs, modems, ISDN and ADSL. Jim spent two years as Director/VP of Analog/Mixed Signal Methodology refining the analog design flow to address National's SoC product strategy. Later he led the development of 10/100 and Gigabit Ethernet Phys and MACs in the Networking division as Design Director. In 2002 Jim was promoted to Chief Technologist of the Interface Division and was later promoted to Chief Technologist for the Product Group covering four product divisions. He later joined the CTO office to drive strategic technology and university research. Jim holds 21 patents in the area of analog circuits and system design.



Meng-Fan (Marvin) Chang
Director, Corporate Research
TSMC



Chuei-Tang Wang
Technical Director
TSMC

Dr. Chang is Director of Corporate Research (CR) of TSMC and is responsible for University Program, Design Solution and Memory Devices at CR. Prior to joining TSMC in 2019, he is a Distinguished Professor in the Electrical Engineering Department at National Tsing Hua University (NTHU), Taiwan during 2006-2019. Before 2006, he has worked in industry on memory circuit designs over 10 years. During 1996-2006, Dr. Chang was with Mentor Graphics, TSMC, and IPLib.

His research interests include design-technology co-optimization (DTCO), circuit designs for volatile and nonvolatile memory, ultra-low-voltage systems, 3D-memory, circuit-device interactions, spintronics circuits, memristor logics for neuromorphic computing, and computing-in-memory for artificial intelligence chips.

Dr. Chang has published more than 70 papers in ISSCC, IEDM, VLSI and DAC. He has been serving on technical program committees for ISSCC, IEDM (Ex-com and MT chair), DAC (sub-com chair), ISCAS (track chair), and numerous international conferences. He has been a Distinguished Lecture speaker for IEEE Solid-State Circuits Society (SSCS) and Circuits and Systems Society (CASS). He has also been serving as the Program Director of Micro-Electronics Program of Ministry of Since and Technology (MOST) in Taiwan during 2018-2020, Associate Executive Director for Taiwan's National Program of Intelligent Electronics (NPIE) and NPIE bridge program during 2011-2018. He is a Fellow of the IEEE.

Chuei- Tang Wang received the B.S. and M.S. degrees in materials science and engineering from National Tsing Hua University, Hsinchu, Taiwan, in 1983 and 1985, respectively, and the Ph.D. degree from Stanford University, Stanford, CA, USA, in 1997. In 2011, he joined TSMC Integrated Interconnect and Packaging (IIP) R&D team as a Technical Director for system architectures and their SI, PI and RF performance exploratory study. He had received a National Award of Industrial Technology Advancement (ITA), Taiwan, for the leadership of connectivity SiP module development in industry in 2007. He holds more than 100 US patents and publishes 20 papers in IEDM, VLSI, ECTC and etc. Now he is a committee member in RF, High-Speed Components & Systems subcommittee in ECTC.

MIT FACULTY AND STAFF BIOGRAPHIES

Polina Anikeeva
MacVicar Faculty Fellow
Associate Professor
Materials Science and Engineering
Brain and Cognitive Sciences
Research Laboratory of Electronics
McGovern Institute for Brain Research

Polina Anikeeva received her BS in Physics from St. Petersburg State Polytechnic University in 2003 and a PhD in Optoelectronics and Materials Science from MIT in 2009. She completed her postdoctoral training in neuroscience at Stanford. Polina joined the faculty of MIT in 2011, where she's now an Associate professor of Materials Science and Engineering and Brain and Cognitive Sciences. Her lab focuses on the development of flexible and minimally invasive materials and devices for neural recording, stimulation, and repair. Polina is a recipient of NSF CAREER Award, DARPA Young Faculty Award, the TR35, and 2018 Vilcek Prize for Creative Promise..

Marc Baldo
Dugald C. Jackson Professor of Electrical Engineering
Director, Research Laboratory of Electronics

Marc Baldo is the Dugald C. Jackson Professor of Electrical Engineering and Computer Science and Director of the Research Laboratory of Electronics at MIT. Marc received his B.Eng. from the University of Sydney in 1995 with first class honors and university medal. He received his Ph.D. from Princeton University in 2001, where he helped develop phosphorescent organic light emitting devices – now the efficiency standard for organic displays and solid state lighting. He has been at MIT since 2002. At MIT he has worked on organic solar cells, fundamental improvements to the efficiency of organic light emitting devices, luminescent solar concentrators, singlet exciton fission for high efficiency solar cells, and triplet exciton fusion for optical upconversion. Awards include the Discover Magazine top 100 for 2008, and the 2013 Jan Rajchman Prize from the Society for Information Display for his outstanding contributions to the discovery of phosphorescent OLED devices

Duane S. Boning
Associate Director, MTL
Clarence J. LaBel Professor, Department of Electrical Engineering & Computer Science
Engineering Faculty Co-Director, MIT Leaders for Global Operations (LGO) Program

Duane S. Boning is the Clarence J. LeBel Professor in the Electrical Engineering and Computer Science Department at MIT. He is affiliated with the MIT Microsystems Technology Laboratories and serves as MTL Associate Director for Computation and CAD. From 2004 to 2011, he served as Associate Head of the EECS Department at MIT, from 2011 through 2013 as Director/Faculty Lead of the MIT Skoltech Initiative, and from 2011 to 2018 as the Director of the MIT/Masdar Institute Cooperative Program. He is currently the Engineering Faculty Co-Director for the MIT Leaders for Global Operations (LGO) Program. From July 2019 to June 2021, he is serving as Associate Chair of the Faculty at MIT.

He 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. His research at MIT focuses on statistical and machine learning for understanding, controlling and reducing variation in semiconductor, photonics, and MEMS processes, devices, and circuits.

Vladimir Bulović
Founding Director, MIT.nano
Maseeh Professor, Department of Electrical Engineering & Computer Science

Vladimir Bulović directs the Organic and Nanostructured Electronics Laboratory, co-leads the MIT-Eni Solar Frontiers Center, leads the Tata GridEdge program, and is the Founding Director of MIT.nano, MIT's new 200,000 sqft nano-fabrication, nano-characterization, and prototyping facility that opened in the summer of 2018. He is an author of over 250 research articles and an inventor of over 110 U.S. patents (cumulatively cited over 50,000 times) in areas of light emitting diodes, lasers, photovoltaics, photodetectors, chemical sensors, programmable memories, and micro-electro machines, majority of which have been licensed and utilized by both start-up and multinational companies. The three start-up companies Bulović co-founded jointly employ over 400 people, and include Ubiquitous Energy, Inc., developing nanostructured solar technologies, Kateeva, Inc., focused on development of printed electronics, and QD Vision, Inc. (acquired in 2016) that produced quantum dot optoelectronic components. Products of these companies have been used by millions. Bulović was the first Associate Dean for Innovation of the School of Engineering and the Inaugural co-Director of MIT's Innovation Initiative, which he co-led from 2013 to 2018. For his passion for teaching Bulović has been recognized with the MacVicar Fellowship, MIT's highest teaching honor. He completed his Electrical Engineering B.S.E. and Ph.D. degrees at Princeton University.

Vicky Diadiuk
Associate Director of Operations, MTL

Vicky Diadiuk received the B.S. and Sc.D. degrees in Physics from the Massachusetts Institute of Technology, in 1972 and 1978, respectively. Her theses were in the field of Josephson and Nb-based superconducting junctions.

Starting in 1978, she was a member of the research staff at MIT Lincoln Laboratory, where she worked on opto-electronic devices in III-V semiconductors. Her research effort concentrated on the development, fabrication, and characterization of high-speed PIN and high-gain avalanche photodetectors on InP-based compounds. She also worked on diode lasers for optical communications, including external cavity-coupled laser and lenslet arrays. In 1996 she joined the Microsystems Technology Laboratories, where she is now Associate Director, Operations. She is in charge of managing the micro/nanofabrication laboratories, in which Si, MEMS & photonic devices are fabricated. She is the Chair of MTL's Process Technology Committee. Dr. Diadiuk holds several US patents and is co-author of numerous publications. She has served on a variety of Conference Committees and University Technical Advisory Boards.

Hae-Seung (Harry) Lee
MTL Director
Professor, Department of Electrical Engineering & Computer Science

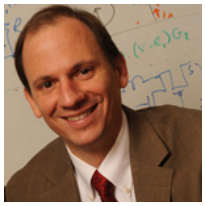
Prof. Hae-Seung (Harry) Lee received the Ph.D. degree in electrical engineering from the University of California, Berkeley, in 1984, where he developed self-calibration techniques for A/D converters.

Since 1984, he has been on the faculty in the Department of Electrical Engineering and Computer Science, Massachusetts Institute of Technology, Cambridge, MA, where he is now Advanced Television and Signal Processing Professor of Electrical Engineering. He is the Director of Microsystems Technology Laboratories and the Director of Center for Integrated Circuits and Systems. He has served the Technology Advisory Committee for Samsung Electronics, Cypress Semiconductor, Sensata Technologies, and Dual Aperture, Inc. He co-founded several companies including SMaL Camera Technololgies, Cambridge Analog Technologies, Omni Design Technologies, and Merlin Tech.

His research interests are in the areas of analog and mixed-signal integrated circuits in scaled CMOS technologies as well as medical electronics. Prof. Lee is a recipient of the 1988 Presidential Young Investigators' Award, and a co-recipient ISSCC Jack Kilby Outstanding Student Paper Award in 2002 and 2006. He has served a number of technical program committees for various IEEE conferences, including the International Electron Devices Meeting, the International Solid-State Circuits Conference, the Custom Integrated Circuits Conference, and the IEEE Symposium on VLSI circuits. Prof. Lee is an inventor or a co-inventor of 63 issued U.S. patents and numerous international patents. He has published more than 160 peer reviewed journal and conference papers, and is a Fellow of IEEE.

Nicholas Menounos
Assistant Director of Infrastructure, MIT.nano

Nicholas P. Menounos received his Bachelors of Engineering (B.E.) degree in Mechanical Engineering from McGill University in 2008, obtained a LEED Associate Professional accreditation from the USGBC in 2009 and has held a Professional Engineering (P.E.) license in the state of Massachusetts since 2012. Over the course of his career he has worked on a wide range of industrial, commercial and infrastructure projects, including; nuclear, defense, biopharmaceutical, higher education R&D and semiconductor manufacturing. Nicholas was the lead process engineer on the MIT.nano building design team and officially joined MIT in 2017, to support building startup and turnover. As the Assistant Director of Infrastructure for MIT.nano, he is responsible for tool installation projects within the facility and ensuring the environmental conditions and utilities meet the research needs of the community.



David Perreault
Joseph F. and Nancy P. Keithley Professor of EECS

David Perreault received the B.S. degree from Boston University and the S.M. and Ph.D. degrees from the Massachusetts Institute of Technology, all in Electrical Engineering. He is presently the Joseph F. and Nancy P. Keithley Professor of Electrical Engineering and Computer Science at MIT. His research interests include design, manufacturing, and control techniques for power electronic systems and components, and in their use in a wide range of applications. Dr. Perreault is a Fellow of the IEEE and is the recipient of various awards for his work in power electronics including the IEEE R. David Middlebrook Achievement Award. He has co-authored thirteen IEEE prize papers in the area, and co-founded startup companies Eta Devices (acquired by Nokia in 2016) and Eta Wireless, Inc.

Jorg Scholvin
Assistant Director User Services - Fab.nano, MIT.nano

Jorg Scholvin grew up in Germany and came to MIT as an undergraduate in computer science. A fascination with microfabrication resulted in a switch to electrical engineering, and a Ph.D. with Prof. Jesus del Alamo on CMOS technology for RF power applications. After working as a derivatives trader at UBS in CT for three years, Jorg returned to MIT, joining Prof. Ed Boyden's lab to work on research combining microfabrication and neuroengineering. Jorg co-founded Neural Dynamics Technologies, an SBIR-funded company that currently commercializes this new technology. In 2018, Jorg joined MIT.nano as the Assistant Director of User Services at Fab.nano, where he assists with transitioning labs and users into the new building, and acts as technical consultant to researchers using the fabrication facility. For the past 3 years, Jorg also has been co-lecturing 6.152J, MIT's micro/nano undergraduate lab class.

MTL LEADERSHIP BIOGRAPHIES

Stacy McDaid
Administrative Officer, MTL

Stacy McDaid assumed the position of MTL Administrative Officer in July 2018. Ms. McDaid brings a multi-disciplinary background and more than 20 years of administrative and financial management experience. She has a BS from Northeastern University. Ms. McDaid started her career at Draper Laboratory, where she worked as an administrative assistant and then a program administrator. Stacy has now been at MIT for 13 years, with years of service as a Senior Fiscal Officer at both the Media Laboratory and the Mechanical Engineering Department, as well as a Contract Administrator in MIT's Office of Sponsored Programs.

Duane S. Boning
See p. 11

Vicky Diadiuk
See p. 12

Jing Kong
Associate Director, MTL
Professor, Department of Electrical Engineering & Computer Science

Jing Kong is a principal investigator in the Research Laboratory of Electronics (RLE) at the Massachusetts Institute of Technology (MIT). She received the B.S in chemistry from Peking University in 1997 and the Ph.D. in chemistry from Stanford University in 2002. From 2002 to 2003, she was a research scientist at NASA Ames Research Center, and from 2003 to 2004, she was a postdoctoral researcher at Delft University. She joined the MIT faculty in 2004 in the Department of Electrical Engineering & Computer Science.

Professor Kong is a member of IEEE. The research in her group focuses on the synthesis, characterization, and application of nanomaterials including carbon nanotubes and two-dimensional materials such as graphene and transition metal dichalcogenides.

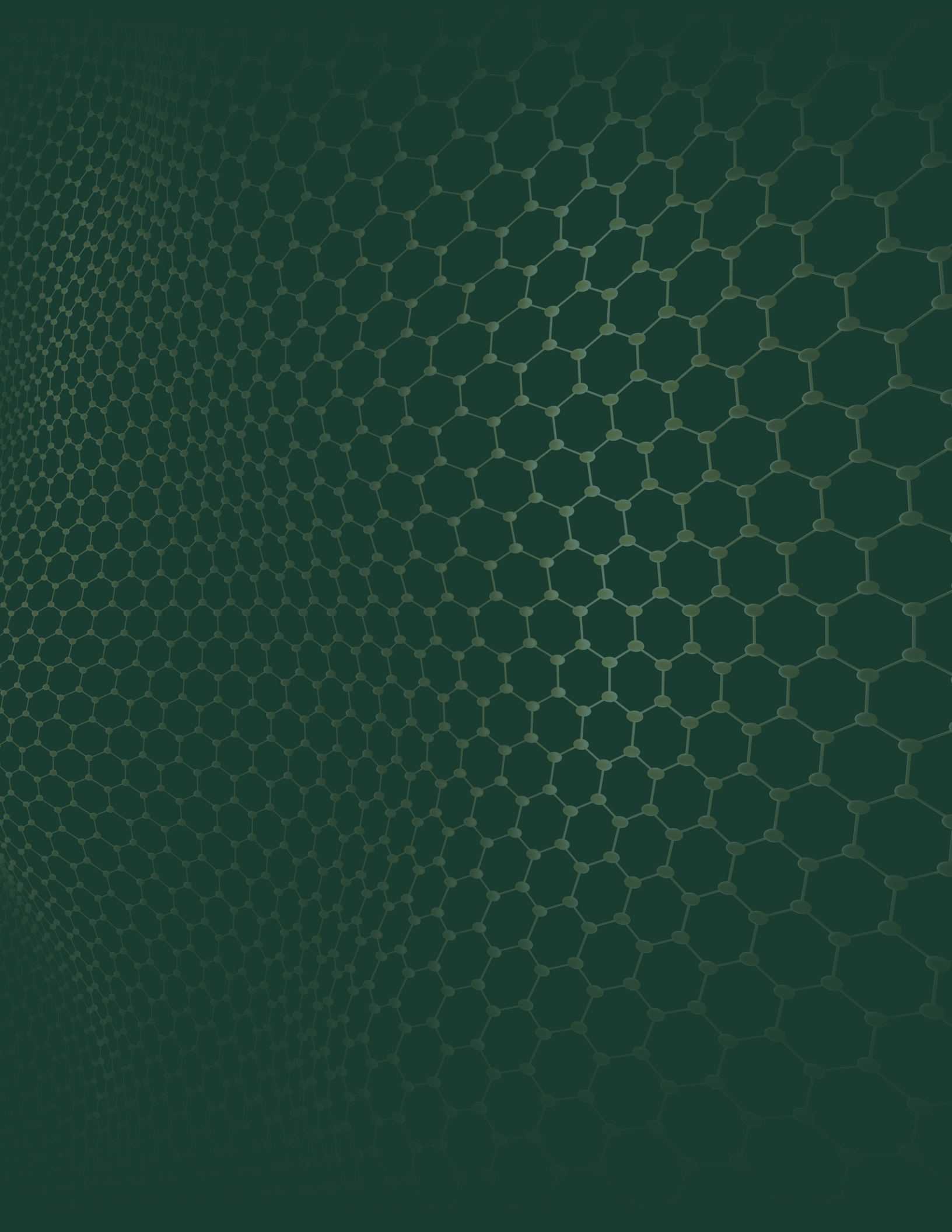
Jeffrey Lang
Associate Director, MTL
Professor, Department of Electrical Engineering & Computer Science

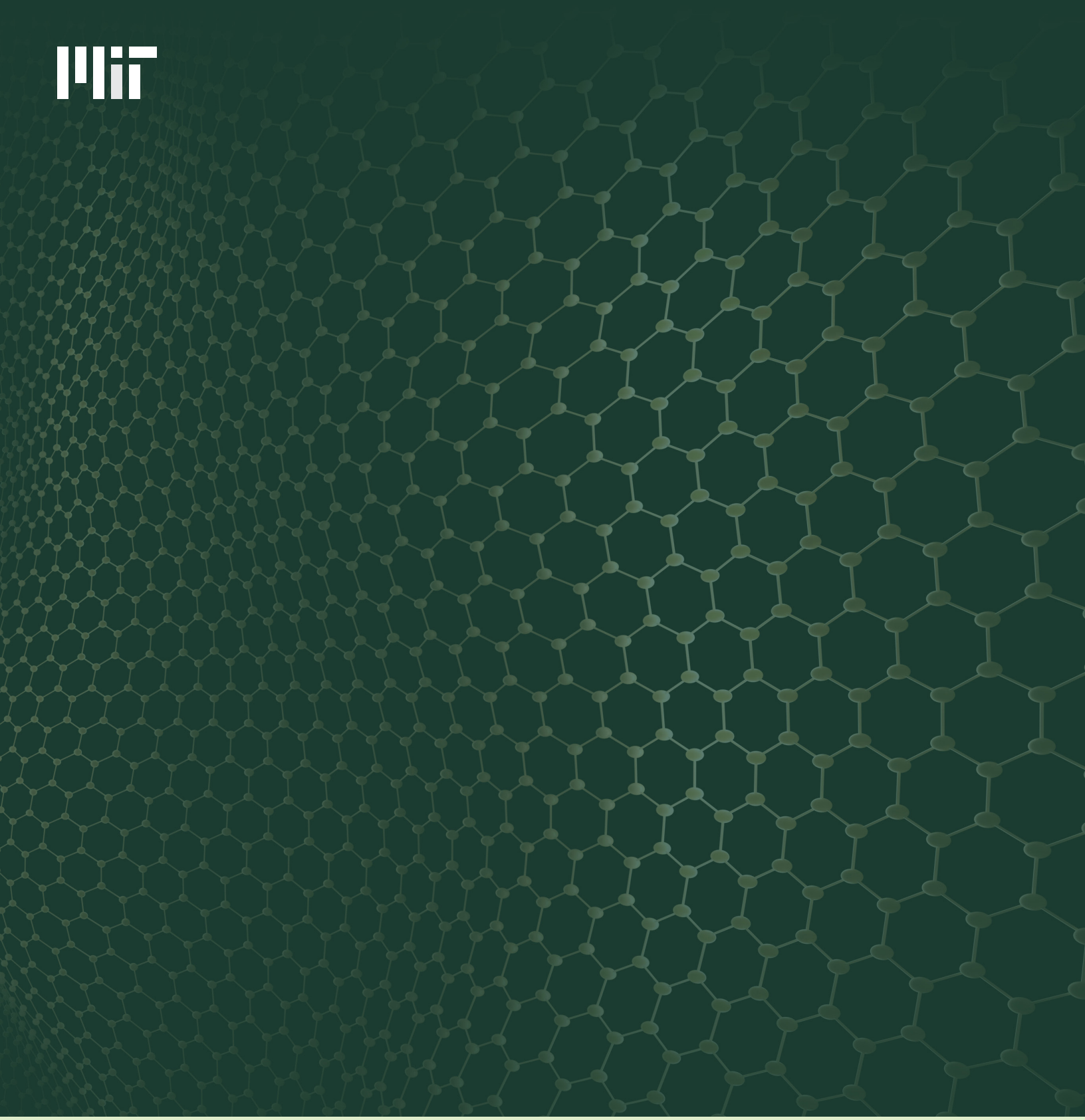
Jeffrey H. Lang received his SB (1975), SM (1977) and PhD (1980) degrees from the Electrical Engineering and Computer Science Department at the Massachusetts Institute of

Technology. He joined the faculty of MIT in 1980 where he is now a professor of Electrical Engineering and a member of the Research Laboratory of Electronics (RLE) and the Microsystems Technology Laboratories (MTL). He served as the Associate Director of the MIT Laboratory for Electromagnetic and Electronic Systems (now part of RLE) between 1991 and 2003, and as an Associate Editor of *Sensors and Actuators* from 1991 to 1994. He has been an Associate Director of MTL since 2012. Prof. Lang is a Fellow of the IEEE and a past Hertz Foundation Fellow.

Prof. Lang's research and teaching interests focus on the analysis, design and control of electromechanical systems with an emphasis on rotating machinery; micro/nano-scale sensors, actuators and energy converters; flexible structures; and the dual use of electromechanical actuators as motion and force sensors. He has written over 300 papers and holds 29 patents in the areas of electromechanics, micro/nano-electromechanical systems (MEMS/NEMS), power electronics and applied control, and has received seven best-paper awards from IEEE/ASME societies. He has also received three teaching awards from MIT. Finally, Prof. Lang is a coauthor of *Foundations of Analog and Digital Electronic Circuits*, an undergraduate text published by Morgan Kaufman, and the editor of, and a contributor to, *Multi-Wafer Rotating MEMS Machines: Turbines Generators and Engines*, a book published by Springer documenting the research results of the 15-year-long MIT Micro-Engine Project.

Hae-Seung (Harry) Lee
See p. 13





MTL MICROSYSTEMS TECHNOLOGY LABORATORIES

IN APPRECIATION OF OUR MICROSYSTEMS INDUSTRIAL GROUP MEMBER COMPANIES:

Analog Devices, Inc.
Applied Materials
Draper
Edwards Vacuum
HARTING
Hitachi High-Tech Corporation
IBM
Lam Research Corp.
NEC
TSMC
Texas Instruments