

Program in Media Arts and Sciences

Graduate Program

A total of 196 students—97 master’s candidates and 99 doctoral candidates—were enrolled in the [Program in Media Arts and Sciences \(MAS\)](#) graduate program during the 2019–2020 academic year. In addition to supervising MAS graduate students, MAS faculty and research staff collectively advised and supported more than 51 graduate students from other departments, including Biological Engineering, Physics, Electrical Engineering and Computer Science (EECS), Mechanical Engineering, Aeronautics and Astronautics, Integrated Design and Management, and Computational and Systems Biology. Faculty also supervised students from the Harvard-MIT Division of Health Sciences and Technology.

MAS offered 38 graduate courses during the academic year. The MAS graduate student community included 79 women, 89 international students, and 21 students from underrepresented minority groups. During the year, 60 advanced degrees were awarded (39 master’s degrees and 21 doctorates).

MAS received 1,112 applications to the graduate program and offered admission to 29 new students, a 1.89% admission rate. MAS is expecting 21 students to enroll, for a 72% yield.

Online Teaching and Learning

Similar to the rest of MIT, MAS transitioned all courses and seminars to online learning for the second half of the spring semester. MAS faculty used a variety of tools and experimented with different formats, and surveys with students showed that the results were generally positive. Key challenges included replicating the unique sense of community and the collaborative and hands-on pedagogy of MAS in online classes. In order to address these challenges and enhance existing digital learning tools and pedagogies, MAS supported the creation of the new Digital Learning & Collaboration Studio within the Media Lab.

Diversity and Student Support

MIT Summer Research Program

The MIT Summer Research Program (MSRP) brings undergraduate students from across the United States to conduct research at MIT for nine weeks over the summer. In addition to gaining research experience, interns learn about applying to and succeeding in graduate school. In summer 2019, the Media Lab hosted four MSRP interns.

Recruitment Efforts

Recruitment efforts were put on hold during AY2020 as we turned our focus exclusively inward. Both the Jeffrey Epstein and COVID crises created an important moment for MAS and the Media Lab to intentionally work on our cultural challenges. This has helped strengthen the fabric of the program, setting us up for more effective recruitment efforts in the coming cycle.

Women's Lunch Series

These monthly lunches serve as a space for our women graduate students and postdocs to connect and build community. Each session features a dynamic speaker who addresses some aspect of professional or personal development. Speakers during the past year were as follows:

Sarah Sobieraj—director of the Digital Sexism Project and associate professor of sociology, Tufts University—“Attacks Against Women Online and the Future of Democratic Discourse”

Catherine D'Ignazio—director of the Data + Feminism Lab and assistant professor of urban science and planning, MIT—“Intersectional Feminism: What Is It and Why Do We Need It Urgently in Tech, Data, & Design?”

Emily Whiting—assistant professor, computer science director, and Shape Lab co-director, Computer Vision & Graphics Group, Boston University—“Mechanics-Based Design for Computational Fabrication”

Margarita Mora—managing director of partnerships, Nia Tero, and Director's Fellow, MIT Media Lab—“Raven Mothers (and Fathers), the New Superheroes?”

Tavi D. Sookhoo—career development specialist, MIT Career Advising & Professional Development—“Salary Negotiation Strategies”

Random Acts of Kindness Week

As part of the MindHandHeart initiative, Random Acts of Kindness Week took place across MIT from March 9 to 13, 2020. MAS Diversity supplemented the Institute-wide events with our own activities, which were limited this year as a result of COVID-19.

Take Someone to Lunch, March 9

We encouraged the Media Lab community to spend time with a friend or meet someone new by inviting her or him to lunch (which was reimbursed by MAS). More than 65 people participated and made an effort to get to know their colleagues.

Community Shout Outs, March 13

MAS encouraged the community to shout out anyone—friends, mentors, colleagues—who has made a difference in their time at the Media Lab. We received 150 shout outs that were shared with the community and posted online.

Diversity Series

The MAS Diversity Series brings the Media Lab community together to develop skills and explore ideas of diversity and social justice through presentations and discussions. This past year Beth L. Buelow, founder of The Introvert Entrepreneur, led a presentation (“Chatty Cathys and Quiet Keiths: A Primer on Cross-Personality Communication”) and interactive discussion about bridging the personality gap between introverts and extroverts through trust and cooperation. Her presentation to the Media Lab community taught attendees how to trust and use their natural preferences to connect with and navigate the diverse personalities with whom they live, learn, and work.

Improving Lab Culture Workshops

MAS and Media Lab Human Resources worked with the Institute Discrimination and Harassment Response Office and Violence Prevention & Response to create a workshop on improving the culture of the Media Lab. Each research and operational group was scheduled to participate. The two-hour workshop explored how culture is built in a group, what helps a healthy culture thrive, and what hinders group communication. This particular workshop was not a deep dive on MIT policy or complaint handling. Rather, it was an opportunity to lay the foundation for a longer engagement about improving the culture of MAS and the Media Lab.

Professional Development

Alumni Roundtables

Alumni roundtables provide a chance for MAS students to meet with MAS alumni working in either industry or academic research in a casual setting over lunch. Alumni discuss their current research work and career paths and give students advice on possible post-MAS careers. During the past year, five MAS alumni participated in the roundtables: Mary Farbood, associate professor of music technology at New York University; Ehsan Hoque, assistant professor of computer science at the University of Rochester; Mako Hill, assistant professor of communication at the University of Washington; Ehi Nosakhare, machine learning scientist at Microsoft; and Sajid Sadi, vice president of research at Samsung.

Professional Development Series

Lily Zhang, manager for graduate student professional development, organizes programming around professional and career development, including a monthly lunch workshop series. In the past academic year, these events focused on building skills for traditional and nontraditional career trajectories. Workshops and leaders were as follows:

Academic Job Search 101—Cindy Kao, assistant professor of design and environmental analysis, Cornell University

Research Leadership, Inclusive Inquiry, & Funding Paths—Allison Druin, associate provost for research, Pratt Institute

Using Narrative to Explain Research—Tony Eng, senior lecturer, EECS

Optimize Your Presentation—Sue Acton, assistant director, MIT Career Services

What Is a PM?—Emily Salvador, associate product manager, Verizon Media

Remote Interviewing—Tavi Sookhoo, career development specialist, MIT Career Services

Undergraduate Engagement

The Undergraduate Research Opportunities Program (UROP) continued to represent the largest undergraduate presence in MAS and the Media Lab. A total of 382 undergraduates from across the Institute participated in various UROP research projects at the Media Lab,

and many students pursued their undergraduate theses and advanced undergraduate projects under MAS faculty supervision. MAS successfully pivoted to a remote UROP experience in the middle of the spring semester. Each UROP student was asked to outline a remote work plan, and the majority of the projects included a hands-on component such as computer-aided design, coding, data visualization, or media production.

Faculty and Staff

Deblina Sarkar joined the MAS faculty in summer 2019. Sarkar studied electrical engineering and physics at the Indian Institute of Technology (Dhanbad) and earned her SM and PhD degrees at the University of California at Santa Barbara. Her graduate research focused on the design and fabrication of quantum transistors and ultrasensitive electrical biosensors. She joined Professor Edward Boyden's Synthetic Neurobiology Group at the MIT Media Lab in 2015, where she was a postdoctoral associate and an MIT Translational Fellow. Sarkar now heads the Nano-Cybernetic Biotrek research group at the Media Lab and holds the AT&T Career Development Chair.

Joi Ito, professor of the practice of media arts and sciences and director of the MIT Media Lab, resigned in September 2019. Iyad Rahwan, associate professor of media arts and sciences, officially departed the lab in June 2020 after a year on leave. Rahwan took a position as director of humans and machines at the Max Planck Institute in Berlin.

The promotions of Ed Boyden and Deb Roy to full professors of media arts and sciences became effective July 1, 2019. In addition, MAS oversaw two successful faculty promotions in the 2019–2020 academic year: the promotion of Cynthia Breazeal to professor of media arts and sciences and the promotion of Fadel Adib to associate professor without tenure. Both promotions are effective July 1, 2020.

Linda Peterson, the MAS director of academic program administration, retired after almost 40 years at MIT and 32 years with the MAS program. Mahnaz (Mahy) El-Kouedi was hired in a revamped role as the new director of academic program administration to work closely with the faculty and academic head to improve faculty/advisor relations, manage faculty appointments and promotions, and develop MAS policies and procedures. Mahy comes with more than 15 years of academic administration experience and was most recently the associate dean for faculty affairs at the Harvard T.H. Chan School of Public Health.

Also from the MAS team, Monica Orta was promoted to director of diversity and student support. In this new role she manages all diversity, community-building, and student support initiatives along with recruitment and admissions. Monica also works to improve the climate and culture of the lab and MAS through our policies and programming.

Selected Honors and Awards

Fadel Adib, with Joseph Paradiso and Kevin Esvelt, was awarded a National Science Foundation (NSF) RAPID grant to develop a system that combines sensing modalities to prevent the spread of COVID-19. Adib was also named the 2020–2022 MIT Doherty Professor in Ocean Utilization.

A team within the Signal Kinetics research group consisting of Reza Ghaffarivardavagh, Sayed Saad Afzal, Osvy Rodriguez, and Fadel Adib won the Explorer Prize, which is the first stage of the Ocean Observing Prize DISCOVER Competition run by the US Department of Energy and the National Oceanographic and Atmospheric Administration.

Signal Kinetics group researchers Junsu Jang and Fadel Adib won the Best Paper Award at the 2019 ACM SIGCOMM (Association for Computing Machinery Special Interest Group on Data Communication) annual conference for “Underwater Backscatter Networking.”

Ed Boyden was awarded the 2020 Wilhelm Exner Medal.

Asmamaw (Oz) Wassie of the Synthetic Neurobiology Group was awarded a 2019 Siebel Scholarship.

Siranush Babakhanova and Michal Gala of the Synthetic Neurobiology Group were awarded 2020 Knight-Hennessy Scholarships.

Daniel Oran of the Synthetic Neurobiology Group was awarded an Activate Fellowship.

Sam Rodriques, a past member of the Synthetic Neurobiology Group, was designated a 2019 STAT Wunderkind. Rodriques also received the 2020 Hertz Foundation Thesis Prize.

Canan Dagdeviren was selected to take part in the National Academy of Engineering’s 25th annual U.S. Frontiers of Engineering symposium.

An MAS.808 course perspective article written by members of the Conformable Decoders research group and published in *Foresight* was selected for an Outstanding Paper Award by the Emerald Literati Group.

The Miniaturized Neural System for Chronic, Local Intracerebral Drug Delivery, developed with the Conformable Decoders research group, was cited by *Nature* as an example of the research that makes MIT a top-ranked institution for life sciences.

Canan Dagdeviren received a 2019 Kadir Has Promising Scientist Award for her construction of piezoelectric devices and her contributions to the careers of the young scientists in her research group.

Kevin Esvelt was awarded an NSF CAREER Award to investigate the possibility of genetically engineering daughterless mice to control mouse populations instead of using harmful poisons. Esvelt is also one of the *Inverse* Future 50, “a group of 50 people who will be forces of good in the 2020s.” In an interview with *Inverse*, he explained why he has dedicated his career to open research and community engagement: “We need to change the way that we ascend the tree of knowledge to somehow ensure that we don’t encounter anything poisonous.”

Emma Chory of the Sculpting Evolution group received a Ruth L. Kirschstein Postdoctoral Individual National Research Service Award to develop a system that will enable the development of peptide therapeutics for previously undruggable targets.

Will Langford of the Center for Bits and Atoms received the Best Student Paper Award at the International Conference on Manipulation, Automation, and Robotics at Small Scales. His paper described a discretely assembling walking motor.

The Center for Bits and Atoms hosted FABxLive, an online meeting of thousands of fab labs that focused on the pandemic response, and led an extramural working group for rapid prototyping responses to the pandemic. The center also advocated for universal access to fabrication facilities and supported Senate bill S.2195, which would lead to a national chartered network of fabrication facilities.

“A Framework for Measuring the Time-Varying Shape and Full-Field Deformation of Residual Limbs Using 3D Digital Image Correlation,” a paper by the Biomechatronics group’s Dana Solav, Kevin Moerman, and Hugh Herr, was featured on the front cover of the October 2019 edition of *IEEE Transactions on Biomedical Engineering*.

Shriya Srinivasan of the Biomechatronics group received the 2019 Delsys Prize from the De Luca Foundation for her work with agonist-antagonist myoneural interfaces for neuroprosthetic control. In addition, Srinivasan was named as one of 22 Schmidt Science Fellows for 2020 and was a \$15,000 graduate winner of the 2020 Lemelson-MIT Student Prize.

Hiroshi Ishii received the Lifetime Research Award from SIGCHI (ACM Special Interest Group on Computer-Human Interaction).

Kyung Yun Choi of the Tangible Media Group received an honorable mention in *Fast Company’s* Innovation by Design Awards in the Student category for *ambienBeat*, a tactile biofeedback device that helps users change their heart rate.

Pranam Chatterjee of the Molecular Machines group won the Top Young Scientist Award at the Frontiers of Genome Engineering Conference.

Nicole L’Huillier of *Opera of the Future* received the 2020 Harold and Arlene Schnitzer Prize in the Visual Arts.

Evergreen Blues, a collaboration between David Su of *Opera of the Future* and singer-songwriter-engineer Dominique Star, received an honorable mention for Best Student Game at the 2020 Independent Games Festival.

AttentivU and AlterEgo, both projects from the Fluid Interfaces group, received honorable mentions in *Fast Company’s* 2019 World Changing Ideas Awards.

Alum Pranav Mistry, a past member of Fluid Interfaces, has been named president and CEO of STAR Labs, an independent entity of Samsung Electronics.

TIME magazine selected Air-Ink, created by alum Anirudh Sharma (Fluid Interfaces) and his spinoff Graviky Labs, as one of the best inventions of 2019.

Judith Amores and Pattie Maes, with UROP students Mae Dotan and Jessie Wang, received a Best Demonstration Award at the 2019 IEEE (Institute of Electrical and Electronics Engineers) Engineering in Medicine and Biology Society symposium and workshop Brain, Mind, and Body: Cognitive Neuroengineering for Health and Wellness. They were recognized for their project Lotuscent: Targeted Memory Reactivation for Wellbeing Using Scent and VR Biofeedback.

Pat Pataranutaporn, Angela Vujic, alum Misha Sra, Pattie Maes (Fluid Interfaces), and David Sun Kong won the Best Paper Award at the 2020 Augmented Humans International Conference. In addition, Pataranutaporn will be a guest editor for the upcoming *IEEE Sensors Journal* special issue Advances and Current Trends in Sensing Physiological Parameters for Human Wellness and Patient Monitoring.

The Mediated Matter group's Aguahoja I was named by Dezeen as the design project of the year and as the sustainable design project of the year. In addition, the project won the art and design category of *Fast Company's* 2020 World Changing Ideas Awards.

Océane Boulais (Responsive Environments) has been accepted into a cohort of early-career ocean scientists and engineers and will participate in a two-year program to develop project ideas, enable measurements, and expand her research network.

Devora Najjar (Responsive Environments) received an early-career grant from *National Geographic* to support her Ocean Cultures project.

Rosalind Picard gave lectures as part of the Gene Brice Distinguished Lecture series at Rice University, the MIT Media Lab/Burnell Symposium at Cornell University, and the Distinguished Lecture series at the University of Toronto. Also, Picard was named a fellow of the Association for the Advancement of Affective Computing, and she chaired the association's first panel addressing ethical uses of affective computing technologies.

Affective Computing researchers Terumi Umematsu, Akane Sano, Sara Taylor, and Rosalind Picard won the Best Paper Award at the 2019 IEEE International Conference on Biomedical and Health Informatics.

Natasha Jaques won the 2019 Rising Stars in EECS Pitch Competition for "Social and Affective Machine Learning."

Kristy Johnson was awarded the MIT Hugh Hampton Young Fellowship, becoming the first person in the Media Lab to be awarded the fellowship twice.

The Commalla project, which is supported by Rosalind Picard, Pattie Maes, Kristy Johnson, and Jaya Narain, was awarded a Technology to Improve Ability grant through the MIT Deshpande Center for Technological Innovation. The project aims to create systems that can enable nonverbal people to communicate.

"Hierarchical Reinforcement for Open-Domain Dialog," authored by a team in the Affective Computing group led by Natasha Jaques and Abdelrhman Saleh, was nominated for Best Paper at the 2019 NeurIPS workshop.

Ehsan Hoque, a past member of the Affective Computing group, was selected as one of the National Academy of Medicine's 2020 Emerging Leaders in Health and Medicine Scholars.

Ramesh Raskar was awarded an NSF RAPID grant to create Safe Paths, an open-source technology for digital contact tracing, and received the Frank E. Perkins Award for Excellence in Graduate Advising for the School of Architecture and Planning. Seeing Through Fog, a project led by Raskar and Guy Satat of Camera Culture, won first place in the 2019 AutoSens Awards Most Influential Research category.

Alum Ayush Bhandari, a past member of Camera Culture and now a lecturer at Imperial College London, was awarded a Future Leader Fellowship by UK Research and Innovation.

Former Camera Culture UROP student Francisca Vasconcelos is one of MIT's five new Rhodes Scholars.

Deblina Sarkar was presented a National Institutes of Health R00 Pathway to Independence award to continue her research integrating nanoelectronics into living systems. She also received the Young Scientist Excellence Award from *Microsystems & Nanoengineering*. In addition, Sarkar won a Distinguished Alumnus Award as a Young Achiever from the Indian Institute of Technology.

Neil Gaikwad (Space Enabled) was chosen for the 2019 INK Fellowship Program for Emerging Innovators.

Danielle Wood was inducted into the International Academy of Astronautics as a corresponding member for engineering sciences. Also, on February 11, Wood testified at a hearing before the House Committee on Science, Space and Technology's Subcommittee on Space and Aeronautics ("Space Situational Awareness: Key Issues in an Evolving Landscape").

Joy Buolamwini of the Civic Media group was selected as one of *Fortune* magazine's "40 Under 40" and was honored with the Carol Jenkins Award from the Women's Media Center. In addition, Buolamwini and Director's Fellow Amanda Nguyen were selected for the inaugural *TIME* 100 Next list of rising stars.

Alum Erhardt Graeff (Civic Media) was honored with the Association of Internet Researchers' Best Dissertation Award.

With a local team in Colombia, Pedro Reynolds-Cuéllar of Civic Media developed RETOS, an artificial intelligence-powered platform designed to help connect rural communities with academics and practitioners in local universities. It was one of eight projects chosen for MIT Solve's Community-Driven Innovators class and also received the AI Innovations Prize and the UN Women She Innovates Prize for Gender-Responsive Innovation.

Chelsea Barabas of Civic Media was selected as one of the Carr Center for Human Rights Policy's 2020–2021 Technology and Human Rights Fellows.

The [bike] swarm technology conceived by Alex Berke and Thomas Sanchez Lengeling of City Science was one of the 10 ventures chosen for the 2020 MITdesignX cohort.

Kate Darling and Joy Buolamwini were included in *Wired's* list of 25 people working to address the 21st century's most pressing issues.

Nataliya Kos'myna and Caitlin Morris of Fluid Interfaces, along with Javier Hernandez and Sebastian Zepf of Affective Computing and Thanh Nguyen, received an honorable mention at the International Conference on Automotive User Interfaces and Interactive Vehicular Applications for their paper "AttentiveU: Biofeedback Glasses to Monitor and Improve Engagement and Vigilance in the Car."

Principal research scientist Shuguang Zhang received the Protein Society's 2020 Emil Thomas Kaiser Award for his highly significant contributions in applying chemistry to the study of proteins.

Bianca Datta (Object-Based Media) was awarded a 2019 Optics and Photonics Education Scholarship by SPIE, the international society for optics and photonics. She was also one of the winners of the 2019 Materials Day Poster Session at the MIT Materials Research Laboratory.

Nina Lutz (Future Sketches/Object-Based Media) received a Best Demo runner-up award at ACM BuildSys 2019 for "Colloidal Luminaries for Architectural Lighting."

Guillermo Bernal (Fluid Interfaces), Shruti Dhariwal (Lifelong Kindergarten), and Nikhil Singh (Opera of the Future) are the 2020 LEGO Papert Fellows. According to Ollie Bray of the LEGO Foundation, "I am always so excited when we select the LEGO Papert Fellows, and I'm looking particularly forward to work[ing] with Guillermo, Shruti, and Nikhil in these unprecedented times where their work, thinking, playfulness, and creative energy will be very much needed to support children of all ages to naturally learn across the home and school environment."

Monica Orta of MAS was selected for Leader to Leader, a yearlong MIT program that provides both a theoretical leadership framework and hands-on leadership experiences.

Tod Machover
Academic Head
Muriel R. Cooper Professor of Music and Media