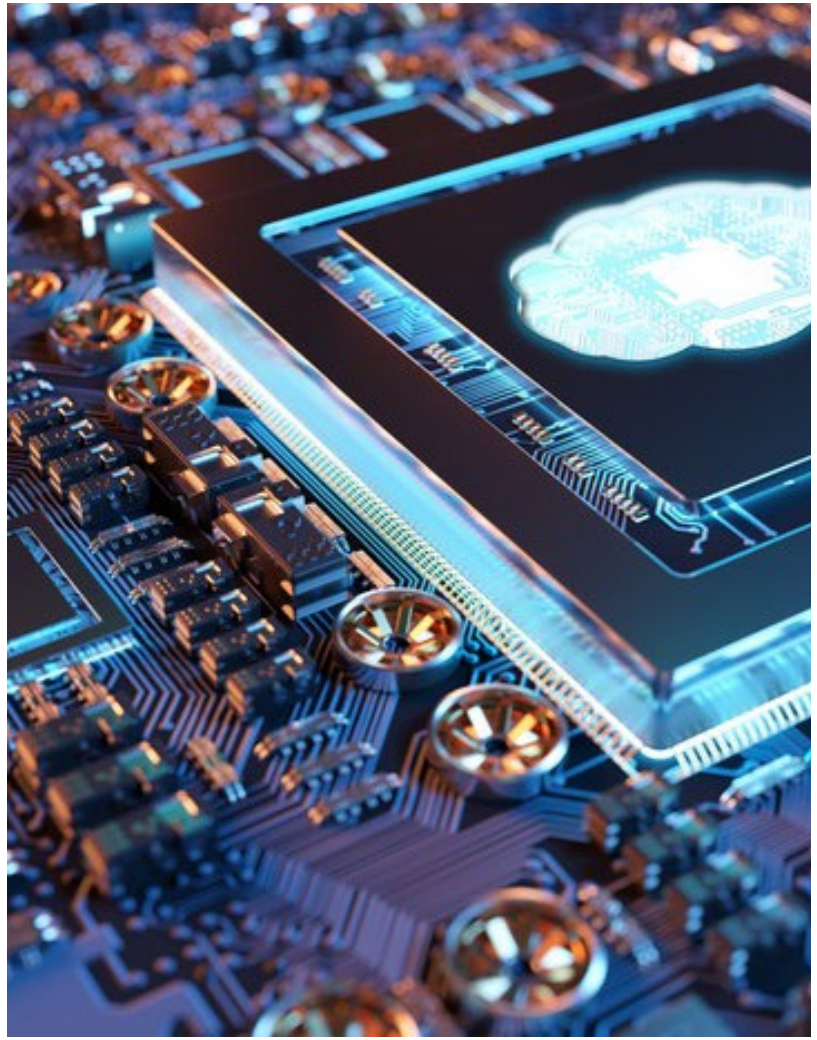
MIT AI Hardware Program

Fall Research Update

November 12, 2025 | 11:00-1:30 PM ET

Co-Leads:
Jesús del Alamo and Aude Oliva

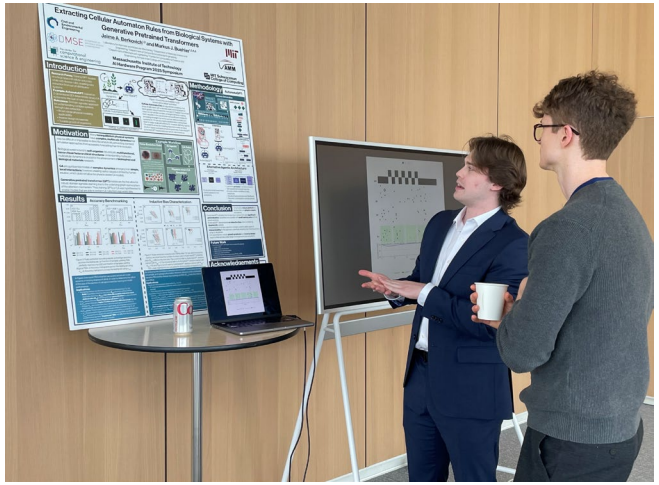


MIT AI Hardware Program

Innovating technologies that deliver enhanced energy-efficiency computing systems in the cloud and at the edge

Research Projects

The program has funded 15 projects with 12 MIT PIs.



Current project topics include:

- Framework for architecture design
- Photonic deep learning
- NLP for transformer models
- Electronic design automation
- Embedded system security
- Microprocessor reliability

Member Companies

AMD ANALOG DEVICES ASML NTTResearch tsmc

Member Engagement

- Invitations to 120+ virtual and in-person events
- Participation in Deep Tech Career Fair
- Annual fall and spring symposiums

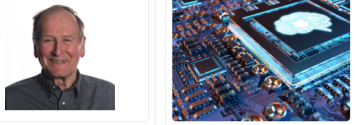
Member Resources

- Private members' portal with extended project portfolio, events, papers, and more
- 100+ recorded events
- 242 MIT news and media mentions on AI hardware-related topics
- 29 MIT AI Hardware Program newsletters
- 600+ student profiles for internships and jobs

MIT AI Hardware Program Corporate Membership Portal

Recorded Events

From past AI Hardware Program events and from the greater MIT community



Maskless Lithography Beyond E...

Date
4/9/2025

Synopsis
The high-flux free-electron lasers being developed for EUV can also deliver a better wavelength for lithography, i.e., 4.5 nm. This change, together with diffractiv...

About
Henry I. Smith is Emeritus Professor at MIT. He, his students and co-workers have contributed a number of innovations to nanoscale science and engineering, ...

Speakers
- **Henry Smith**, Professor Emeritus, MIT Dept of Electrical Engineering & Computer Science

Link to recording
Recording

2025 MIT AI Hardware Annual ...

Date
3/31/2025

Synopsis
The MIT AI Hardware Program is an academia-industry initiative between the MIT School of Engineering and MIT Schwarzman College of Computing. We ...

About
Agenda
Project Reviews
- *Increasing Architectural Resilience to Small Delay Faults ...*

Speakers
- **Jesús del Alamo**, Donner Professor, Department of Electrical Engineering and Computer Science
- **Aude Oliva**, Senior Research ...

Link to recording
Recordings

Agile Design of Domain-Specifi...

Date
2/12/2025

Synopsis
With the slowing of Moore's law, computer architects have turned to domain-specific hardware accelerators to improve the performance and efficiency ...

About
Priyanka Raina received the B.Tech. degree in Electrical Engineering from IIT Delhi in 2011, and the M.S. and Ph.D. degrees in Electrical Engineering and Computer ...

Speakers
- **Priyanka Raina**, Assistant Professor of Electrical Engineering at Stanford University

Link to recording
Recording

Towards Secure Machine Learni...

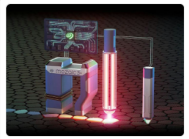
Date
12/19/2024

Synopsis
The security vulnerabilities of off-chip memory can undermine the confidentiality and integrity necessary for deep neural network (DNN) accelerators that process...

About
Kyungmi Lee received a Ph.D. degree in Electrical Engineering and Computer Science from MIT in May 2024. She is currently a Postdoctoral Associate at Pro...

Speakers
- **Kyungmi Lee**, Postdoctoral Associate, MIT

Link to recording
Recording

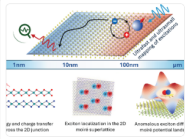


Heat Assisted Magnetic Recordi...

Date
12/4/2024

Synopsis
The high-flux free-electron lasers being developed for EUV can also deliver a better wavelength for lithography, i.e., 4.5 nm. This change, together with diffractiv...

About
Stephanie Hernandez obtained her Ph. D. in Electrical Engineering from the University of Minnesota in 2010. Her graduate research involved modeling ...



Painting potential landscapes o...

Date
12/2/2024

Synopsis
In this MIT Nano Seminar Series talk, Archana Raja, form Lawrence Berkeley National Laboratory and UC Berkeley will discuss stories from her joint experiment...

About
Atomically thin van der Waals crystals like graphene and transition metal dichalcogenides allow for the creation of arbitrary, atomically precise interfaces ...

Can we rely on future AI ICs?- R...

Date
11/21/2024

Synopsis
Seminar talk by Harald Gossner, Senior Principal Engineer at Intel, from the NanoBio Seminar Series. Future AI ICs will rely on sub-2 nm technologies and ...

About
Most advanced AI ICs components will require downscaled technologies beyond 2 nm and massive heterogeneous integration on package level to satisfy th...

2024 Mildred S. Dresselhaus Le...

Date
11/18/2024

Synopsis
This talk by Clare Grey, Royal Society Research Professor and Geoffrey Moorhouse-Gibson Professor of Chemistry at Cambridge University, will ...

About
Rechargeable batteries have been an integral part of the portable electronics revolution and are now playing a critical role in transport and grid applications to...

Professional Education

Offered at a discounted member rate

Unsupervised Machine Learnin...

Registration Deadline
November 12, 2025

Course Dates
- November 12, 2025-January 21, 2026

Faculty
- **Antonio Torralba**, Delta Electronics Professor and Faculty Head of AI+D, Department of Electrical Engineering and Computer Science...

Link
https://executive.mit.edu/course/unsupe...

Course Brochure

Artificial Intelligence in Health ...

Registration Deadline
November 12, 2025

Course Dates
- November 12, 2025-January 27, 2026
- January 28 – March 17, 2026
- March 25 – May 12, 2026

Faculty
- **Regina Barzilay**, Delta Electronics Professor, Department of Electrical Engineering and Computer Science; AI Faculty Lead, MIT Abdul Latif ...

Link
https://executive.mit.edu/course/artificia...

Course Brochure

Artificial Intelligence: Implicatio...

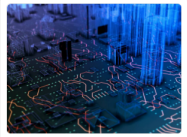
Registration Deadline
November 19, 2025

Course Dates
- November 19, 2025-January 28, 2026
- January 28 – March 17, 2026
- March 4 – April 21, 2026...

Faculty
- **Randall Davis**, Professor, MIT Computer Science and Artificial Intelligence Laboratory
- **Iyad Rahwan**, Associate Professor ...

Link
https://executive.mit.edu/course/artificia...

Course Brochure



Making AI Work: Machine Intell...

Registration Deadline
November 19, 2025

Course Dates
- November 19, 2025-January 28, 2026

Faculty
- **Simon Johnson**, Ronald A. Kurtz (1954) Professor of Entrepreneurship, MIT Sloan
- **Daron Acemoglu**, MIT Institute ...

Link
https://executive.mit.edu/course/making...

Course Brochure

Frontiers of Generative AI in Bu...

Registration Deadline
November 19, 2025

Course Dates
- November 19–21, 2025
- February 11–13, 2026

Faculty
- **Paul McDonagh-Smith**, Senior Lecturer, IT and Executive Education, MIT Sloan School of Management
- **Regina Barzilay**, SoE Distinguished ...

Link
https://executive.mit.edu/course/frontier...

Course Brochure

Designing and Building AI Prod...

Registration Deadline
December 4, 2025

Course Dates
- December 4, 2025 - February 12, 2026
- January 29 - April 9, 2026
- March 19 - May 28, 2026...

Faculty
- **Brian Subirana**, Former Director of MIT Auto-ID lab, MIT
- **Andrew Lippman**, Senior Research Scientist, MIT; Associate Director, ...

Link
https://xpro.mit.edu/courses/course-v1:x...

Course Brochure

Artificial Intelligence in Pharma...

Registration Deadline
January 21, 2026

Course Dates
- January 21–March 10, 2026
- March 11–April 28, 2026
- May 6–June 23, 2026
- July 1–August 18, 2026

Faculty
- **Regina Barzilay**, Delta Electronics Professor, Department of Electrical Engineering and Computer Science; AI Faculty Lead, MIT Abdul Latif ...

Link
https://executive.mit.edu/course/artificia...

Course Brochure

Machine Learning, Modeling, a...

Registration Deadline
February 2, 2026

Course Dates
- February 2 - March 9, 2026
- April 27 - June 1, 2026

Faculty
- **Youssef M. Marzouk**, Faculty Co-Director of MIT Center of Computational Engineering, Associate Professor of Aeronautics ...

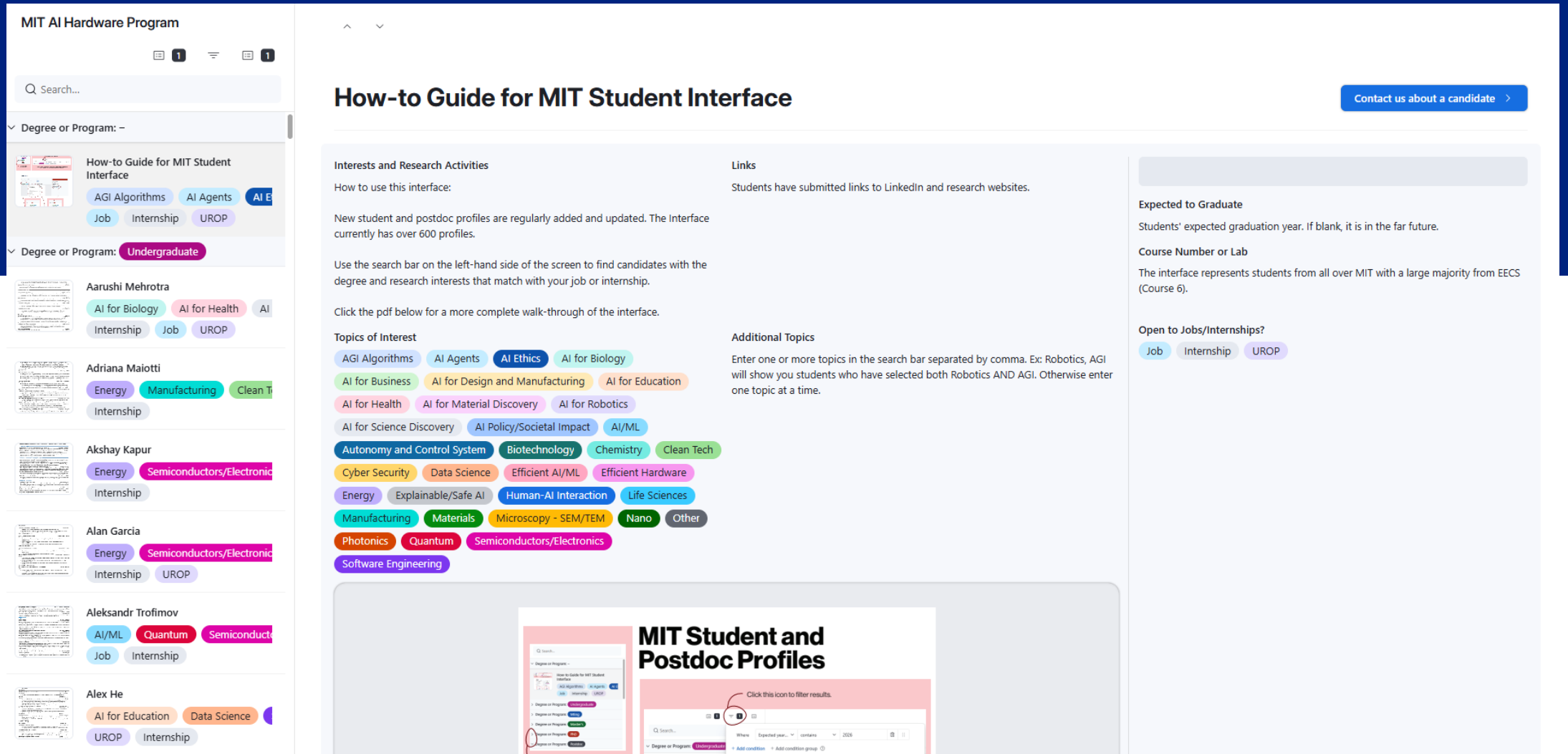
Link
https://xpro.mit.edu/programs/program...

Course Brochure

Student and Postdoc Profiles

- 600+ active profiles, new ones are regularly added.
- Access through the member portal.

- Send internship and job opportunities to program manager Emily Goldman (ediamond@mit.edu) for distribution to students.
- Schedule a Zoom session to walk through how to search based on your preferences.

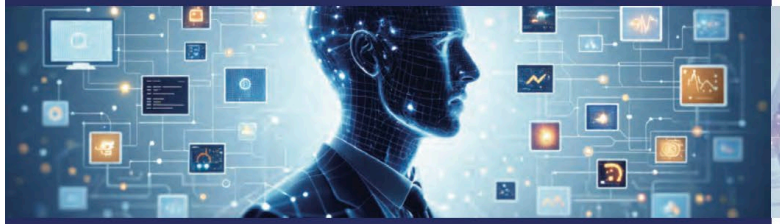


AI Hardware Prospective Projects

Machine Learning

Automated Interpretability Agents for Generative Models

This research develops Automated Interpretability Agents (AIAs) using vision-language models and interpretability tools to audit AI systems. It includes synthetic testbeds and aims to create expert-level agents for explaining advanced models across domains.



Antonio Torralba

Faculty Head, AI+D;
Delta Electronics Professor,
Electrical Engineering and Computer Science

Materials, Devices, Systems

Machine Learning-Based Phased-Array Radar with Beamforming for Vital Sign Detection

This project develops a millimeter-wave phased-array radar for contactless multi-user vital sign detection, using machine learning to optimize beamforming parameters, enhancing signal quality and tracking for improved in-home healthcare monitoring.

Anantha Chandrakasan

Dean of Engineering;
Vannevar Bush Professor,
Electrical Engineering and Computer Science

Negar Reiskarimian

Assistant Professor, Electrical Engineering and Computer Science

Agenda

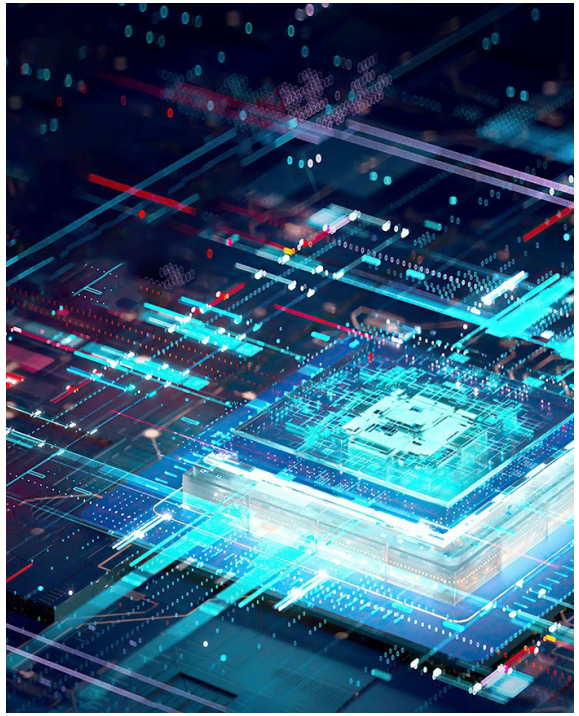
11:00-11:05	**Year in Review & the Year Ahead** *Jesús del Alamo & Aude Oliva*
11:05-11:20	**Fast Fusion Scheduling for Efficient AI Accelerators** *Vivienne Sze & Joel S. Emer*
11:20-11:35	**Neuromorphic Devices and Systems Enabled by Wafer-Scale CVD Growth of 2D Transition Metal Dichalcogenides** *Tomás Palacios & Jing Kong*
11:35-11:50	**Improving RL Sampling for Action Data Collection toward Generalized Parameter Sizing in Analog Integrated Circuits** *Yan Xu [Ruonan Han]*
11:50-12:05	**Increasing Architectural Resilience to Small Delay Faults** *Peter Deutsch [Mengjia Yan & Joel Emer]*
12:05-12:20	**SVDQuant: Absorbing Outliers by Low-Rank Components for 4-Bit Diffusion Models** *Muyang Li [Song Han]*
12:20-12:50	**More with Less: Fault-Tolerance and Information-Theoretic Optimality in Programmable Photonics** *Dirk Englund*
12:50-1:05	**Multimodal Tactile Sensing for Robotics** *Wojciech Matusik*
1:05-1:20	**A 23-µJ-per-Frame Fully-Integrated U-Net-Based TinyML Processor for Real-Time and Autonomous Medical Image Segmentation** *Zoey Song [Anantha Chandrakasan]*
1:20-1:25	**Closing Remarks** *Jesús del Alamo & Aude Oliva*

Member Access

Recordings of the talks will be available to member companies.

An archived version of the **Fall Research Update** will be available on our private, password-protected Member Portal. We will notify members via email once the recordings are available.

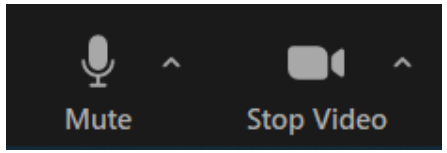
If you have any questions we are always available to assist. Contact program manager Emily Goldman at **ediamond@mit.edu**.

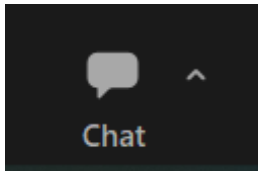


Q&A

Each talk will be followed by a short Q&A.

Please unmute your audio to ask a question. You are welcome to start your video as well.





You are also welcome to ask your questions in the chat box. They will be read by our moderator.