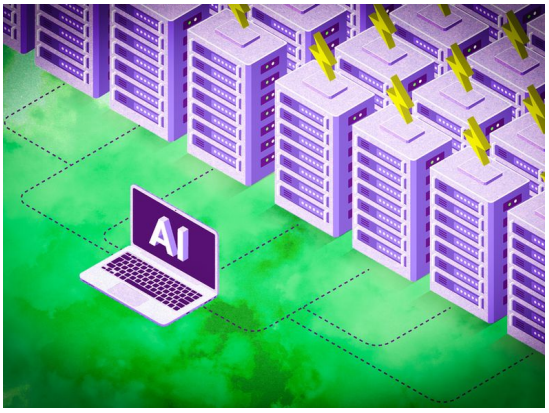
MIT-IBM Watson AI Lab

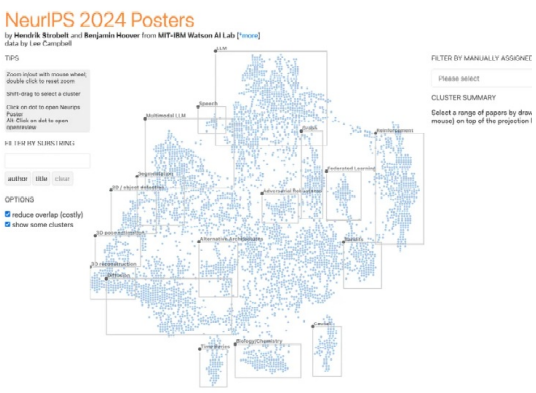
In the Lab



Explained: Generative AI's environmental impact

Environmental consequences include increased electricity demand and water consumption.

Generative AI is significantly more resource-intensive than traditional computing, which puts additional strain on the power grid leading to increased CO_2 emissions and diesel burning, demand for water cooling at data centers with biodiversity implications, and hardware manufacturing, which requires raw material mining and fabrication, explains Lab researcher Elsa Olivetti and her report co-authors.



How to visualize modern AI research at NeurIPS

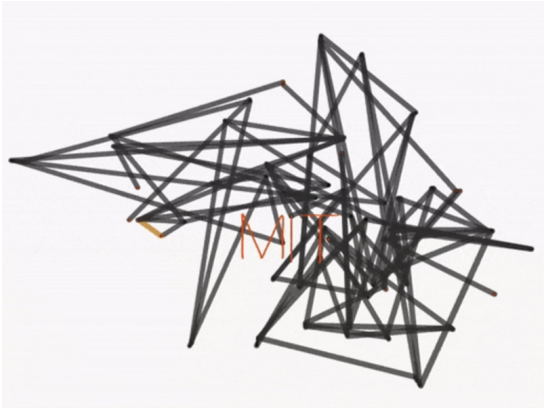
The conference sets a new record with more than 4,500 accepted publications.

Lab researchers Benjamin Hoover and Hendrik Strobelt built a visualization tool to make it easier to find and present papers at NeurIPS, a top AI conference. Using an AI model, pretrained on AI-paper abstracts, the work thematically clusters and labels papers.

A new way to create realistic 3D shapes using generative AI

[A simple fix to an existing technique could help artists and engineers create better 3D models.]

Lab researchers Kristjan Greenewald, Vincent Sitzmann, Justin Solomon, and their teams developed a technique that allows an off-the-shelf, pretrained image diffusion model to create smooth, realistic-looking 3D shapes without the need for costly retraining.



3 Questions: Inverting the problem of design

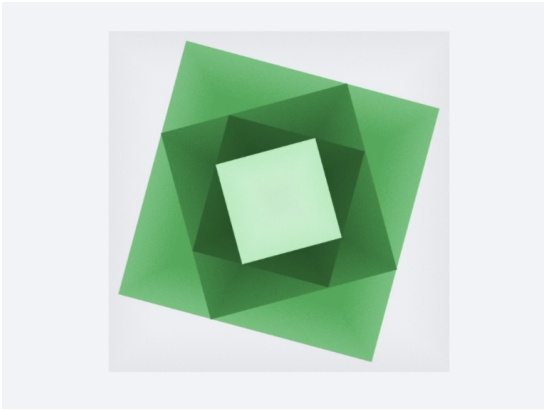
[Creating linkage mechanisms to innovate human-AI kinematic engineering]

The teams of Lab researchers Akash Srivastava, Dan Gutfreund, Kai Xu, and Faez Ahmed are augmenting engineering design workflows with machine learning and generative AI techniques to yield automated, novel mechanical systems, using planar bars and joints.

Graph-based AI model maps the future of innovation

[An AI method finds hidden links between science and art to suggest novel materials]

Similarities in patterns and complex features can be found throughout the physical world and the arts, though many are still uncovered. Work from Lab researcher Markus Buehler leverages graphs and category theory to find symbolic relationships that map across domains.



Serving customized AI models at scale with LoRA

[Low-rank adaptation (LoRA) is a faster, cheaper way of turning LLMs and other foundation models into specialists.]

Finding ways to efficiently and quickly modify base model weights with LoRAs, the Lab teams of Onkar Bhardwaj, Leshem Choshen, Kristjan Greenewald, Mikhail Yurochkin, and Justin Solomon grouped and compressed similar LoRAs together. Another group led by Leonid Karlinsky, Rogerio Feris, Soumya Ghosh, and Lab co-directors David Cox and Aude Oliva created a nearly data-free method for moving LoRAs to new versions of a model within or across families.

In the Media

Ionics for energy-efficient AI hardware

To train and run AI systems requires a substantial and unsustainable amount of energy. At TEDxMIT, Lab researcher Bilge Yildiz shared how her group is developing ionic synaptic devices — inspired by biology — that can move ions quickly, reliably, and at low energy. The devices could further be integrated into the next generation of AI chips and could enable more capable AI hardware.

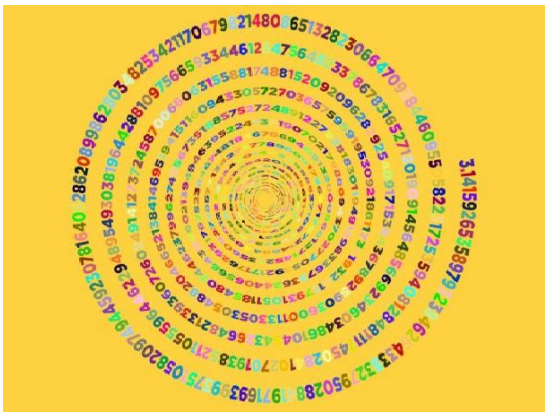
Efficient AI computing

AI model sizes have been growing at an impressive rate, and the memory capacity in the available hardware has not kept pace, leading to a need for more efficient computing, Lab researcher Song Han told TEDxMIT audiences. Han's team addresses this issue by developing quantization and compression techniques to run AI systems faster and more efficiently on resource-constrained hardware devices.

Goldman Sachs joins Lab researchers to advance biodiversity measurement

With the Lab, Goldman Sachs is helping to advance the application of artificial intelligence to biodiversity measurement — a crucial ingredient for scaling nature-based financial products and meeting the needs of assessing nature-related demands on corporates and financial institutions.

Upcoming Events



Expanding Horizons in Computing

MIT Schwarzman College of Computing
January 28-31, all day ET

Over four, in-person sessions (one per day) MIT faculty will delve into key topics in computing — such as deep learning, societal impact, crypto security, and quantum — while examining the opportunities and challenges these advancements present. Speakers include Lab researchers Antonio Torralba, Kaiming He, Phillip Isola, Yoon Kim, Will Oliver, and Kevin O'Brien. Registration required.

Lab Highlights

Lab researcher Frances Ross received the 2025 Joseph F. Keithley Award For Advances in Measurement Science “for groundbreaking advances in in situ electron microscopy in vacuum and liquid environments.”

Lab researcher Daniela Rus earned the 2025 IEEE Edison Medal recognizing her leadership and pioneering work in modern robotics, as well as the John Scott Award her robotics research that has fundamentally changed our understanding of the field. She was also inducted into the French Académie Nationale De Médecine.

Lab researcher Pin-Yu Chen was honored as an IEEE Fellow "for contributions to machine learning robustness and AI safety."

Lab researchers Sara Beery, Marzyeh Ghassemi, and Yoon Kim were honored with AI2050 Early Career Fellowships from Schmidt Futures — Eric and Wendy Schmidt’s philanthropic initiative — for their pursuit of “bold and ambitious work on hard problems in AI.”

Online Learning

Artificial Intelligence: Implications for Business Strategy
A joint MIT CSAIL and MIT Sloan School of Management Course begins
January 29

Machine Learning in Business
A joint MIT CSAIL and MIT Sloan School of Management Course begins
February 5

Driving Innovation with Generative AI
An MIT xPRO Course begins
February 10

Making AI Work: Machine Intelligence for Business and Society
A joint MIT Sloan & Schwarzman College of Computing Executive and Professional Course begins
March 12

Unsupervised Machine Learning: Unlocking the Potential of Data
A joint MIT Sloan & Schwarzman College of Computing Executive and Professional Course begins
March 19