MIT Industrial Liaison Program Faculty Knowledgebase Report

MIT AI in Software Engineering Forum

April 2, 2025 9:00 am - 1:30 pm

8:30 AM	Registration
9:00 AM	Welcome and Introduction Jim Flynn Program Director, MIT Industrial Liaison Program

Jim Flynn
Program Director
MIT Industrial Liaison Program

Before MIT, Jim was the assistant dean of research business development at the UMass Amherst College of Information and Computer Sciences. Jim founded, built, and sold multiple technology companies in fintech and online media. He has bootstrapped startups and closed venture capital, angel, and private equity funding rounds. Jim also served as the Chief Operating Officer of a public company and a subsidiary of Pitney Bowes. He began his career at AT&T as a software developer, hardware engineer, and national account manager. Jim has authored patents and wrote one of the first books on Java programming. Out of all the roles he's held, Jim's favorite job title by far is dedicated dad of four. He earned a BS from Manhattan College and an MBA with concentrations in finance and international business from New York University.

9:10 AM — State of the Art: How AI Has Impacted Software Engineering

Armando Solar-Lezama

Prof. Armando Solar-Lezama, a leading expert in program synthesis and software systems, will delve into the key transformative effects of AI on software engineering, from automating code generation to optimizing complex systems. Drawing on cutting-edge research and real-world applications, this talk will highlight the current capabilities, challenges, and future potential of AI-driven tools and techniques in revolutionizing how software is designed, developed, and maintained. Attendees will gain insights into how these innovations are reshaping the industry and what lies ahead.

9:40 AM — The Synergy of AI and Modular Design

Daniel Jackson

According to GitHub, programmers using Copilot, its AI-based code assistant, are now generating half their code with it. But look more carefully, and it turns out that almost all the code being generated is small fragments, often single functions. How might we use AI to generate entire apps? Prof. Daniel Jackson, a renowned authority on software modeling and design, will explain how success with AI in software development will depend on having radically modular structure in our apps. He'll describe a new kind of modularity (called concept design) and show how it can lead to better development processes and better software, whether built by humans or bots.

10:10 AM

AI-Powered Integrated Development Environments

Adam Chlipala

Integrated Development Environments (IDEs) are evolving with AI, becoming smarter and more intuitive to empower developers. In this talk, Prof. Adam Chlipala, an expert in formal methods and programming languages, will explore how AI is enhancing IDE capabilities—from intelligent code assistance and error detection to advanced refactoring and debugging tools. Highlighting the intersection of AI and programming environments, Prof. Chlipala will discuss breakthroughs, practical applications, and the road ahead for AI-driven software development workflows.

10:40 AM

Networking Break

10:50 AM

Enhancing Security via AI and Machine Learning

Dennis Ross

This session will discuss using machine learning and AI to detect vulnerabilities, strengthen software security, and respond to emerging threats in real-time.

11:20 AM

AI Generated Synthetic Data for Testing Software Applications

Kalyan Veeramachaneni

Our world runs on software applications. More and more of these software applications are data-driven; that is, the logic of the application depends on the data that comes in, which determines which pathway is taken through the application during run time. In order to test these applications, developers need data. Currently, their options are to wait to get access to production data, to create fake data using Faker or test data management tools, or to manually generate data.

We set out to test an alternative: We wanted to see whether AI-generated synthetic data could help improve the supply of test data. This new paradigm involves learning a generative AI model from a very small subsample of the production data. Once the model is trained, the developer can port it to different environments, sample as much data as they want, and even sample data that fits specific conditions.

Training a generative AI model to create realistic data for enterprise-grade applications required a number of foundational developments, as we needed to improve generative AI's ability to create realistic data and to handle the complexities that come with enterprise data. This included incorporating the ability to model relational databases, to capture and model data patterns pertaining to business logic, to model data based on context not available in data schemas, and to address a sprawl of data types. In this talk, I will cover how we are revolutionizing generative AI models so that they can produce data for enterprise-grade applications and datasets, and go over some recent success stories.

I will also cover another important aspect of generative AI that is often overlooked. Adopting generative AI algorithms at an enterprise level will require human involvement—they are not as automatic as we think, and require new innovations and deliberate, value-driven planning in order to succeed in this environment. I will also cover how MIT plays a unique role in an enterprise's AI adoption journey. In a field crowded with analysts, media, influencers and numerous other avenues that, while educational, are far from where rubber hits the road, this talk is an opportunity to get real about this technology and what it can do.

11:50 AM

Industry Panel: Real-World Impacts of AI in Software Engineering

Jim Flynn
Program Director
MIT Industrial Liaison Program

Lisa Amini
Director
IBM Research Cambridge

Simon Lee
Director of Data Science
Humana

Wilko Schwarting
Senior Director, Industrial Robotics & Vision
Symbotic

Leaders from the industry will share their experiences leveraging AI to transform software engineering practices. This panel will explore how AI is being applied to tackle real-world challenges, from automating development workflows to enhancing system reliability and scalability. Featuring insights from IBM, Humana, and other top innovators, the discussion will provide a deep dive into the successes, lessons learned, and emerging trends shaping the future of AI-powered software engineering. Attendees will gain valuable perspectives on the practical applications and strategic considerations of integrating AI into their development processes.

12:30 PM

Closing Remarks
Jim Flynn
Program Director, MIT Industrial Liaison Program

Jim Flynn
Program Director
MIT Industrial Liaison Program

Before MIT, Jim was the assistant dean of research business development at the UMass Amherst College of Information and Computer Sciences. Jim founded, built, and sold multiple technology companies in fintech and online media. He has bootstrapped startups and closed venture capital, angel, and private equity funding rounds. Jim also served as the Chief Operating Officer of a public company and a subsidiary of Pitney Bowes. He began his career at AT&T as a software developer, hardware engineer, and national account manager. Jim has authored patents and wrote one of the first books on Java programming. Out of all the roles he's held, Jim's favorite job title by far is dedicated dad of four. He earned a BS from Manhattan College and an MBA with concentrations in finance and international business from New York University.

12:35 PM

Networking Lunch

1:30 PM

Afternoon Session: MIT Startup Exchange Live Demo Day