Institute of Artificial Intelligence (Aii)

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Invited Speaker

Dr. Roei Herzig, MIT-IBM Watson AI Lab



"Towards Structured Physical AI Models"

Tuesday, April 14, 2026 • 2:00PM • SPRK 229 (Formerly Global) • Zoom

Abstract:
Current AI systems can synthesize videos, pass the bar exam, and write code. Despite these advances, robots still struggle with basic physical tasks, like folding a shirt, that humans perform naturally. This disparity stems from the Robotic Data Gap: Robotics has no internet. While digital AI trains on billions of hours of web data, robot learning relies on small, costly datasets that are difficult to standardize and highly heterogeneous. In contrast, humans are remarkably data-efficient, generalizing effortlessly from limited experience. This raises a key research question: Can we bridge this gap by building Physical AI systems that perceive, reason, and adapt to the physical world, driving data efficiency and scalable generalization?

In this talk, I will present recent efforts in Physical AI to integrate physical inductive biases, allowing robots to generalize beyond their limited training data. I will highlight ongoing work that incorporates structured representations, such as motion particles, object geometries, symmetries, and affordances, into learning-based robotic models. My work, spanning from manipulation arms to humanoids, demonstrates that this structured approach is the key to unlocking data-efficient Embodied AI despite the constraints of real-world data scarcity .

Bio:
Roei Herzig is a Postdoctoral Scholar at UC Berkeley and a Research Scientist at the MIT-IBM Watson AI Lab. He is advised by Professor Trevor Darrell and collaborates with Professors Jitendra Malik, Shankar Sastry, and Deva Ramanan. Roei earned his PhD from Tel Aviv University under the supervision of Professor Amir Globerson. His research develops models and learning algorithms for Physical AI, grounded in structural priors, using robots as the ultimate testbed. He has been recognized with several distinctions, including the 2023 Dissertation Award for the best AI thesis in Israel and the Israeli Excellence in Data Science Postdoctoral Fellowship.