



THE UNIVERSITY OF CHICAGO

**DATA SCIENCE
INSTITUTE**



Data Science Institute/Computer Science/Statistics
Joint Seminar

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2:00 p.m. - 3:00 p.m.

[Live Stream](#) or Zoom (details sent via seminar email announcement)

Optimization-in-the-loop AI for energy and climate

Addressing climate change will require concerted action across society, including the development of innovative technologies. While methods from artificial intelligence (AI) and machine learning (ML) have the potential to play an important role, these methods often struggle to contend with the physics, hard constraints, and complex decision-making processes that are inherent to many climate and energy problems. In this talk, I present the framework of “optimization-in-the-loop” AI, and show how it can address such challenges by enabling the design of methods that explicitly capture relevant constraints and decision-making procedures within the learning process. For instance, this framework can be used to design learning-based controllers that provably enforce the stability criteria or operational constraints associated with the systems in which they operate. It can also enable the design of task-based learning procedures that are cognizant of the downstream decision-making processes for which their outputs will be used. By significantly improving performance and preventing critical failures, such techniques can unlock the potential of AI and ML for operating low-carbon power grids, improving energy efficiency in buildings, and addressing other high-impact problems critical to climate action.

Bio: [Priya Danti](#) is a Ph.D. Candidate in Computer Science and Public Policy at Carnegie Mellon University. Her research explores methods to incorporate physics and hard constraints into deep learning models, in order to enable their use for forecasting, optimization, and control in high-renewables power grids. She is also a co-founder and chair of Climate Change AI, an initiative to catalyze impactful work in climate change and machine learning. Priya is a recipient of the MIT Technology Review’s 2021 “35 Innovators Under 35” award, the Siebel Scholarship, the U.S. Department of Energy Computational Science Graduate Fellowship, and best paper awards at ICML (honorable mention), ACM e-Energy (runner-up), PECC, the Duke Energy Data Analytics Symposium, and the NeurIPS workshop on AI for Social Good.