

**ECE/ KHOURY  
FACULTY CANDIDATE**



**SARAH DEAN**

PhD Candidate  
UC Berkeley

*Reliable Machine Learning in  
Feedback Systems*

Friday, March 26  
1:00 PM – 2:00 PM

Zoom Link:  
<https://northeastern.zoom.us/j/91638503698>

**Abstract:** Machine learning techniques have been successful for processing complex information, and thus they have the potential to play an important role in data-driven decision-making and control. However, ensuring the reliability of these methods in feedback systems remains a challenge, since classic statistical and algorithmic guarantees do not always hold.

In this talk, I will provide rigorous guarantees of safety and discovery in dynamical settings relevant to robotics and recommendation systems. I take a perspective based on reachability, to specify which parts of the state space the system avoids (safety) or can be driven to (discovery). For data-driven control, we show finite-sample performance and safety guarantees which highlight relevant properties of the system to be controlled. For recommendation systems, we introduce a novel metric of discovery and show that it can be efficiently computed. In closing, I discuss how the reachability perspective can be used to design social-digital systems with a variety of important values in mind.

**Speaker Bio:** Sarah is a PhD candidate in the Department of Electrical Engineering and Computer Science at UC Berkeley, advised by Ben Recht. She received her MS in EECS from Berkeley and BSE in Electrical Engineering and Math from the University of Pennsylvania. Sarah is interested in the interplay between optimization, machine learning, and dynamics in real-world systems. Her research focuses on developing principled data-driven methods for control and decision-making, inspired by applications in robotics, recommendation systems, and developmental economics. She is a co-founder of a transdisciplinary student group, Graduates for Engaged and Extended Scholarship in computing and Engineering, and the recipient of a Berkeley Fellowship and a NSF Graduate Research Fellowship.