Event: Fall 2025 CSM Student Poster Session - taking place on Wednesday, December 3rd

Student presenter: Ethan Baratz

Poster Title: Multi-Period Portfolio Optimization via the Hamilton-Jacobi-Bellman Equation

Abstract: In finance, many firms manage portfolios, and a challenge they face is figuring out how to allocate the wealth in the portfolio across risky assets. A mathematical model, called the Hamilton-Jacobi-Bellman (HJB) equation, uses a stochastic control framework describing the evolution of our wealth over a certain time horizon, and provides a framework for finding the optimal investment strategy and maximizing the expected utility of future wealth.

To solve the HJB equation, the continuous time solution is approximated by discretizing the time and using a Monte Carlo simulation to forecast the expected wealth. This model shows how we can combine stochastic control problems by using numerical methods to find the optimal allocation of wealth.