Cole Becker

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Summary

MIT PhD candidate developing theoretical foundations and practical applications of diffusion models for optimization and robotics. Research spans reward-aware sampling, multi-modal learning, and flow-based generative models. Seeking summer 2026 internship in generative AI.

EDUCATION

Massachusetts Institute of Technology Sep. 2023 – Present
PhD Student in Computer Science – Advisor: Pablo Parrilo Cambridge, MA

- My research focuses on two areas: 1) adapting pre-trained generative models for reward-aware sampling 2) learning across different data sources to improve sample quality in target domain.

Princeton University Sep. 2017 – May 2023
M.Eng. and B.S.E. in Electrical and Computer Engineering Princeton, NJ
Advisors: Bartolomeo Stellato and Amir Ali Ahmadi

- **GPA**: 3.79/4.0 - *Magna Cum Laude*
- **Thesis**: Learning Uncertainty Sets in Robust Optimization

EXPERIENCE

Diffusion Models for Optimization Fall 2023 - Present
Massachusetts Institute of Technology Cambridge, MA
with Professor Pablo Parrilo and Professor Asu Özdağlar

- Developed flexible diffusion-based optimization framework for (i) solving inverse problems with diffusion, (ii) sampling from tilted (reweighted) distributions, and (iii) optimizing reward functions over potentially low-dimensional distribution manifolds, without the need to train task-specific conditional models.

Diffusion for Robotics Fall 2024 - Present
Massachusetts Institute of Technology - Professor Russ Tedrake Cambridge, MA

- Developing flow-based sim-to-real transfer methods for diffusion policy training in robot manipulation.

Robust Optimization 2022 - 2023
Princeton University - Advised by Professor Bartolomeo Stellato Princeton, NJ

- Co-led a project to build a robust extension package to cvxpy to automate dualization from robust optimization problems to tractable convex programs.

JOURNAL PUBLICATIONS

Mean Robust Optimization 2023
I. Wang, C. Becker, B. Van Parys, B. Stellato

- *Mathematical Programming* 213 (1), 1235-1277
- **Best Paper Award** ICCOPT 2022

Learning Decision-Focused Uncertainty Sets in Robust Optimization 2023
I. Wang, C. Becker, B. Van Parys, B. Stellato

- arXiv preprint arXiv:2305.19225

TEACHING

Instructor – Diffusion Models Jan. 2025, 2026
Massachusetts Institute of Technology Cambridge, MA

- Co-taught introductory January course in Diffusion Models, lectured, designed problem sets, and led office hours.

Assistant Instructor – Convex Optimization and Other Courses Fall 2020 – Spring 2022
Princeton University Princeton, NJ

- Served as Assistant Instructor and Graduate/Undergraduate TA for multiple courses including Convex Optimization, Convex & Conic Optimization (PhD), and Introduction to Logic Design. Responsibilities included leading weekly office/study hours, grading and writing assignments and exams, delivering review lectures

FELLOWSHIPS AND AWARDS

National Science Foundation Graduate Research Fellowship (NSF GRFP) 2023

George Mueller Award – Princeton University 2022
Highest achievement across engineering and athletics

TALKS

ICCOPT July 2022
Learning Uncertainty Sets in Robust Optimization Lehigh University

SKILLS

Software : Python, MATLAB, CVXPY, PyTorch, JAX, NumPy, Pandas, Seaborn, Matplotlib, Java
Languages : English (native), French (B1), Spanish (B1)

ACTIVITIES

Squash 2008 – Present

- Princeton Varsity Squash Team – Captain (2020–21)
- Professional Squash Player (Top 5 U.S.)
- U.S. National Squash Team Member (2015–2021)