
Education

PhD, Computer Science and Robotics

July 2025 - *Purdue University*
Current

Masters of Engineering, Computer Science

September 2019 - *Massachusetts Institute of Technology*
February 2021

Bachelor of Science, Computer Science and Physics

September 2015 - *Massachusetts Institute of Technology*
June 2019

Honors & Talks

July 2026 **Talk: ModPPL: Probabilistic Programming in Rust**
Scientific Computing in Rust 2026

June 2026 **Best Poster Award (2nd place)**
2026 Midwest Robotics Workshop, for "Sequential Monte Carlo for Model Predictive Control"

Experience

Cambridge, MA IBM (Business Innovation Team & MIT-IBM Lab)

October 2021 - *AI Software Engineer. Managers: Mark Weber & Dan Gutfreund*
May 2023

- Conducted research for DARPA's Machine Common Sense mission, focusing on robust perception and computational reasoning.
- Deployed a Visual Question-Answering system integrating neural-based LLMs and symbolic reasoning onto a TIAGo robot, presented to clients and colleagues at IBM Think.
- Coauthored an arXiv preprint, "Barrier functions enable safety-conscious force-feedback control," contributing to live demonstrations with the TIAGo robot.

Cambridge, MA MIT Probabilistic Computing Project

June 2019 - *Master's Student. Advisor: Vikash Mansinghka*
February 2021

- Coauthored "3DP3: 3D Scene Perception via Probabilistic Programming" (NeurIPS 2021), advancing model-based vision using MCMC and SMC algorithms.
- Developed probabilistic inference and dynamic models using the Gen.jl language to synthesize Bayesian methods with deep learning.
- Conducted careful scientific investigation of state-of-the-art inference programs for inverse graphics.

Cambridge, MA ISEE

January 2018 - *Research Intern. Mentor: Wongun Choi*
September 2018

- Prepared and transformed real-world LIDAR datasets in ROS to support autonomous vehicle perception systems.
- Implemented multi-modal detection and regression ANNs using GPU-accelerated PyTorch for autonomous vehicles.

Phoenix, AZ Tandem Wealth Advisors

October 2023 - Software Consultant

April 2024

- Deployed a full-stack retirement planning model for a firm serving over 100 clients.
- Implemented an integrated back-end, Monte Carlo method, and client-facing web application.

Projects

May 2023 - **ModPPL: Probabilistic Programming Language in Rust**

July 2024 *Independent project*

- Built a modular library for probabilistic programming in Rust, integrating effect handlers, particle filtering, importance sampling, and MCMC.
- Designed a generic probabilistic generative function trait interface and dynamic modeling language using procedural macros.

February 2020 - **3DP3: 3D Scene Perception via Probabilistic Programming (NeurIPS 2021)**

January 2021 *Collaborators: Nishad Gothoskar, Marco Cusumano-Towner, Ben Zinberg*

- Developed generative models for inverse rendering using the Gen probabilistic programming system, incorporating scene graph priors.
- Designed and implemented an advanced RJMCMC algorithm to infer object poses and geometric contacts from real-world image data.

February 2019 - **Master's Thesis: Infrastructure for Modeling and Inference Engineering with 3D Generative Scene Graphs**

January 2020

Advisor: Vikash Mansinghka

- Developed infrastructure for practical implementation of 3D scene graph models, including human-editable specification, visualization tools, and structure inference algorithms.
- Designed a preliminary scene graph model and implemented inference programs using the Gen probabilistic programming language.
- Conducted synthetic enumerative tests and analyzed real-world data to optimize model hyperparameters, improving structure prediction performance.

Teaching Experiences

West Lafayette, IN **Graduate Teaching Assistant, Purdue University**

Fall 2025 - *CS 177: Programming with Multimedia Objects*

present *CS 250: Computer Architecture*

CS 536: Software Engineering for Robotics

Copenhagen, DK **Probabilistic AI School**

Summer 2024 *Teaching Assistant*

Cambridge, MA **Teaching Assistant, MIT**

Fall 2017 - *6.01: Introduction to EECS I*

Spring 2018 *6.031: Software Construction*

Skills

Programming: Python, C/C++, Rust, Julia, Haskell

Frameworks: Jax, PyTorch, TensorFlow, ROS, WebGPU, OpenGL, Gen.jl