

Milo Knowles

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<https://github.com/miloknowles>

<https://miloknowles.github.io>

WORK EXPERIENCE

Robust Robotics Lab, CSAIL – *Research Assistant*

August 2016 – September 2020

My masters research focused on uncertainty learning and online adaptation for deep stereo. As an undergraduate, I worked on monocular visual odometry and descriptor-based data association.

Skydio, Redwood City CA – *Autonomy Software Intern*

June 2019 – August 2019

Implemented autonomy features in C++ and Python for exploring, mapping, and imaging buildings. Built a web application using Three.js for overlaying aerial imagery on the 3D structures.

AdaViv, Cambridge MA – *Robotics Intern*

January 2018 – March 2018

Implemented a visual odometry pipeline in C++ for estimating the trajectory of a camera in a greenhouse and stitching together overhead imagery.

Optimus Ride, Boston MA – *Perception Software Intern*

June 2018 – August 2018

Implemented computer vision software in C++ to auto-generate maps from LiDAR, point cloud, and camera data.

Kespry, Menlo Park CA – *Software Engineering Intern*

May 2017 – August 2017

Built a web application using Node.js and PostgreSQL for annotating training data for deep learning models.

EDUCATION

Massachusetts Institute of Technology (2019-2020)

M.Eng Computer Science – 5.0 GPA

Massachusetts Institute of Technology (2015-2019)

B.S Computer Science (6-3) – 4.8 GPA

LANGUAGES & FRAMEWORKS

Languages: C++, Python, C#, Javascript, R, MATLAB, Halide

Robotics: ROS, OpenCV, PCL, LCM, Gazebo

Machine Learning: PyTorch

Web: Node.js, React.js, PostgreSQL, HTML, CSS

COURSEWORK

Computational Biology

- Biomolecular Feedback Systems
- Intro to Computational Biology

Robotics and Machine Learning

- Robotic Manipulation
- Advances in Computer Vision
- Robotics: Science and Systems
- Principles of Autonomy and Decision Making
- Computational Photography
- Applied Machine Learning

Computer Science

- Computer System Design
- Design and Analysis of Algorithms
- Introduction to Algorithms
- Computation Structures
- Video Game Design
- Computer Music

Math and Science

- Algorithms for Inference
- Optimization for ML
- Linear Algebra
- Differential Equations
- Introduction to Inference
- Physics I & II
- Calculus I & II
- Signals and Systems
- Introduction to Astronomy

SELECTED PROJECTS

6.141: Robotics Science and Systems

Wrote perception, planning, and control software for an autonomous racecar using C++, Python, and ROS. Algorithmic work included Monte Carlo localization, lane following, RRT*, Closed-Loop RRT, Motion Primitive Planning, and a pure pursuit controller.

MIT Mobile Autonomous Systems Lab 2017 – 1st Place

Designed, built, and programmed an autonomous robot to navigate through an unknown environment, collect, sort, and stack blocks. Used ROS and OpenCV with nodes in Python and C++.

MIT Pokerbots Competition (January 2020)

Implemented a particle filter and counterfactual regret minimization algorithm to train an agent to play “Permutation Hold’em”.

6.881 Class Project (Spring 2020): A Lagrange Dual Learning Framework for Solving Constrained Inverse Kinematics Tasks

Trained a neural network to produce fast, approximate solutions to inverse kinematics problems with physical constraints such as joint limits and workspace obstacles.

6.557 Class Project (Spring 2020): Designing a Feed-Forward Genetic Circuit for a Temperature-Robust Toggle Switch

Designed a circuit that uses a temperature-controlled protease to make a genetic toggle switch robust to temperature changes.

6.047 Class Project (Fall 2019): Identifying cell-specific epigenetic biomarkers for improved food allergy diagnostic testing

Used cell-type deconvolution to identify CpG locations that are differentially-methylated between control and allergic individuals. Compared the performance of predictive models for food allergy based on these epigenetic biomarkers.