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LUKE SHIMANUKI

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EXPERIENCE

Senior Software Engineer (Motion Planning) *Aurora Innovation* 2022 - present
Developed models for predicting and planning semantic driving behaviors such as merging and lane changing.

SDE II --> Senior SDE (Planning & Controls) *Magna Electronics (formerly Optimus Ride)* 2020 - 2022
Designed and implemented probabilistic model for inferring trajectories and interactions between road users.
Formulated requirements and algorithmic design for ADAS features following automotive industry safety standards.

Intern (Prediction) *Cruise Automation (General Motors)* Summer 2018

SWE Intern (Perception) *Optimus Ride (L4 Autonomous Driving)* Summer 2017

Intern (Machine Learning / Vision) *RightHand Robotics (Warehouse Picking)* January 2017

Developer *Tanius Technology (Proprietary Trading)* 2015 - 2016

RESEARCH

MIT CSAIL Learning and Intelligent Systems Group 2017 - 2020
Proved NP-hardness of 2D motion planning under obstacle uncertainty. WAFR 2018 & IJRR 2021
Developed efficient fixed-parameter algorithm for motion planning under obstacle uncertainty. WAFR 2022
Modeled value functions for guiding task-and-motion planning using graph networks. CoRL 2019 & IJRR 2021
Defined constraints for safe control in the presence of mobile obstacles with unobservable policies. (preprint)
Designed system leveraging hierarchies to efficiently solve robotic planning tasks / POMDPs. (unpublished)

Stanford Autonomous Systems Laboratory Summer 2015
Developed simulations comparing vehicle routing algorithms based on real-world ride requests. ICRA 2016
Designed vehicle routing algorithm with 10% improvement over state-of-the-art in simulation. Intel STS 2016

EDUCATION

Massachusetts Institute of Technology 2016 - 2020
M.Eng Electrical Engineering & Computer Science (AI Concentration), GPA 5.0 (out of 5)
S.B. Double Major in Computer Science and Brain & Cognitive Science, GPA 4.9 (out of 5), 5.0 in-major (CS)

Embedded Systems	Quantum Computation (G)	Natural Language Processing	Computational Intelligence (G)
Machine Learning (G)	Theory of Computation (G)	Advanced Data Structures (G)	Computational Cognitive Science
Operating Systems (G)	Robotics Science & Systems	Computational Linguistics (G)	Design & Analysis of Algorithms

ACTIVITIES

Site Manager *Food for Free COVID-19 Relief Program* 2020
Directed team of volunteers for packing groceries and handing off to drivers to deliver to ~300 households weekly.

Program Director, Head Webmaster *MIT Educational Studies Program* 2017 - 2020
Directed educational programs (Splash, Summer HSSP) reaching ~3000 students with ~1000 classes taught by ~500 teachers and run by ~100 volunteers. Mentored future directors. Maintained website used by ~5000 students.

Software Lead *AVBotz* 2012 - 2016
Managed the programming team (~12 members) for autonomous submarine capable of manipulating objects, aiming and shooting torpedoes, and navigating around obstacles. International finalist (7th Place) at RoboSub 2015.

Co-President, HPMS Branch Director *ACE Coding* 2013 - 2016
Managed ~16 volunteers to teach weekly programming lessons to ~100 middle school students annually.
Organized ACE Code Day, an 8 hour event attracting ~300 students. Taught machine vision workshop.

Middle School Tutor *Cambridge School Volunteers* 2019 - 2020

SKILLS

Proficient in:	C	C++	Python	Javascript	Java	UNIX Shell
Familiar with:	C#	LabView	Matlab	Simulink	Scala	x86 Assembly
Libraries:	ROS	OpenCV	Theano	PyTorch	ReactJS	TensorFlow

AWARDS

USA Computing Olympiad Platinum Division
Eagle Scout
Intel Science Talent Search 2016 Semifinalist
MIT Battlecode 2018 Finalist (9th place)

PROJECTS

C++ Low latency audio streaming to enable musicians to play together in-sync remotely using UDP hole-punching
C Web browser using Chromium's rendering engine with configurable vi-like key bindings
C C compiler to convert C code to x86 assembly
Java Neural network AI for a multiplayer platformer fighting game
Python Musical autocomplete to assist chord and melody composition
Python Gridded workspace manager for the i3 Window Manager