

RYAN TSE

Electrical Engineering and Math Student

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📍 College Park, MD

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Electrical engineering and math student interested in novel applications of “pure” math to engineering problems, particularly in control theory, machine learning, and digital signal processing (DSP). Graduating with a combined B.S./M.S. in Spring 2023. Previously worked on radar DSP at Nuro, a self-driving delivery vehicle startup. Currently developing a robust, geometry-inspired reinforcement learning alternative tailored to multi-agent control problems with funding from New Science.

WORK EXPERIENCE

Nuro

Intern (Radar)

📅 June 2020 – August 2021 📍 Mountain View, CA

Developed, simulated, and implemented digital signal processing algorithms for radars on self-driving delivery vehicles.

Intelligent Automation Incorporated

Intern (Communications, Localization)

📅 June 2019 – August 2019 📍 Rockville, MD

Assisted in the hardware implementation of a bursty space-time continuous phase modulation receiver by analyzing quantization error. Assisted in developing indoor positioning system technology by modifying tracking filters to include IMU data.

Naval Research Laboratory

Intern (Communications)

📅 May 2018 – August 2018 📍 Washington, DC

Developed an efficient bursty satellite ranging protocol in GNURadio. Applied control loops to correct for channel impairments and implemented packet protocols.

Naval Research Laboratory

Intern (Localization)

📅 June 2017 – August 2017 📍 Washington, DC

Applied deep learning to vehicle trilateration.

TOOLS

Experienced:

Python C Matlab Java Git \LaTeX Linux

Familiar:

C++ Rust GNURadio PyTorch Tensorflow
OpenCV Verilog KiCAD Cadence

Novice:

Simulink JAX ROS AWS+GCP
JS/HTML/CSS MIPS ASM

EDUCATION

University of Maryland

B.S. + M.S. in Electrical Engineering, B.S. in Mathematics

📅 Aug 2019 – Present

Select Completed Courses

(star indicates graduate level course)

- Advanced Calculus
- Partial Differential Equations
- Differential Forms
- Systems Theory *
- Communications Systems
- Optimization for Control *
- Optimal Control *

- Controls Lab
- Capstone Design: Accelerator Physics

Select Current Courses:

- Abstract Algebra *
- Random Processes *
- Advanced Digital Signal Processing *
- Stochastic Control *

PROJECTS

Computationally Approximated Manifold Control

Independent Research

📅 March 2021 - Present 📍 College Park, MD

Inventing a robust, geometry-inspired reinforcement learning alternative tailored to multi-agent control problems. Funded by New Science. Details and paper coming soon.

Auto-Drifter

Hackathon Project

📅 April 2022 - Present 📍 College Park, MD

Designing a model-predictive control (MPC) law to autonomously drift a car in VDrift. Solved LQR on a linearized model for the short-time optimal control. Working through a numerical instability in linearization. Plan to eventually implement direct multiple shooting on the nonlinear model.

blair3sat

Team Founder, President, and RF Instrument Engineer

📅 2017 – 2019 📍 Rockville, MD

Developed a CubeSat to measure 3D ionospheric charge density profiles by receiving ground-based ionospheric sounders from space. Designed DSP algorithms for the instrument and lead the team in spacecraft engineering and fund seeking in an executive capacity. Secured \$6,000 of funding and two corporate partnerships in 6 months. Co-wrote conference presentation for SmallSat 2019.