# NATHAN T. HATCH

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## ROBOTIC SYSTEMS ENGINEERING EXPERIENCE

**RACER Project, U. of Washington**                                    Seattle, WA
**Software Team Lead**                                    September 2021 - present

**Develop perception, planning, and control software for ~10 m/s autonomous navigation of a Polaris RZR in off-road terrain including dirt trails, steep hills, tall grass, bushes, trees, water, and rocks**
· Brainstorm and prioritize big projects that might improve autonomous performance (e.g. variable $dt$)
· Design and implement features for local planning and control (e.g. attitude costs)
· Design and implement tools for efficient development and field tests (e.g. testing on rosbag replay)
· Curate regression test cases and tune parameters to pass the tests
· Prepare software for weekly field tests (code review, simulation validation, writing field test plan)
· Attend field tests, direct experiments, drive chase vehicle, and assist with recovery after accidents
· Analyze field test results to identify issues and propose solutions (e.g. open-loop execution at waypoints)
· Manage 10-person team (maintain task tracking system, weekly group meeting, and several 1-1s)
· Recruit and interview team members and maintain onboarding materials
· Explain technical progress to stakeholders, including UW PIs and DARPA program manager
· Handle software-related logistics (e.g. data offload, security, shipping computing equipment)

**SARA Project, U. of Washington**                                    Seattle, WA
**System Engineer**                                    June 2019 - September 2021
· Conducted weekly field experiments for perception, planning, and control of a Clearpath Warthog robot (a.k.a. Argo J5 XTR) outfitted with cameras and an Ouster OS2 LIDAR sensor
· Handled physical and electrical hardware integration for new sensors
· Sped up the LIDAR processing pipeline to 10Hz to support 3m/s vehicle velocities

**Husky Robotics Club, U. of Washington**                                    Seattle, WA
**Software Subsystem Lead**                                    January 2020 - September 2021
· Wrote software for teleoperation and autonomous control of a student-designed and -built Mars rover
· Recruited team members and delegated tasks to prepare for the University Rover Challenge (URC)
· Implemented a planar navigation simulator with A* search, and inverse kinematics for the rover arm
· Teleoperated the rover during the 2021 virtual URC, in which we placed 3rd globally!

## EDUCATION

**University of Washington, Seattle**                                    January 2020 - September 2021
M.S. in Computer Science & Engineering; Advisor: Dr. Byron Boots

## ACADEMIC PUBLICATIONS

**N. Hatch** and B. Boots. "The Value of Planning for Infinite-Horizon Model Predictive Control." *ICRA 2021.* https://arxiv.org/abs/2104.02863.

A. Shaban, C. Cheng, **N. Hatch**, and B. Boots. "Truncated Back-Propagation for Bilevel Optimization." *AISTATS 2019.* http://proceedings.mlr.press/v89/shaban19a.html.

## TECHNICAL STRENGTHS

Python, C++, ROS, Git, PyTorch, TorchScript