







Seth Nielsen

Electrical & Computer Engineering | MS Student

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EDUCATION — BRIGHAM YOUNG UNIVERSITY

August 2021 **Master of Science: Electrical and Computer Engineering | Advisor: Randy Beard**

August 2018 Bachelor of Science: Mechanical Engineering with Computer Science minor

WORK EXPERIENCE

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|------------------------------------|--|
| Present
May 2018 | Graduate Research Assistant — Autonomous Landings for UAVs BYU MAGICC Lab Provo, UT <ul style="list-style-type: none">➤ Investigated the use of various sensors in the autonomous landing of multirotors on arbitrary ships at sea and of eVTOL aircraft in urban environments➤ Extended Microsoft AirSim, a simulator for multirotors, to include tiltrotor eVTOL aircraft, including dynamics model, control inputs, animated mesh, and PX4 autopilot integration in photorealistic city environment powered by Unreal Engine (GitHub link, YouTube link)➤ Created a software-in-the-loop simulation tool that combines high-end graphics with real autopilot software to produce a high-fidelity camera and physics simulator, used by other students for research and in a BYU course on quadrotor control (YouTube link) <div>C++ Python Controls Simulation SITL Software Engineering Deep Learning Unreal Engine</div> |
| Dec 2017
May 2017 | Robotics Internship — Lead, full ownership of project Hall Labs Provo, UT <ul style="list-style-type: none">➤ Designed and built prototype of robotic self-parking chair capable of moving a 180-lb person➤ Produced mechanical design in CAD and manufactured it, and designed and built the circuitry➤ Wrote high-level and low-level software for onboard computer and microcontrollers <div>Embedded Programming C++ Python Estimation Circuits CAD Prototyping</div> |

SKILLS

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| Programming | C++, Python, Rust, Java, MATLAB, Embedded, High Performance Computing |
| Tools | Linux (Arch, Ubuntu), Windows, Unreal Engine, Qt |
| Experiential | Driving independent and team projects to completion, leading teams, using Git to manage large code bases |

PROJECTS

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|---|----------------------|
| UNIVERSITY ROVER CHALLENGE — 1ST PLACE IN AUTONOMOUS TRAVERSAL TASK <ul style="list-style-type: none">➤ Lead autonomous navigation engineer for the BYU Mars Rover Team: the only team to complete the final, fully autonomous navigation portion of task (YouTube link)➤ One of the lead operators of the rover throughout development, testing, and competition; implemented much of the team's user interface and networking software➤ Wrote code for state machine of obstacle detection and avoidance using lidar and potential field avoidance algorithm➤ Trained deep neural network to detect goal markers and adapted it for real-time inference on rover, achieved nearly perfect accuracy during competition➤ Implemented controller for GPS waypoint following and vision-based controller to approach within required 2 m radius of goal marker <div>C++ Python GNC Estimation Controls Software Engineering Deep Learning Leadership Operation</div> | JAN 2017 — JUNE 2018 |
| CO-FOUNDER, TESTING LEAD, AND SECRETARY OF BYU ROCKETRY CLUB <ul style="list-style-type: none">➤ Co-founded the BYU Rocketry Club; now 60+ members including a university-funded capstone team➤ Competed in IREC 2017 as avionics lead, achieved 95% of target apogee in competition launch➤ Created Python simulation to model active guidance of rocket to a target apogee using airbrake system, gathered wind-tunnel data to improve modelling➤ Managed communication between team and faculty; ensured all project milestones were met on time <div>Python MATLAB LabView Simulation Testing Leadership</div> | AUG 2016 — AUG 2017 |