# Seth Nielsen


Electrical & Computer Engineering | MS Student

linkedin.com/in/nielsenseth github.com/sethmnielsen
sethmnielsen@gmail.com U.S. Citizen +1 540 604 4632


## 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

**Present – May 2018** **Graduate Research Assistant — Autonomous Landings for UAVs | BYU MAGICC Lab** | Provo, UT

- 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 (GitHub 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

C++ | Python | Controls | Simulation | SITL | Software Engineering | Deep Learning

**Dec 2017 – May 2017** **Robotics Internship — Lead, full ownership of project | Hall Labs** | Provo, UT

- 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

Embedded Programming | C++ | Python | Estimation | Circuits | CAD | Prototyping

## Skills

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

## Projects

### University Rover Challenge — 1st Place in Autonomous Traversal Task

Jan 2017 — June 2018

- 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

C++ | Python | GNC | Estimation | Controls | Software Engineering | Deep Learning | Leadership | Operation

### Co-founder, Testing Lead, and Secretary of BYU Rocketry Club

Aug 2016 — Aug 2017

- 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

Python | MATLAB | LabView | Simulation | Testing | Leadership