Seth Nielsen

Electrical & Computer Engineering | MS Student

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Education — Brigham Young University

Aug 2021	**Master of Science: Electrical and Computer Engineering	Advisor: Randy Beard**	GPA: 3.5
Aug 2018	Bachelor of Science: Mechanical Engineering — Computer Science minor	GPA: 3.6

Work Experience

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

- Created a simulator from scratch that combines high-end graphics with real autopilot software to produce a high-fidelity SITL flight and camera simulation for UAVs, now used by other students for research and adopted by a university course to teach vision-based quadrotor control (YouTube link)
- Built a completely new vehicle type — eVTOL aircraft — for Microsoft AirSim, a simulator for multirotors; including dynamics model, control inputs, animated mesh, and PX4 autopilot integration in photorealistic city environment powered by Unreal Engine (GitHub link, YouTube link)
- Investigated the use of various sensors in the autonomous landing of multirotors on arbitrary ships at sea and of eVTOL aircraft in urban environments

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

Dec 2017 – May 2017 | **Robotics Internship — Full Ownership of Project | Hall Labs** | Provo, UT

- Designed and built prototype of robotic self-parking chair capable of moving a 180-lb person
- Designed the mechanical and electrical components, then manufactured them
- Wrote high-level and low-level software for onboard computer and microcontrollers
- Conducted tests, analyzed performance, found issues and made a completely new design
- Built and tested second prototype which successfully met all performance goals

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

Skills

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

Jun 2018 – Jan 2017 | **1st Place in Autonomous Traversal Task — University Rover Challenge**

- Lead engineer in autonomous navigation for the BYU Mars Rover Team: the only team to successfully complete the fully autonomous navigation portion of task (YouTube link)
- One of the lead rover operators in the competition and throughout development
- Wrote the code for nearly all UI involved in rover operation, including the networking backend
- Programmed potential field algorithm for obstacle detection and avoidance using laser scanner
- Trained deep neural network to detect goal markers and adapted it for real-time inference on rover, achieved nearly perfect accuracy during competition
- Implemented GPS waypoint following and vision-based controllers to fulfill requirement of arriving within 2-meter radius of goal marker

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

Aug 2017 – Aug 2016 | **Co-founder, Testing Lead, and Secretary of BYU Rocketry Club**

- 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 target apogee using airbrake system, performed wind tunnel tests on prototype to improve model
- Managed communication between team and faculty; ensured all project milestones were met on time

Python | MATLAB | LabView | Simulation | Testing | Leadership