







# Seth Nielsen

## Electrical & Computer Engineering | MS Student

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## EDUCATION — BRIGHAM YOUNG UNIVERSITY

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

## WORK EXPERIENCE

Present May 2018	<b>Graduate Research Assistant — Autonomous Landings for UAVs   BYU MAGICC Lab   Provo, UT</b> <ul style="list-style-type: none"><li>&gt; 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 ( <a href="#">YouTube link</a> )</li><li>&gt; 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 ( <a href="#">YouTube link</a>, <a href="#">GitHub link</a> )</li><li>&gt; Investigated the use of various sensors in the autonomous landing of multirotors on arbitrary ships at sea and of eVTOL aircraft in urban environments</li></ul> <div>C++ Python Controls Simulation SITL Software Engineering Deep Learning Unreal Engine</div>
Dec 2017 May 2017	<b>Robotics Internship — Full Ownership of Project   Hall Labs   Provo, UT</b> <ul style="list-style-type: none"><li>&gt; Designed and built prototype of robotic self-parking chair capable of moving a 200-pound person</li><li>&gt; Designed the mechanical and electrical components, then manufactured them</li><li>&gt; Wrote high-level and low-level software for onboard computer and microcontrollers</li><li>&gt; Conducted tests, analyzed performance, discovered design flaw and made a completely new design</li><li>&gt; Built and tested second prototype which satisfied company's goals for mobility, load capacity and stability</li></ul> <div>Embedded Programming C++ Python Estimation Circuits CAD Prototyping</div>

## SKILLS

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

## PROJECTS

Jun 2018 Jan 2017	<b>1<sup>st</sup> Place in Autonomous Traversal Task — University Rover Challenge</b> <ul style="list-style-type: none"><li>&gt; Lead engineer of autonomous navigation for the BYU Mars Rover Team, a team of 23 individuals</li><li>&gt; Rover successfully traversed the final, fully autonomous stage of task; no other rover of the 35 international teams was able to do so ( <a href="#">YouTube link</a> )</li><li>&gt; One of the primary rover operators in the competition and throughout development</li><li>&gt; Wrote the code for nearly all UI involved in rover operation, including the networking backend</li><li>&gt; Programmed potential field algorithm for obstacle detection and avoidance using laser scanner</li><li>&gt; Trained deep neural network to detect goal markers and adapted it for real-time inference on rover; achieved nearly perfect accuracy during competition</li><li>&gt; Implemented GPS waypoint following and vision-based controllers to fulfill requirement of arriving within 2-meter radius of goal marker</li></ul> <div>C++ Python GNC Estimation Controls Software Engineering Deep Learning Leadership Operation</div>
Aug 2017 Aug 2016	<b>Co-founder, Testing Lead, and Secretary of BYU Rocketry Club</b> <ul style="list-style-type: none"><li>&gt; Co-founded the BYU Rocketry Club; now 60+ members including a university-funded capstone team</li><li>&gt; Competed in IREC 2017 as avionics lead, achieved 95% of target apogee in competition launch</li><li>&gt; Created Python simulation to model active guidance of rocket to target apogee using airbrake system, performed wind tunnel tests on prototype to improve model</li><li>&gt; Managed communication between team and faculty; ensured all project milestones were met on time</li></ul> <div>Python MATLAB LabView Simulation Testing Leadership</div>