Brooke Hudson

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Education

Cornell University - *BS* Fall 2021 - Spring 2025

Computer Science and Mechanical Engineering (Double Major)

Relevant coursework: Computer Graphics (and Practicum), Visual Imaging in the Electronic Age, Foundations of Robotics, Mechatronics, Fast Robots, Internet of Things, Climate & Energy, Future Energy Systems, Object Oriented Programming, Functional Programming & Data Structures, Discrete Structures, Computer System Organization, Operating Systems, Analysis of Algorithms, Statics, Dynamics, System Dynamics, Thermodynamics, Fluid Mechanics, Heat Transfer, Fluids and Heat Transfer Lab, Mechanical Synthesis, Mechanics of Materials

Relevant Activities: Cornell CUP Robotics, Women in Computing at Cornell , Project Greenhouse President

Sussex Academy High School Fall 2017 - Spring 2021

Relevant Activities: Technology Student Association & VEX Robotics, Mu Alpha Theta Math Tutor, Civil Air Patrol Cadet, National Honor Society, Green Team, Lewes Library Volunteer

Academic Projects

Computer Vision Traffic Tracking for Environmental Justice - *Senior Design Project* Spring 2025

The environmental justice group Blueprint Geneva partnered with Cornell University, requesting a device that would count different types of trucks and traffic and send this data back to them. Using a Raspberry Pi Zero 2 W, camera, and AdaFruit Feather board, the video from the camera at the road location used a YOLO computer vision (CV) model and OpenCV to identify the different types of traffic (object detection). The Feather board used LoRaWAN to transmit the data back to the environmental justice group.

Cornell Big Red Make-a-thon - *1st Place Best Hardware* Spring 2024

In this 24 hour make-a-thon themed "smart cities," a robot was designed with the capability to guide blind or disabled citizens through potentially dangerous traffic safely. The hardware design was completed in Fusion360, with some electrical integration using LiDAR obstacle detection methods and partial Google Maps API integration.

Cornell CUP Robotics - *Path Planning & Mechanical Engineering Teams* Spring 2022 - Spring 2024

Using a LiDAR system/ API and an A* algorithm, a lab robot was programmed to travel autonomously using python. Collaboration was implemented using GitHub. I also gained experience with 3D printing, CAD modeling in Fusion360, Ansys Workbench Analysis, and general machine shop training.

Job and Internship Experience

Charles Stark Draper Laboratory - *Strategic Systems Engineering Intern* Summer 2024

During this internship, I used MATLAB and C++ to assist in the creation of a plotting tool for use on multiple projects, primarily the M2 and M3 iSpace moon rover program. The old method of checking data for these projects did not run in parallel and took too long to generate the plots. Additionally, I assisted with unit test implementation for the flight software on the same moon rover project.

Cornell University - *Data Structures and Functional Programming Consultant* Fall 2023

Being a consultant for this course required providing guidance about programming in OCaml and how to use data structures relevant to the course. This is done by hosting office hours and grading student exams.

Charles Stark Draper Laboratory - *Model Based Systems Engineer* Summer 2023

I used C++, MATLAB/ Simulink, and some YAML to test that physical models related to defense system projects passed contractual requirements. I applied mathematical and physical concepts such as the motion of stars over time for celestial navigation tasks within a multiple repository system, gaining experience with industry tools such as GitLab and Jira. I also gained experience with maximizing the efficiency of code flow and organization.

Cape Henlopen State Park - *Nature Interpreter* Summer 2022

I educated state park visitors about local natural phenomena and assisted with aquarium upkeep.

Technical Skills

Python, MATLAB/Simulink, C++, Java, OCaml, Autodesk Fusion360, Git, Visual Studio Code, Arduino IDE, Jira, OpenCV, Ultralytics YOLO, Jupyter Notebook, Soldering, Bantam CNC machining, 3D Printing, Raspberry Pi & Raspberry Pi OS