# Caleb Patton

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#### **EDUCATION**

**University of Nevada, Reno** - *M.S. Mechanical Engineering* Control Theory, Autonomous Vehicles, Aerospace

Jan 2023 - Dec 2024 GPA: 4.0/4.0

**University of Illinois, Urbana-Champaign** - *B.S. Computer Engineering* Deep Learning, Robotics, Embedded Systems, Hardware, Statistics

Aug 2018 - May 2022 GPA: 3.77/4.0

#### **EXPERIENCE**

## Graduate Research Assistant - University of Nevada, Reno

Jan 2023 - Present

Learning Autonomy and Control Systems Lab + Robotic Workers Lab

Reno, NV

- Used ROS, Python, and C++, to architect a Simulated Environment for Autonomous Vehicles using CARLA, Gazebo and PX4 to test Control, Mapping and Deep Learning Algorithms
- Used the DJI SDK and ROS to create a Perception HW/SW stack to fly a DJI M600 fully autonomously in a GPS-Denied Environment by using Sensor Fusion on LIDAR, RGB-D and IMU data
- Tested the accuracy of the Voxblox and Octomap mapping algorithms in a simulated environment
- Researched methods of generating optimal trajectories for UAVs to avoid obstacles, moving and static, using Deep Learning and SLAM

## Computer Vision and Robotics Intern – Brunswick Corporation

Feb 2021 - Dec 2021 Champaign, IL

- Autonomy Team
  - Developed 2 perception systems for an autonomous watercraft to detect swimmers, boats, docks, and other obstacles using FasterRCNN, YOLOv5 and MaskRCNN at 30 fps and 10 fps
  - Optimized performance of C++ code for scientific computing to support autonomous boating simulations
  - Researched methods to utilize and generate synthetic data to improve performance of DNNs using Unreal Engine by varying time of day, weather conditions and object generation
  - Led team of 15 interns in marine RGB and IR image data collection and subsequent obstacle labelling processes using a dSpace Autera and Microsoft Azure
  - Ran mapping algorithms on mobile robotic platforms using LiDAR Sensors and Raspberry Pi Cameras

#### **PROJECTS**

### Multivariate Time Series Transformer Model - Python, PyTorch, Pandas

2023

Used Python to implement and train a Transformer Deep Neural Network to classify Multivariate Time
Series data with 93% accuracy on an unseen test set

#### x86 Operating System (ECE391) - C, Assembly, QEMU

2020

Used C to implement Page Tables, Interrupt Service Routines, and other features of an OS Kernel

## RC Tricopter Scratch Build - Electronics, RC Aircraft, CAD

2020

- Designed a Quadcopter frame that could constructed for under 5 dollars to test RC hobby electronics
- Used Fusion360 to design a folding arm Tricopter frame that could be cut from acrylic on a Laser Cutter

## **TECHNICAL SKILLS**

**Programming**: Python, C/C++, PyTorch, CUDA, ROS, Docker, SQL

Manufacturing: 3D Printing (FDM, SLA), Laser Cutters, Soldering, Power Tools

**CAD**: Fusion360, NX 12.0