# Nathan Litzinger

130 Saunders Station Road
Trafford, PA 15085

**Email:** nlitz88@gmail.com
**Portfolio** nlitz88.github.io
**Phone:** (412) 721-9386

## EDUCATION

**Carnegie Mellon University**                                             Expected: December 2024
*Master of Science in Electrical and Computer Engineering*

**The Pennsylvania State University**                                         Expected: May 2023
*Bachelor of Science in Computer Engineering*                                          *3.98 GPA*

## RELEVANT WORK EXPERIENCE

**Technical Lead - PSU Advanced Vehicle Team (State College, PA)**        November 2022 - Present
- Currently directing the technical efforts of 40+ Penn State students to develop an L4 autonomous vehicle for SAE's Autodrive II Challenge.
- Eliminated inefficient team processes and introduced agile-like project management strategies to reclaim 20+ hours of collective student effort each week.
- Coordinated development between teams to create MVP 3+ weeks before competition deadline.
- Lead the initial design of the vehicle's auxiliary power system and network infrastructure.
- Developed Arduino C interface for parsing vehicle CAN frames to control autonomous warning lights.

**Software Engineering Intern - Qualcomm (San Diego, CA)**            May 2022 - August 2022
- Designed Python framework for the collection and analysis of Snapdragon power system data.
- Unlocked insights into power system anomalies spread across 100,000+ recorded test-scenarios.
- Applied object oriented design techniques to create flexible and extensible Python modules.
- Employed multithreading and multiprocessing to maximize performance of framework components responsible for collecting, processing, and analyzing log data from around Qualcomm's global network.

**Software Engineering Intern - IAM Robotics (Pittsburgh, PA)**        June 2021 - August 2021
- Increased testing throughput for developers by extending AMR simulation software stack.
- Enabled developers to create new testing scenarios in seconds by adding new simulation control endpoints.
- Reduced simulation reset delays tenfold by working across robot software and fleet management teams to debug problematic features in robot C++ code and Python microservices.
- Designed, implemented, and tested code with a team of developers in an agile development environment.

**Software Engineering Intern - TMI Consulting (Harrison City, PA)**     July 2020 - September 2020
- Developed an updated invoice management system for local automotive business serving 500+ customers.
- Adapted ancient Microsoft Access database to a more robust VB.NET application with cloud backups.
- Collaborated directly with mechanics to make creating invoices more intuitive and cut creation time in half.

## RELEVANT PROJECT EXPERIENCE

**Malloc Implementation**                                               January 2022 - February 2022
- Designed a dynamic memory allocator to manage the heap of a process's virtual memory space.
- Maximized heap utilization by using block headers only and split blocks to reduce internal fragmentation.
- Optimized malloc performance using a set of segregated free lists to locate adequately sized blocks.
- Built and heavily unit-tested low-level memory interfaces for managing blocks and free lists.

**Jetson GStreamer Powered Bird Feeder Live Stream**                 December 2021 - January 2022
- Developed gstreamer pipeline for encoding and broadcasting live video stream on NVidia Jetson Nano
- Leveraged NVidia gstreamer modules to decode MJPEG source and re-encode using H.264 compression.
- Trained a YOLOv7 object detection neural network to identify birds on different camera feeds.
- Created stream control scripts using OBS websockets API to change camera view based on detected birds.

## TECHNICAL SKILLS

**Languages**

**Python, C**, **C++**, **Verilog**, JavaScript, Visual Basic, Java , Bash, HTML, CSS, SQL

**Software/Tools/Devices/Frameworks**

Linux, Git, Docker, Kubernetes, Proxmox, Traefik, NGINX, InfluxDB, MongoDB, Telegraf, MQTT, PyTorch, Jupyter, Regex, GDB, GProf, Make, Vivado, Vitis HLS, FPGA, ESP32, NVidia Jetsons, ROS