NIKOLAAS BENDER

Robotacist - Explorer
Energetic, Motivated, Capable, Rapid

CONTACT

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SKILLS

PROFICIENCY | TIME

- **Robotics** 4+ yrs
- **Machine Learning** 3+ yrs
- **Python** 7+ yrs
- **C++** 7+ yrs
- **Linux** 7+ yrs
- **Web Development** 7+ yrs
- **Internet Of Things** 2+ yrs
- **Teaching** 10+ yrs

TOOL BOX

- C++, Python, GoLang, C, fortran, C, JavaScript, SQL
- ROS, OpenCV, Pytorch, TensorFlow, GTSAM, Eigen
- Agile, ClickUP, JIRA, Communication
- Object-Oriented Design, Jupyter, MatLab, TensorRT, Git, Docker, Cmake
- CAN bus, UART, LoRa, Embedded C

EDUCATION

MS - Electrical and Computer Engineering — **2021 - 2023**
University of California Santa Cruz

Head of drone operations and precision agriculture for HARE lab

BA - Computer Science — **2016 - 2021**
University of Colorado Boulder

Focus in field robotics
Minor in philosophy

WORK EXPERIENCE

Researcher — **2021 - current**
University of California Santa Cruz

Team leader precision agriculture group. Developed open source, high precision, and scalable GPS appliance for field robotics applications. Coordinated field exercises including safety procedures, flight plans, and experimental procedures. Developed a novel plant health labeling tool leveraging embedded systems and high precision GPS to seamlessly fit into common agroecologist practices for rating plant health in relation to the reference frame of a farm. Jointly developed multi-spectral sensor package for flight on a quad rotor platform. Currently researching the use of multispectral imagery for mapping in agricultural environments. Building a custom SLAM solution that accommodates novel deep learning based keypoint extraction and description with the ability to easily add components for future research by other lab members.

Research: mapping in self similar environments

Researcher — **2020 - 2022**
University of Colorado Boulder -> University of California Santa Cruz

Developed a remote data gathering and exfiltration system along side industry and Army partners to monitor an autonomous shuttle at Fort Carson, Colorado Springs. Developed a system for aligning LIDAR and camera data for fusion. Built an early collision warning system using velodyne LIDARs to find instances of unsafe driving.

Undergraduate research assistant — **2019 - 2021**
University of Colorado Boulder

Developed and maintained the human operator interface for team MARBLE as part of the DARPA SubT Challenge. Self directed and developed a novel system for allowing operators to set goal points in the 3D map generated by the robots. The system also allowed for muxing teleop and 3D representation of artifacts in the map. Also collected a multimodal dataset for YOLO using LIDAR and visual data. One of the two drivers for the team truck and gear at the Urban Challenge of SubT. MARBLE finished 3rd overall winning $50,000 in prize money.

- Statistical Signal Processing, Mechantronics, Computer Vision, Linear Dynamics, Data Structures, Algorithms, Filtering, State Estimation

Software development intern **Summer 2019**
Object Rocket, Austin Texas

Developed production software as part of the database automation team. Built and ran unit tests. Learned how professional software development teams operate.

Software development intern **Summer 2018**
IQVIA

Built an error logging tool for database updates. Errors were displayed on a website that was mobile friendly. Automated database updates.

CLASS PROJECTS

Team Toast **2021**
Mechatronics robot

Part of a 3 person team that built a robot from the ground up that used a pic32 to sense from hand built magnetic, infrared, and light level sensors to navigate to and solve a course for the UCSC Mechatronics class. This class forced learning the skills of how to work for 100hrs/week, how to build complex circuits, and how to rapidly build a platform. Class core concept was failing quickly, learning, and moving forward quickly to accomplish large tasks in short periods of time.

Sidewalk sculpin **2019**
ROS based robot that autonomously followed sidewalks on campus

Part of a 3 person team that built up a Clear Path Jackal with an nVidia Jetson AGX Xavier and an Intel RealSense camera in order to follow sidewalks through the use of a semantic segmentation neural network with gradient descent. Became well practiced in the application of neural networks to robotic platforms and computational optimization of control and perception systems.

"lucky" number seven **2019**
ROS based 1/10th scale car that raced around a set of hallways autonomously

Part of a 5 person team that used two laser range finders with an ODROID sbc mounted to a 1/10th scale car. The class required developing a car that would go around a track under a set amount of time. This project honed skills in ROS and forced learning the fundamentals of modern robotics.

CoLab **2018**
Golang based collaboration and project tracking site

Leader of a 5 person team that built the basics of a website that mixed Twitter and Trello. Learned complex web design and system deployment to remote resources.

EXTRACURRICULAR

- Competitive cyclist: Racing gravel, road, enduro, and downhill. This is for fun and exercise. Cycling has the the benefits of travel and friendship as well.