

CHRISTOPHER MORAN

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RELEVANT PROFESSIONAL EXPERIENCE

RESEARCH & DEVELOPMENT ENGINEER II UC Santa Barbara Earth Research Institute

*Santa Barbara, CA
Sep 2018 - Aug 2021*

ARPA-E Scalable Aquaculture Monitoring System (SAMS), Underwater Kelp Farm Monitoring

- Built, tested, and piloted Blue Robotics BlueROV2 Heavy, including sensor integration
- Tested and operated microUUV, including ZED stereo camera integration and sonar post-processing, using C++ and Python on embedded Linux
- Primary test lead of prototype autonomous surface vessel using Mavlink and QGroundControl, implementing upgrades such as the replacement of 2.4 GHz WiFi communication with 900 MHz Ethernet radio for long-distance networking
- Developed a novel deep learning image segmentation pipeline for submerged kelp imagery using FastAI/PyTorch, eliminating the need for external development and resulting in a cost savings of over \$25,000

COAST Lab

- Supported deployments of a REMUS-600 AUV in coastal ocean and lake environments
- Provided consulting for lab safety, Export Control office, and general lab maintenance
- Worked as local network sysadmin, including automated backups, vehicle networking, and general tech support for other lab personnel (Linux, Windows 7/10, and Mac)
- Served as lead advisor for Electrical & Computer Engineering group capstone project for autonomous surface vehicle prototype

NSF Santa Barbara Channel Long-Term Ecological Research (SBC LTER)

- Serviced and maintained oceanographic equipment, including ADCPs and CTDs
- Certified as an AAUS Scientific Diver, carrying out tasks such as quadrat layouts, servicing moorings, and survey transects

SYSTEMS TEST CO-OP

iRobot (Terra Robotic Lawnmower)

Bedford, MA

Jul 2017 - Jan 2018

- Developed test fixture for and conducted thermal performance analysis of brushless DC motors
- Contributed to the design, coding, and operation of automated software smoke tests of embedded Linux systems
- Served as a primary support contact for users participating in user testing program
- Conducted accelerated lifetime testing on prototypes, including diagnosing and logging various failure modes

MECHANICAL ENGINEERING CO-OP

Accion Systems (Electrospray Ion Thruster Propulsion)

Boston, MA

Jun 2016 - Jan 2017

- Led mechanical design and development of planned flight product for use on CubeSats and small satellites
- Supported environmental testing of products, including vibration & thermal vacuum tests
- Machined scale mass models, lab-scale prototypes, and fixtures for in-house testing using Tormach CNC mill
- Designed and created CAD renderings of products and concepts, then edited and reviewed final proposal packages

ELECTROCHEMICAL ENGINEERING CO-OP

Nuvera Fuel Cells (Hydrogen Fuel Cell Stack R&D)

Billerica, MA

Jul 2015 - Jan 2016

- Built, installed, and operated fuel cell stacks and test benches to collect and process performance data
- Contextualized results in technical reports for executive-level and customer presentations
- Worked directly with external suppliers to ensure proper design implementation and quality control
- Developed preliminary design drawings and FEA for hydrogen fuel cells stack components using SolidWorks

OPEN SOURCE CONTRIBUTIONS

- Founding member and contributor to the Rust-ML machine learning working group
 - Coordinates community support and bi-weekly group meetings
 - Individual contributor to Rust `mnist` and `cifar-ten` crates
 - Writes documentation and code walkthroughs for multiple algorithms in Rust-ML Book
- Contributed updates and documentation to Rust BMP280 and BNO055 `#![no_std]` device libraries
- Built and open sourced personal website (auto-generated HTML pages from Markdown source files using CSS theme, and served on Rocket web framework from Digital Ocean droplet)

EDUCATION

BACHELOR OF SCIENCE, MECHANICAL ENGINEERING AND PHYSICS

Boston, MA

Northeastern University

2018

Senior Capstone Project: Design, fabrication, and testing of a modular passive thermal management system prototype for CubeSats, in collaboration with the NASA Jet Propulsion Laboratory

PUBLICATIONS

- C. Moran, "**Machine Learning, Ethics, and Open Source Licensing (Part II/II)**", *The Gradient*, 2021.
- C. Moran, "**Machine Learning, Ethics, and Open Source Licensing (Part I/II)**", *The Gradient*, 2021.
- Bell et al., "**The Utility of Satellites and Autonomous Remote Sensing Platforms for Monitoring Offshore Aquaculture Farms: A Case Study for Canopy Forming Kelps**", *Frontiers In Marine Science*, 2020.

ADDITIONAL SKILLS & INTERESTS

TECHNICAL SKILLS

Languages

Rust, Python, C++
Bash, MATLAB
Vanilla JS, HTML

Frameworks

Linux, Git, CMake,
OpenCV, MOOS-IvP,
ROS/2

CAD/FEA

SolidWorks,
Inventor,
FreeCAD,
Ansys

PROFESSIONAL INTERESTS

- High-reliability systems
- Composable behaviors
- Autonomous navigation and controls

Fabrication

CNC milling (manual and CAM), CNC lathe (manual), 3D printing, soldering, crimping, spot-welding, high-pressure hydraulic presses; aluminum, engineering thermoplastics, and stainless steels

ACCOMPLISHMENTS

- Founding member of the Rust-ML open source working group
- Achieved Eagle Scout (2013)