

# JACK LAWRENCE

San Francisco, CA — jacclawrence@gmail.com — 479.202.1977 — [LinkedIn](#) — [GitHub Portfolio](#)

## OBJECTIVES

---

Astrophysicist and machine vision engineer looking to outperform the current generation of engineers by applying a physics-based mindset to novel machine learning applications, optical systems, and research.

## SKILLS

---

<b>Programming:</b>	C/C++, Python, PyTorch, Tensorflow, Qt, Arduino, L <sup>A</sup> T <sub>E</sub> X, MATLAB, Mathematica, Teach Pendant
<b>Software:</b>	Autodesk Inventor, OnShape, <i>mvme</i> , Microsoft Office, Google Suite, Atlassian Suite, Adobe Photoshop, Connected Components Workbench, waveSharp (RegiStax6)
<b>Experimental:</b>	$\gamma$ -Ray Spectroscopy, HPGe Detector Upkeep & Maintenance, Solar Telescope Configuration & Maintenance, Background Subtraction and Signal Tuning, Data Acquisition System Development, NIM/VME System Design, Vacuum and Cryo System Design
<b>Other:</b>	Computational Image Processing, Signal Tracing, Supervised and Unsupervised ML Construction, Monte Carlo Simulation, Dead-time Measurement, Electrical Fault Diagnosis and Repair, 3D Design and Printing, PLC Configuration

## EXPERIENCE

---

<b>Vision Technician</b>	<b>Nov 2023 - Present</b>
UnitX Labs	Santa Clara, CA, USA
<ul style="list-style-type: none"><li>• Develop and manage over 19 unique machine vision solutions for customers across manufacturing industries (eg: automotive, medical, semiconductor, etc.)</li><li>• Design and build imaging and lighting systems with robotic arm (Fanuc) and PLC integration for automated assembly</li><li>• Train neural networks (AI) for defect detection with custom integrated image pre-processing and post-processing scripts</li><li>• Create deep clustering algorithms for improved defect detection</li><li>• Build custom image preprocessing scripts (ie filtering, sharpening, computational stacking) to optimize inspection</li><li>• Conduct HIL tests on custom integrated solutions</li><li>• Test lenses, filters, and wavelengths for optimal image capture</li><li>• Troubleshooting communication between software, light controllers, and PLCs</li><li>• Create CAD of machine visions solutions including custom components for camera and light fixturing and prototype printing</li></ul>	
<b>DAQ System Developer - SULI Sponsorship</b>	<b>May 2023 - Sept 2023</b>
Lawrence Livermore National Laboratory - Nuclear Criticality Safety Division	Livermore, CA, USA
<ul style="list-style-type: none"><li>• Utilized custom neural networks trained with real and simulated data for accurate dead-time corrections and background subtraction</li><li>• Developed DAQ system with reduced dead-time and live data-analysis capabilities</li><li>• Configured DAQ software with PLC and irradiated sample transport system for time-synced spectroscopy</li><li>• Designed unique experiments with radiation detectors, scintillators and PMTs for DAQ system validation</li><li>• Maintained and repaired detectors and vacuum equipment</li><li>• Cooled detectors with liquid nitrogen daily to maintain a noise-free signal environment</li><li>• Kept detailed notes of all tasks performs to track issues and changes, as well as increase project reproducibility</li><li>• Compiled DAQ system development and experiments into a detailed report submitted to the DOE through SULI</li><li>• Attended weekly lectures from research groups around the laboratory</li></ul>	
<b>Astronomy Instrumentation Engineer - Undergrad Research</b>	<b>Oct 2022 - April 2023</b>
Morehead Planetarium & Science Center	Chapel Hill, NC, USA
<ul style="list-style-type: none"><li>• Stationed an H-Alpha telescope on planetarium roof-deck to allow Morehead Planetarium to sponsor stellar research</li><li>• Constructed plastic and aluminum telescope enclosure with servo-controlled hood for protection from the environment</li><li>• Designed custom circuitry and servo system for remote telescope etalon tuning</li><li>• Implemented a Raspberry Pi and virtual desktop to remote control image capture, stacking, and filtering to produce consistently high resolution images of the Sun</li></ul>	

## DAQ Software Developer - DSTI Sponsorship

May 2022 - Aug 2022

Lawrence Livermore National Laboratory - Nuclear Criticality Safety Division

Livermore, CA, USA

- Developed DAQ system with reduced dead-time and live data-analysis capabilities
- Improved detector readout capability through added spectroscopy windows
- Increased DAQ system flexibility to streamline the unification of multi-detector systems
- Cooled detectors with liquid nitrogen daily to maintain a noise-free signal environment

## Bakery Sales and Service Lead

Jan 2022 - May 2022, Aug 2022 - Feb 2023

Great Harvest Bread Co.

Chapel Hill, NC, USA

- Managed opening, midday, and closing shifts, including daily cleaning, register and tip count, ingredient inventory tracking, to ensure a smooth transition between shifts and optimal hygiene
- Prepared bakery and deli ingredients, mixed recipes, kept regular attention ovens, proofers, refrigerators, and freezers in adherence with health codes to deliver fresh goods
- Baked cafe treats in accordance with company standards to ensure repeatability in the product
- Developed a reliable customer base and ensured a positive, welcoming environment for Great Harvest patrons and team members

## DAQ Software Developer - Undergrad Research

Jan 2021 - May 2022

Triangle Universities Nuclear Laboratory - LENA & The Tandem Laboratory

Durham, NC, USA

- Developed open-source DAQ software to improve flexibility and usability for TUNL research projects
- Performed comparative dead-time tests on various DAQ programs and which led to the lab-wide adoption a new DAQ software for nuclear experimentation
- Became the TUNL point of contact for modern nuclear DAQ software as older programs were phased out
- Constructed efficient, clock-synced data streams from detectors to NIM modules to software

## EDUCATION

---

Bachelor of Science, Astrophysics\*, University of North Carolina at Chapel Hill

Aug 2019 - May 2023

\*minor in English

## TRAINING & CERTIFICATION

---

DOE Certificate of Core Radiological Training

May 2021 - May 2025

Radiation Worker I

DOE Certificate of Core Radiological Training

May 2023 - May 2025

Radiation Worker II

Machine Learning, Stanford University & DeepLearning.AI (ID RTBETC4ZVQL1)

Jan 2025

Supervised Machine Learning: Regression and Classification (ID ECE4CZYJPANU)

Advanced Learning Algorithms (ID BQMYKWB6MF9B)

Unsupervised Learning, Recommenders, Reinforcement Learning (ID FLWZPO1N9WEY)

## PUBLICATIONS

---

- <sup>1</sup> J.Garcia-Duarte, Y. Mishnayot, A. S. Tamashiro, **J. R. Lawrence**, and J. T. Harke, "Innovative dead-time correction and background subtraction for neutron multiplicity measurements using neural networks", Scientific Reports 14, Available online ([here](#)), 7579 (2024).

## AFFILIATIONS AND VOLUNTEERING

---

OutLoud Sports, Player, Volunteer

Aug 2023 - Present

An LGBTQ+ sports league that fosters a safe community for queer athletes and hosts charity events for underprivileged members of the queer community

Platelet Donor at UNC Hospitals, Volunteer

Oct 2021 - May 2023

30+ platelet (and plasma) donations to the UNC Hospital Surgical Center (I was chiefly motivated by emails following my appointments, described the patients who benefited from my donation!)

**UNC Physics Foundations Seminary, External Liaison**

**Jan 2021 - Jan 2022**

A student-led organization hosting faculty and guest speakers to teach foundational physics topics, promoting understanding and engagement for both majors and non-majors

**UNC Visibility in Physics, Student Member**

**Jan 2020 - May 2023**

An organization that aims to provide resources, advice, and an encouraging social atmosphere for underrepresented minorities and allies in the field of physics

**UNC Society for Physics Students, Student Member**

**Jan 2020 - May 2023**

A chapter based society that exists to help students transform themselves into contributing members of the professional Physics community

**UNC Running Club, Member, Travel Coordinator**

**Aug 2019 - May 2023**

A student-led club affiliated with the National Intercollegiate Running Club Association that connects a community of student runners, providing training and registration resources for affiliate and non-affiliate races