

# JACK LAWRENCE

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

Machine vision and operations engineer looking to outperform the current generation of engineers by applying a physics-based mindset to novel machine learning tools, vision systems, and data-dense research, with a focus on curating a healthy and happy team.

## SKILLS

<b>Programming:</b>	Python, PyTorch, Tensorflow, GitHub, C/C++, Qt, Arduino, L <sup>A</sup> T <sub>E</sub> X, MATLAB, Mathematica, Teach Pendant
<b>Software:</b>	Fusion360, SolidWorks, OnShape, Cin7 Core, <i>mvme</i> , Microsoft Office, Google Suite, Atlassian Suite, UpKeep, Notion, Asana, Connected Components Workbench, Adobe Photoshop, waveSharp (RegiStax6), AutoStakkert!3, KStars
<b>Experimental:</b>	Optical Systems, $\gamma$ -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>	Electrical Fault Diagnosis and Repair, QA Testing, Network Configuration, Computational Image Processing, Signal Tracing, Supervised and Unsupervised ML Construction, Monte Carlo Simulation, Dead-time Measurement, 3D Design and Printing, PLC Configuration

## EXPERIENCE

### Interim Vision and Operations Engineer

Feb 2025 - Present

UnitX Labs

Santa Clara, CA, USA

- Design end-to-end custom machine vision inspection solutions for manufacturers (auto, battery, cosmetics, etc)
- Build technical proposals for 40+ customers, including physical assembly and CAD
- Build deep clustering algorithms for improved defect detection and defect labeling assignment with tensorflow
- Train neural networks (AI) for defect detection and dimensional analysis
- Write and test Python-based image filtering scripts for enhanced defect discrimination
- Troubleshooting communication between software, cameras, light controllers, and PLCs
- Design and build demos to showcase automated machine vision systems with robotic arm and PLC integration for trade shows and customer visits
- Oversee inventory management including implementation, receiving, packing, shipping, stocktakes, and RMA
- Conduct QC and benchmark tests on cameras, light controllers, and IPCs for predeployment and defective returns
- Manage lab and hardware stations for ease-of-use
- Manage employee amenity services, including lunch and dinner delivery, office pantry stock, equipment requests
- Plan company off-site and on-site adventures, including travel, group activities, and lodging

### Vision Technician

Nov 2023 - Feb 2025

UnitX Labs

Santa Clara, CA, USA

- Test lenses, filters, and wavelengths for optimal image capture
- Create Proof of Concept presentations detailing project-specific machine vision inspections
- Configure customized industrial PCs (IPCs), outfit with various storage and processing capacity
- Write SOPs for POCs, Inventory tracking, RMA testing, and QC workflows
- Assist hardware team in design and rapid prototyping of new equipment and products
- Compile RMA and QC information into shared Google sheets and detailed reports
- Order and configure new-hire equipment
- Assist with new-hire training for Service, Solutions, and Operations teams
- Establish and cultivate customer relations
- Track time and update project status/information daily

### DAQ System Developer - SULI Sponsorship

May 2023 - Sept 2023

Lawrence Livermore National Laboratory - Nuclear Criticality Safety Division

Livermore, CA, USA

- Utilized custom neural networks trained with real and simulated data for accurate dead-time corrections and background subtraction for neutron multiplicity measurements

- Developed DAQ system with reduced dead-time and live data-analysis capabilities for spectroscopy, multiplicity measurements, and fission-product yield detection (Lāpaki)
- Configured DAQ software with PLC and irradiated sample transport system for time-synced spectroscopy
- Designed unique experiments with radiation detectors, scintillators and PMTs for DAQ system validation
- Took Cf-252 spectra in vacuum with silicon detector, PMT, and Gd-loaded liquid scintillator
- Took Co-60 spectra with liquid-nitrogen-cooled HPGe clover detector
- Measured coincidence of Na-22 through  $\beta^+$  decay with liquid-nitrogen-cooled HPGe detectors
- Maintained and repaired detectors and vacuum equipment
- Cooled detectors with liquid nitrogen daily to maintain a noise-free signal environment
- Kept detailed notes of all tasks performs to track issues and changes, as well as increase project reproducibility
- Compiled DAQ system development and experiments into a detailed report submitted to the DOE through SULI
- Edited and provided feedback for group research papers and reports
- Attended weekly lectures from research groups around the laboratory

#### **Astronomy Instrumentation Engineer - Undergrad Research**

**Oct 2022 - April 2023**

Morehead Planetarium & Science Center

Chapel Hill, NC, USA

- Stationed and calibrated an H-Alpha telescope on Morehead Planetarium roof-deck for UNC-sponsor stellar research and public education
- Implemented a Raspberry Pi and virtual desktop to remote control batch image capture with KStars
- Implemented AutoStakkert!3 stacking and waveSharp (RegiStax6) wavelet filtering to produce consistently high resolution images
- Designed custom circuitry and servo system for remote telescope etalon tuning
- Built GUI for remote precision etalon tuning
- Built contrast and brightness filters in Photoshop for normalized image enhancement
- Designed telescope enclosure with Fushion360
- Constructed telescope enclosure with servo-controlled hood for protection from the environment
- Built a manual for system operation
- Built and presented my project poster at the UNC 2023 Celebration of Undergraduate Research Symposium

#### **DAQ Software Developer - DSTI Sponsorship**

**May 2022 - Aug 2022**

Lawrence Livermore National Laboratory - Nuclear Criticality Safety Division

Livermore, CA, USA

- Developed DAQ system for Lāpaki and NeutronStars
- 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
- Built and delivered slide presentation at DSTI Summer 2022 Research Symposium

#### **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
- Oversaw daily cleaning, register count, and inventory tracking to ensure a smooth shift transition and optimal hygiene
- Prepared bakery and deli ingredients, mixed recipes, kept regular attention of baking equipment in adherence with health codes to deliver fresh goods
- Baked cafe treats in accordance with company standards to ensure product repeatability
- Developed a reliable customer base and built a welcoming environment for 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 (*mvme*) to improve flexibility and usability for LENA at TUNL
- Performed comparative dead-time tests between mvme and MIDAS nuclear DAQ software
- Constructed efficient, clock-synced data streams from detectors to NIM modules to software
- Assisted a grad student in research with Alpha spectroscopy
- Assisted in designing a small-footprint, electrically isolated vacuum chamber
- Became the TUNL point of contact for modern nuclear DAQ software (*mvme*)
- Presented research and DAQ progress weekly to TUNL board

## EDUCATION

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

**Aug 2019 - May 2023**

\*minor in English

## TRAINING & CERTIFICATION

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**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

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- 1 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

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**SF Recreation and Parks Dept. Volunteer Program**, Habitat Restoration Volunteer

**Apr 2025 - Present**

A program where volunteers participate in a wide variety of restoration activities, such as planting and propagating native plants, controlling erosion, and monitoring wildlife habitat.

**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