Jackson Sheppard

2327 Branner Dr, Menlo Park, CA, 94025
650-862-9401 | sheppard@slac.stanford.edu
https://github.com/jsheppard95

Problem Solver

Programmer, Engineer, Quantitative Reasoning, Dedicated Learner

Highly motivated, independent worker, and dedicated to learning new skills. Experience working in a scientific research environment. Excellent logical reasoning and written/oral communication skills to express ideas and learn from others. Able to break down difficult concepts into understandable pieces.

Proficient in Python (Numpy, Pandas, Matplotlib), C++, ETL, Excel/VBA, SQL, SQLAlchemy/Python-based ORM, MongoDB, JavaScript (D3, Plotly, Leaflet, GeoJSON), HTML5 (Bootstrap), Tableau, Matlab, Linux, PLC Programming (Beckhoff), Experimental Physics and Industrial Control System (EPICS), GUI Development (EPICS Display Manager). Basic understanding of TensorFlow/Keras and 3D modeling (VMD). Comfortable working in a collaborative software development environment using standard version control tools such as Git and SVN. Dedicated to learning new skills on the job and flexible to adjust to new disciplines as needed.

Professional Experience

SLAC National Accelerator Laboratory, Menlo Park, CA 6/2018 - Present

United States Department of Energy National Laboratory operated by Stanford University. Scientific program focuses on using X-rays from synchrotron radiation for research in areas of atomic and solid-state physics, chemistry, biology, and medicine.

SLAC - Hourly, Linac Coherent Light Source (LCLS) 11/2020 – Present
Part-time position in the Experiment Control Systems (ECS) Delivery group within LCLS. Transitioned to this role in order to attend the UC Berkeley Extension Data Analytics Boot Camp with the goal of applying data science and machine learning techniques to physics problems.

- Responsible for remote support of systems under expertise: motion controls for the Offset Mirror System and LAMP interaction point at the TMO endstation.
- Created procedures for setup and basic controls operation of systems under expertise.
- Coordinating installation and checkout of motion controls for CVMI interaction point at the TMO endstation.

Science and Engineering Associate, Linac Coherent Light Source (LCLS) 9/2018 – 11/2020
Controls engineer in the Experiment Control Systems (ECS) Delivery group within LCLS. During active operations, responsible for experiment setup and on-call technical support for assigned experiments at assigned instruments to troubleshoot common controls problems and escalate when beyond expertise. Over instrument downtime, responsible for integration of new LCLS-II devices into ECS-developed control systems. Interfaced frequently with groups of various engineering expertise (mechanical, electrical, optical, etc.) both at SLAC and with outside vendors/research institutions. Worked with scientists and other engineers to ensure the requirements for new instruments were met.

- Integrated motors, cameras, temperature sensors, timing trigger signals, and other devices into ECS-developed controls software stack for assigned experiments.
- Expanded device support through Python development on a Linux system (IPython sessions containing device objects for specific experiments).
- Deployed a controls upgrade to existing Offset Mirror System (OMS) motion controls to employ LCLS-II standard Beckhoff motion hardware and PLC software interface. Coordinated system reinstallation and performed controls checkout to ensure motion requirements were satisfied. Integrated system into ECS controls stack for use by scientists during experiments.
- Worked with vendor Axilon (Germany) on controls design for LCLS-II era mirror systems, performed Site Acceptance Test for motion requirements, and integrated into ECS controls system.
- Deployed motion control system for LAMP interaction point at the LCLS-II Time-resolved atomic, Molecular, and Optics Science (TMO) instrument.

Summer Student, Linac Coherent Light Source (LCLS), 6/2018 - 9/2018
Student under the mentorship of staff physicist Claudio Pellegrini. Worked on free electron laser (FEL) beam dynamics simulations using GENESIS and Matlab for preprocessing and analysis. Focused on optimization of X-ray output power using undulator tapering: the process of varying the magnetic field that causes electron motion within the undulator of a free electron laser in order to maximize the conversion of electron energy to photon output power. Worked with my mentor to learn an overview of FEL physics and apply it using existing software tools to maximize performance.

- Characterized the undulator "taper profile" by finding the optimal relationship for magnetic field strength as a function of longitudinal distance using simulations and iterative search methods.
- Presented findings in the LCLS Summer Internship Poster Session with other students, mentors, and SLAC faculty (Received 2nd place).
- Published findings in the Journal of Synchrotron Radiation: Halavanau, A., Decker, F. J., Emma, C., Sheppard, J., Pellegrini, C. 2019. Very high brightness and power LCLS-II hard X-ray pulses. *J. Synchrotron Rad*. **26(3):**635-646

University of California, Santa Barbara, Goleta, CA **1/2016 - 6/2018**

Academic/professional experience while pursuing my Bachelor of Science in Physics.

Undergraduate Research Assistant, The Shea Group, 1/2018 – 6/2018

Worked in a research group within the Department of Chemistry at UCSB that focused on developing statistical and computational physics techniques to study biological problems. Participated in computational research that applied statistical and data science techniques to molecular dynamics simulations in order to model these complex biological processes.

- Worked on data pre-processing in Python using NumPy for models built with TensorFlow and Keras.
- Assisted with data visualization using Matplotlib plotting software.
- Learned to use 3D modeling software Visual Molecular Dynamics (VMD) to visualize protein dynamics.
- Employed cluster analysis techniques to pre-process data and allow for more accurate model fitting

Physics Study Room Fellow, Physics Department, 4/2018 - 6/2018

Undergraduate tutor in physics homework center alongside teaching assistants. Assisted undergraduate students both inside and outside the physics major with their course material.

- Tutored students with a broad spectrum of physics and mathematical backgrounds in a wide variety of physics subjects with different levels of mathematical rigor.
- This work enhanced my communication skills as I learned to explain complex concepts in a variety of ways with familiar comparisons to convey the material.

Test Proctor, Disabled Students Program (DSP), 6/2016 - 6/2018

The Disabled Students Program at UCSB ensures equal access to classes and other educational activities for students with disabilities. I worked as a test proctor with the responsibility of administering exams to students requiring fully or partially isolated environments.

- Coordinated with professors to pick up exams on time and drop off securely.
- Administered exams to single and groups of students, enforcing all necessary requirements to maintain academic honesty.

EDUCATION

Bachelor of Science in Physics, June 2018

University of California, Santa Barbara
GPA: 3.79
Relevant Courses: Introduction to Scientific Computation (Python/Linux), Analog Electronics, Linear Algebra, Quantum Mechanics, Complex Variables, Advanced Mechanics, Electromagnetism, Thermal/Statistical Physics, Fluid Mechanics, Nonlinear Dynamics, Experimental Physics Lab

Data Analytics Boot Camp, November 2020 - present

UC Berkeley Extension
Expected Completion: April 2020

Control of Mobile Robots, May 2020

Georgia Institute of Technology
Coursera Certificate

HONORS, AWARDS, AND PUBLICATIONS

SLAC National Accelerator Laboratory

- SLAC Spot Award for Dependability (August 4, 2020)
- Halavanau, A., Decker, F. J., Emma, C., Sheppard, J., Pellegrini, C. 2019. Very high brightness and power LCLS-II hard X-ray pulses. *J. Synchrotron Rad*. **26(3):**635-646
- LCLS Poster Award, Second Place, LCLS Summer Internship Poster Session (August 24, 2018)

University of California, Santa Barbara

- High Honors (June 15, 2018)
- Dean's Honors (Fall 2014, Winter 2015, Spring 2015, Winter 2016, Winter 2017, Fall 2017, Spring 2018)
- Department of Physics Academic Honors (May 13, 2018)

Hobbies & Interests

- Hiking, bicycling (road and mountain), snowboarding, and camping
- Music with a focus on guitar