

# JACKSON SHEPPARD

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Portfolio: [https://jsheppard95.github.io/JacksonSheppard\\_Portfolio/](https://jsheppard95.github.io/JacksonSheppard_Portfolio/)

## PH.D STUDENT IN CHEMISTRY

### SUMMARY

Ph.D student in the Department of Chemistry and Biochemistry at the University of California, Santa Barbara with a Bachelor of Science in physics (with honors) from the same institution. Two years experience in a collaborative software development environment as a controls engineer at SLAC National Accelerator Laboratory earning the SLAC Spot Award for Dependability. Certificate in data analytics and skills including Python, SQL, MongoDB, JavaScript/HTML, and PLC programming. Highly organized with experience balancing multiple responsibilities and a dedicated learner with a passion for problem solving. Quantitative analysis experience in a variety of technical environments and excellent written/oral communication skills to express ideas and learn from others.

### TECHNICAL SKILLS

**Languages:** Python, C++, SQL, JavaScript ES6+, HTML5, R, MATLAB, Experimental Physics and Industrial Control System (EPICS), PLC

**Applications:** NumPy, pandas, Matplotlib, hvPlot, Flask, PySpark, SQLAlchemy/SQLite, scikit-learn, imbalanced-learn, TensorFlow/Keras, PostgreSQL, MongoDB, AWS RDS, AWS S3, D3.js, Plotly, Leaflet, GeoJSON, Bootstrap, Tidyverse, EPICS Display Manager, Tc2\_MC2

**Tools:** Jupyter Notebook, Google Colaboratory, Excel/VBA, Tableau, Beckhoff, Visual Molecular Dynamics, Visual Studio Code, Git/GitHub, SVN

**Concepts:** ETL, Data Visualization, Big Data, NLP, Machine Learning, Neural Networks, Linux

### PROJECTS

**Mapping Earthquakes** | [https://github.com/jsheppard95/Mapping\\_Earthquakes](https://github.com/jsheppard95/Mapping_Earthquakes)

Web application with interactive maps of cities, airports, airline routes, and earthquakes from local JSON/JavaScript files and API calls to USGS GeoJSON sources.

- Role: Sole author
- Tools: JavaScript, Leaflet, D3.js, Mapbox, Python

**Mission-to-Mars** | <https://github.com/jsheppard95/Mission-to-Mars>

Interactive web scraping application acquiring Mars data, storing using MongoDB, and then visualizing in a Flask application.

- Role: Sole author
- Tools: Python, Splinter, bs4, Pandas, Flask, MongoDB, Jupyter Notebook

**lcls-plc-lfe-optics** | <https://github.com/pcdshub/lcls-plc-lfe-optics>

PLC project and EPICS Input/Output Controller (IOC) for deployed LCLS optics MR1L0 and MR2L0 relying on lcls-twincat-optics library.

- Role: Defined motion axes for MR1L0 and MR2L0 optics and performed system checkouts to verify motion requirements.
- Tools: PLC, Beckhoff, Tc2\_MC2, pytmc, EPICS

### EXPERIENCE

#### Ph.D Student

#### University of California, Santa Barbara

Ph.D student in the Shea Group within the Department of Chemistry and Biochemistry at UCSB. Current project involves characterizing the genetic diversity of the microtubule-associated Tau protein (MAPT) to understand related pathological development over vertebrate evolution through machine learning analysis of protein sequences.

August 2021 - Present

Santa Barbara, CA

**Controls Engineer**

November 2020 - July 2021

**SLAC National Accelerator Laboratory**

Menlo Park, CA

Part-time position in the Experiment Control Systems Delivery (ECS, formerly PCDS) group within the Linac Coherent Light Source (LCLS) while attending the UC Berkeley Extension Data Analytics Boot Camp. Responsible for remote support of LCLS-II style Beckhoff motion control systems.

*Key Accomplishments:*

- Created procedures for setup, basic operation, and troubleshooting of motion control systems under expertise.
- Coordinated installation and checkout of motion controls for CVMI interaction point at the TMO endstation.
- Trained recent hires and colleagues on systems under expertise to create a more uniform understanding within the group.

**Science and Engineering Associate**

September 2018 - November 2020

**SLAC National Accelerator Laboratory**

Menlo Park, CA

Controls engineer in the Experiment Control Systems (ECS) Delivery group within the Linac Coherent Light Source (LCLS). During active operations, responsible for experiment setup and on-call technical support of assigned experiments at assigned instruments. Over instrument downtime, responsible for integration of new LCLS-II devices into ECS-developed control systems.

*Key Accomplishments:*

- Integrated motors, cameras, temperature sensors, timing trigger signals, and other user devices into the 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 to employ LCLS-II style Beckhoff motion hardware and PLC software interface. Coordinated system reinstallation and performed checkout to ensure motion requirements were satisfied. Integrated system into ECS controls stack for use by scientists during experiments.
- Received SLAC Spot Award for Dependability (August 4, 2020).

**Summer Student**

June 2018 - September 2018

**SLAC National Accelerator Laboratory**

Menlo Park, CA

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.

*Key Accomplishments:*

- 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 LCLS Poster Award, 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.

**Undergraduate Research Assistant**

January 2018 - June 2018

**University of California, Santa Barbara**

Santa Barbara, CA

Student in the Shea Group within the Department of Chemistry at UCSB. Participated in computational research that applied statistical and data science techniques to molecular dynamics simulations in order to model complex biological processes.

*Key Accomplishments:*

- Cleaned and pre-processed data using NumPy and employed cluster analysis techniques using Python to prepare data for models built with TensorFlow and Keras.
- Produced latent space visualization with Matplotlib.
- Utilized 3D modeling software Visual Molecular Dynamics to visualize protein folding.
- Earned Department of Physics Academic Honors (May 13, 2018).

**EDUCATION****Ph.D, Chemistry: University of California, Santa Barbara, Santa Barbara, CA**

Expected 2026-2027

**Data Analytics Certificate: UC Berkeley Extension, Berkeley, CA**

May 2021

A 24-week intensive program focused on gaining technical programming skills in Excel, VBA, Python, R, JavaScript, SQL Databases, Tableau, Big Data, and Machine Learning.

**Bachelor of Science, Physics: University of California, Santa Barbara, Santa Barbara, CA**

June 2018

GPA: 3.79 (High Honors)