Jackson Sheppard

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Data Analyst

Summary

Data analyst with a Bachelor of Science in physics (with Honors). 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, MATLAB, Experimental Physics and Industrial Control System (EPICS), PLC
Applications: NumPy, pandas, Matplotlib, Flask, SQLAlchemy, PostgreSQL, MongoDB, D3.js, Plotly, Leaflet, Bootstrap, EPICS Display Manager, Tc2_MC2
Tools: Jupyter Notebook, Excel/VBA, Tableau, Beckhoff, Visual Molecular Dynamics, Git/GitHub, SVN
Concepts: ETL, Data Visualization, Linux

Projects

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-twincat-optics | https://github.com/pcdshub/lcls-twincat-optics
PLC library for LCLS optics designed with LCLSII-style Beckhoff motion control architecture.

- Role: Created function blocks to control six axes of motion fixed to LCLS optics. Implemented coordinated gantry motion interlock and stepper/piezo motor state machine to satisfy equipment protection and precision requirements.
- Tools: PLC, Beckhoff, Tc2_MC2

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

pcdsdevices | https://github.com/pcdshub/pcdsdevices
Collection of device subclasses including LCLS optics defining Python interfaces to EPICS IOCs for staff scientists to operate instruments in IPython sessions.

- Role: Defined mirror-specific subclasses to create a Python interface for PLC-controlled mirrors and saved device class instances in a database for automated deployment during user experiments.
- Tools: Python, Ophyd, NumPy

Experience

Controls Engineer, Casual - Nonexempt November 2020 - Present
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

Data Analytics Certificate: UC Berkeley Extension, Berkeley, CA
Expected 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)