Alyssa Johnson

Quantitative Developer | Physics PhD candidate building ML systems for signal detection, forecasting, and alpha-driven financial modeling.
U.S Citizen | San Diego, CA | alj010@ucsd.edu | c: +1 240 678 8942 | LinkedIn | github.io | *References available upon request*

SKILLS

Programming: Python (Pandas, NumPy, scikit-learn, PyTorch), SQL, Linux, Bash, Git, Docker, API development & integration, Parallel computing, Web scraping (BeautifulSoup, Selenium), Flask

ML / Stats: Tree-based models, Ensemble methods, Deep Learning (CNNs, RNNs, LSTMs, Transformers, GNNs, Diffusion), NLP (BERT, GPT, Seq2Seq)

Financial & Tools: Derivatives (Options, Futures, Swaps), Fixed Income, Equities, Commodities, Cryptocurrencies

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EXPERIENCE

UCSD Triton Quantitative Trading Club - Lead, Strategy Development Research Group Spring 2026 - *present*

- **Project:** Constructed an in-database ML forecasting pipeline using MySQL HeatWave, benchmarking time series model performance against external Python baselines; documenting tradeoffs in latency, accuracy, and scalability. 🌐
- **Project**:Constructing a suite of delta-hedged options strategies in QuantConnect, implementing vega-scaled positioning, IV percentile filtering, and automated Greeks-based entry and exit logic across long/short vega and gamma regimes on SPY. 🌐

UCSD OIR Lab - Graduate Student Researcher April 2025 - *present*

- **Award** → University of California, San Diego Sloan Scholars Fellowship → *fellowship is ongoing*
- **Project**: Assembled, integrated, and validated PANOSETI telescope modules and SiPM detector systems for nanosecond-scale optical transient detection and high-time-resolution instrumentation.
- **Project**: Developed a Python full-sky figure-of-merit pipeline (3M+ directions) combining stellar density and dust extinction models to optimize PANOSETI survey field selection. 🌐

UCSD Cosmology Group - Graduate Student Researcher August 2022 - April 2025

- **Award** → High Energy Physics Consortium for Advanced Training Fellowship → *fellowship is ongoing*
- **Project**: Developed statistical signal processing and noise-modeling pipelines for CMB detector time-series data, contributing to the Simons Observatory instrumentation stack (co-authored SPIE 2024). 🌐

NASA Goddard Space Flight Center - NASA GSFC Intern Aug. 2021 - Aug. 2022

- **Awards** → NASA Sally Ride Scholarship, NASA Space Generation Advisory Council Scholarship
- **Project**: Delivered single-user relay and handover experiments that demonstrated user data services for optical communications, defining spacecraft configurations and scheduling parameters to support LCRD mission operations.

Cal Poly, Humboldt, Gravitational Physics Lab - Student Researcher February 2019 - July 2022

- **Award** → Cal-Bridge Program Scholarship
- **Project**: Optimized an active servo-leveling control system for a precision short-range gravity experiment using numerical modeling and sensor feedback analysis; published in J. Undergrad. Rep. Phys. (2023). 🌐

Montana State University Solar Physics REU - Student Researcher 🌐 June - August 2021

EDUCATION

- University of California, San Diego | **PhD Candidate in Astrophysics** *Expected Spring 2028*
  - Relevant courses: Deep Learning, Data-Centric AI and AI Engineering, Advanced Optimization, Machine Learning, Stochastic Processes, Real Analysis *series*, Probability Theory
- University of California, San Diego | **MSc in Astrophysics** grad. June 2025
- California State Polytechnic University, Humboldt | **BSc in Physics, *Cum Laude*** grad. Dec. 2021
- Additional degrees: The Ohio State University, MFA (grad. 2014); Temple University, BFA (grad. 2011)

SELECT PUBLICATIONS

- **Johnson, A**., Rogers, C., Dunkley, N., Gengo, M., Hoyle C.D., *Optimization of an Active Leveling Scheme for a Short-Range Gravity Experiment.*" J. Undergrad. Rep. Phys. 33, 100002 (2023)
- Bhimani, Sanah, et al. (including **Johnson. A.**). "*The Simons Observatory: Deployment and current configuration of the Observatory Control System for SAT-MF1 and data access software systems*." Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy XII. Vol. 13102. SPIE, 2024.