David Elliott Perryman

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Skills

Languages	English, French(A2), C, C++, CUDA, Julia, Python, R, SQL
Methods	Monte-Carlo, Distributed Optimization, Gaussian Processes, Digital Signal Processing

Work

PhD Candidate at Institut Laue-Langevin March 2024 - present

Working on developing autonomous experimentation methods for neutron scattering experiments on quantum materials. In this project I worked with with Martin Boehm at the Institut Laue Langevin, Daniel Mazzone at the Paul Scherrer Institute, and Marie-Bernadette at Université Grenoble Alpes.

Master Internships at Institut Laue-Langevin Summer 2022 & Spring 2023

Writing symmetric Gaussian Processes for autonomous experimentation on triple axis spectroscopy. In this project I worked with Martin Boehm and Marie-Bernadette Lepetit at the University of Grenoble Alpes.

Software Developer at Caravel Concepts Jan 2021 - Aug. 2021

Wrote django+PostgreSQL database models and API endpoints. Improved quality of investment plans by improving asset allocation optimization with JAX, Numba, and some basic math.

Undergraduate Researcher at Lawrence Berkeley Laboratory Aug. 2019 - Jun 2020

- Sped up ALS-steering software GPCAM by at least 20X through batching, converting Cholesky decomposition to linear solves, and porting to GPU with pytorch.
- Wrote fast numerical integration methods in Python for crystallography.
- Wrote distributed multi-optima optimization method.
- Wrote exploration scheme for material science application. Presented summary poster at SULI spring 2020.

Undergraduate Researcher at Oak Ridge National Labs Aug. 2017 - Jun 2022

- Ported signal processing convolution to CUDA FFT on GPU for 30X speedup
- Characterized and optimized signal feature extraction using Monte-Carlo methods
- Wrote signal anomaly detection with Conv Nets and data exploration with k-Means

Lumber tote at Columbia Construction and Crawlspace 2016 (Seasonal)

- Crawlspace Work
- Framing

Seasonal work in summer during high school.

Worker at Armstrong, Lacey, Shoup, and Williams Farms 2011 - 2016 (Seasonal)

- Landscaped
- Farm upkeep
- Hauled Hay
- Farming (tilling, pulling weeds, etc)

Seasonal work in summer during high school.

Projects

- Pitched a business idea in the 2018 NAE Grand Challenge Pitch Competition (3 weeks of work)

– Reviewed articles for Pursuit, UTK's undergraduate Journal (2017-2021)
– Developed Monte Carlo simulation for Helium microscopy (2018, about 4 months of work)
– Poured concrete accessibility ramps at Chickasaw park for an Eagle Scout Project (2015) (40 hours of work)

Education

Mar 2024 - present	PhD (Physics) at **Université Grenoble Alpes, France**
Fall 2021 - Spring 2023	Masters (Applied Math) at **Institut Polytechnique de Grenoble**
Fall 2016 - Spring 2021	Bachelor's Degree at **University of Tennessee, Knoxville** (GPA: 3.69/4.0)
Fall 2012 - Spring 2016	High School Degree at **Columbia Central High School**

Publications

[1] Francisco M Gonzalez et al. "First Full Dalitz Plot Measurement in Neutron β-Decay using the Nab Spectrometer and Implications for New Physics". In: *arXiv preprint arXiv:2508.16045* (2025).

[2] David Elliott Perryman et al. "Effect of likelihood misspecification in Gaussian process-driven autonomous experimentation". In: *APL Machine Learning* 3.4 (2025).

[3] Martin Boehm et al. "Autonomous Neutron Experiments". In: *Methods and Applications of Autonomous Experimentation*. Chapman and Hall/CRC, 2023, pp. 256–275.

[4] Marcus Noack et al. "GpCAM". In: *Zenodo* (2022).

[5] Marcus Noack and David Perryman. "fvGP v2. 2.0". In: *US Department of Energy (DOE) Software* (2021), p. 26.

[6] Marcus Michael Noack et al. "High-performance hybrid-global-deflated-local optimization with applications to active learning". In: *2021 3rd Annual Workshop on Extreme-scale Experiment-in-the-Loop Computing (XLOOP)*. IEEE. 2021, pp. 24–29.

[7] Marcus Noack and David Perryman. *HGDL v1.* Tech. rep. Lawrence Berkeley National Laboratory (LBNL), Berkeley, CA (United States), 2020.

[8] Petrus H Zwart and Elliott D Perryman. "Evaluating crystallographic likelihood functions using numerical quadratures". In: *Biological Crystallography* 76.8 (2020), pp. 736–750.

[9] Jason Fry et al. "The Nab experiment: A precision measurement of unpolarized neutron beta decay". In: *EPJ Web of Conferences*. Vol. 219. EDP Sciences. 2019, p. 04002.

[10] David Perryman, Nab Experiment Collaboration, et al. "(CEU) Pile-up Detection in Silicon Detector Signals via Machine Learning for the Nab Experiment". In: *APS Division of Nuclear Physics Meeting Abstracts*. Vol. 2019. 2019, SL–006.

[11] Tom Shelton et al. "A GPU Algorithm to Determine the Time-of-Flight of Protons in the Neutron Decay Experiment Nab". In: *APS April Meeting Abstracts*. Vol. 2019. 2019, S01–060.

[12] David Perryman. "Optimization of Particle Energy and Arrival Time Determination using GPUs for the Nab Experiment". In: *Bulletin of the American Physical Society* 63 (2018).

Presentations

– Invited talk at Theoretical and Experimental Magnetism Meeting (accepted July 2026)

- Poster at International Conference on Neutron Scattering (accepted July 2025)
- Talk at College 2, Institut Laue-Langevin (January 2025)
- Talk at AI for X-ray and Neutron Scattering, Munich (April 2024)
- Invited 20 min talk at LBL Autonomous Experimentation Workshop (April 2021)
- Perryman, David (2018). "Optimization of Particle Energy and Arrival Time Determination using GPUs for the Nab Experiment". In: Bulletin of the American Physical Society 63.
- Perryman, David, Nab Experiment Collaboration, et al. (2019). "(CEU) Pile-up Detection in Silicon Detector Signals via Machine Learning for the Nab Experiment". In: APS Division of Nuclear Physics Meeting Abstracts. Vol. 2019, SL–006.
- Regional physics conference (SESAPS 2018) - won best oral presentation
- National Conference for Undergraduate Research (2019)
- UTK Eureca Symposium (Spring 2019)
- UTK Research Day (Spring 2019)