KEVIN NELSON, PhD

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Software engineer with focus on AI/ML applications. Strong expertise in Python and PyTorch, and a proven ability to lead projects and mentor team members. Deep understanding and experience with LLM architectures, fine-tuning, and deployment. Experienced in implementing training pipelines, building scalable CI/CD pipelines on distributed systems, and defining metrics to ensure data quality and system health.

Employment

CERN ATLAS Experiment   **Meyrin, Switzerland**
Software Engineer, technical lead, group leader   *2024-2025*
- Selected from a competitive pool of 14 nominees to lead critical software modernization, complete residency in Meyrin.
- Reduced feedback time for high-volume data streams (2 GB/s) from months to hours by automating data processing.
- Saved estimated $10M in computing hours with automated framework that flags problems earlier.
- Brought 5 students projects back on schedule ($\approx$12 months) with technical leadership and policy of written feedback.

Reference: Dr. Rosy Nikolaidou and Dr. Stelios Angelidakis

University of Michigan   **Ann Arbor, MI**
Postdoctoral Research Fellow, specializing in AI applications   *2023-present*
- Boosted precision by 70% with innovative methods for multi-task learning and message passing in transformers.
- New transformer methods projected to accelerate the timeline for discovery by 10 years by requiring less data taking.
- Reduced uncertainty in ML predictions by 75% (to the 3% level), with novel methods in domain adaptation.
- Analyze 100s of millions of GB of data on millions of distributed computing cores in 42 countries.

Reference: Prof. Jianming Qian

Graduate student / Doctoral candidate   *2018 - 2023*
- Reduced false positives by 80% through innovative ML research in kernel density estimation.
- Used advanced deep learning techniques (deep sets, pNN) increasing classifier precision from 78% to 94%.
- Delivered a data acquisition system with 25k readout channels by managing a 3-year hardware integration timeline.
- Developed a software framework for detector calibration which exceeded the target precision by 8% (1 std dev).

Reference: Prof. Dante Amidei and Prof. Bing Zhou

Education

University of Michigan   **Ann Arbor, MI**
Ph.D. Physics, Experimental particles and fields, 4.0 /4.0 GPA   *2018-2023*
- **Awards:** Stephanie Zimmerman thesis prize (Best Ph.D. thesis including the muon system).

The College of William and Mary   **Williamsburg, VA**
BS Computer Science, BS Physics, 3.92 / 4.0 GPA   *2014-2018*
- **Awards:** Don Edward Harrison Jr. Award (Top Physics undergraduate student).

Personal Projects

Functional Decomposition - functional-decomposition   **February 2025**
- Increased speed of bottlenecked tasks by 10x by porting code to GPUs.
- Extended ML density estimation technique to NN outputs, allowing for differentiable p-values.

LLM Sarcasm Detection Fine-Tuning - sarcasm   **April 2025**
- Fine-tune BERT to detect sarcasm with F1-score of 0.975 on The Onion vs. news headlines.
- Improve generalization accuracy by 10% without sacrificing validation set performance by weighting by feature frequency.

Technical Skills

Languages: python, C/C++, bash, LaTeX, Javascript
Tools: transformers, graph networks, neural networks, pytorch, docker, cmake, CI pipelines
Instrumentation: Noise reduction, data acquisition, detector construction, hardware integration