ZAVIER KAMATH

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SKILLS

Programming & AI/ML: Python, C++, LLMs, Agentic AI Systems, Prompt Engineering, LangChain / LangGraph, Git, Neural Networks
Cloud & Data: AWS (Bedrock, S3, Athena, Lambda, Sagemaker), Monte Carlo Methods, Scikit-Learn, Vector Similarity, API Development
Research & Technical: LaTeX, Bash, Bayesian Statistics, High-Performance Computing, Statistical Mechanics, Science Communication

PROFESSIONAL EXPERIENCE

Huntington National Bank   **May 2025 - Present**
Data Science Co-op (AI Center of Excellence)   *Columbus, OH*
- Research and development to implement AI solutions across all aspects of banking
- Developed fully automatic agentic AI loan application processor POC that chats with customers applying for loans, processes documents and natural language input, and stores data.
  - Solutions built using: AWS (S3, Athena, Bedrock, Sagemaker AI), LangChain / LangGraph, Agentic AI, Memory / Context Engineering, Git, Azure DevOps, Agile, Bash
- Created LLM automation workflows and architecture designs for data science team, authored wiki articles and Python libraries to enable workflow facilitation
  - Solutions built using: Prompt Engineering, Microsoft Copilot, Context Engineering, Model Documentation Processing, Azure DevOps, Science Communication

The Ohio State University Astronomy Department   **Summer 2023 - Summer 2024**
Astrophysics Research Assistant   *Columbus, OH*
- Research project under Prof. Annika Peter and Prof. Ivan Esteban to analyze Dark Matter models
- Advanced constraints on Warm Dark Matter particle mass to >4 keV/c² through Bayesian statistical analysis of Milky Way satellite galaxy data, doubling previous predictions and optimizing computational bottlenecks to obtain 100x runtime improvement
  - Solutions built using: Bayesian Statistics, Python (Numpy, Scipy, Vegas, Matplotlib), Monte Carlo Integration, High-Performance Computing, Bash
- Authored research methods summary for upcoming publication with full GitHub reproducibility, and presented findings at poster session communicating complex statistical analysis to diverse academic audience
  - Solutions built using: GitHub, LaTeX, Publication-Level Research Writing, Science Communication / Presentation / Documentation, Data Visualization

PROJECTS

Physics Grad Match *(Entrepreneurial Project / Web App)* - physicsgradmatch.com   **June 2025 - Present**
- A commercial web application that matches physics PhD program applicants to professors
- Leveraged AI tools to build database of professors and research interest and website for analyzing user's natural language input using LLM for keyword extraction and vector similarity search for matching
- Solutions built using: Claude Code, OpenAI Embeddings and LLM model APIs, Web Scraping (Beautiful Soup, Crawl4AI), React, Next.js API Routes, Vercel deployment), Supabase (PostgreSQL + pgvector and OAuth), Stripe Checkout, Vector Similarity

Rep Quest *(Personal Project / Web App)*   **May 2025**
- A web app that I use every day to track my progression in resistance training workouts
- Leveraged AI tools to build a web app to track the sets, reps, and weight used for every exercise with graphs and performance metrics
- Solutions built using: Replit, Cursor, React, Express.js, NeonDB (PostgreSQL), Vercel (deployment), Shadcn (UI Components)

PCA Analysis of Quasar UV Spectra *(Advanced Astronomy Data Science Class Project)*   **April 2025**
- Reproduced the characteristic inverse relationship between received Quasar light (flux) and distance (redshift) using Principal Component Analysis
- Reconstructed full quasar continuum spectra from red-side spectral weights to reproduce mean transmitted flux vs. redshift relation through dimensionality reduction of high-resolution UV data
- Implemented advanced spectroscopic analysis techniques using Python with astronomical data processing libraries
- Solutions built using: Principal Component Analysis (PCA), SDSS Data, Data Cleaning, Python (Numpy, Scipy, Pandas, Astropy)

Analysis of One-Dimensional Thermal Conductivity *(Computational Physics Class Project)*   **March 2025**
- Confirmed 1D thermal conductivity behavior in space and time along a copper rod matches Modified Heat Equation predictions
- Performed statistical analysis and data analytics with Python and numerical computations with C++ (faster)
- Solutions built using: Python (Numpy, Matplotlib, Pandas), C++, LaTeX, Laboratory Instrumentation, Statistical Analysis

Deming Regression Analysis of Tully-Fisher Relation *(Advanced Astronomy Data Science Class Project)*   **March 2025**
- The relationship between galaxy luminosity and rotational speed predicts galaxy distance
- Extended the analysis to early/late-type spiral galaxies to get a more accurate distance indicator
- Performed novel Bayesian linear regression analysis accounting for X and Y uncertainties in galaxy velocity-luminosity data
- Solutions built using: Deming Regression (Bayesian), SPARC galaxy data, Bootstrapping, Python (Pandas, Numpy)

NFL Data Analysis *(Big Data Science Class Project)*   **November 2024**
- Trained neural network and random forest models to analyze 50,000+ NFL plays and predict pivotal NFL plays with 75%+ precision
- Predicted fumble probability and identified key correlational features while classifying shotgun vs. non-shotgun formations
- Solutions built using: Python (Scikit-Learn, Keras, Pandas, Plotly, Numpy), Neural Network, Random Forest

EDUCATION

The Ohio State University **May 2025**
Bachelor of Science | Majors: Physics and Astronomy & Astrophysics | **Minor:** Spanish | **GPA:** 3.98/4.0 *Columbus, OH*
Coursework:
- Computational Physics, Astronomy Data Science, Big Data Analytics, Advanced Physics Lab, Quantum Mechanics, Electricity and Magnetism, Statistical Mechanics, Cosmology, Calculus 1-3, Differential Equations, Linear Algebra, Intermediate Spanish

Leadership
- **Gaming Club Team Captain:** Led competitive esports team with planning, practice, and mentorship of teammates

Honors and Awards
- **2025 Physics Senior Award –** Cash award for outstanding academic achievement among senior Physics majors
- **Summa Cum Laude -** Latin honors awarded by The Ohio State University for exceptional academic performance
- **2023 Physics Summer Undergraduate Research Scholarship -** For conducting cutting-edge physics research
- **Trustees Scholarship -** Merit-based scholarship awarded by The Ohio State University for academic excellence
- **Dean's List -** For all 8 semesters at The Ohio State University

Other Activities: Astronomical Society (Autumn 2023), Intermediate Spanish Proficiency, Advanced Laboratory Instrumentation