Zane Perry

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EDUCATION

University of Colorado Boulder Boulder, CO

M.S. Applied Mathematics August 2025 - Expected May 2026

Dynamics & Numerical Modeling, Applied Data Science & Stochastic Processes, Machine Learning; Cumulative GPA: 4.0

B.S. in Computer Science, B.S. in Applied Mathematics August 2021 - May 2025

Cumulative GPA: 3.99; Dean's List Fall 2021- Spring 2025, National Merit Scholar

Additional Relevant Coursework: Genetics, Molecular Biology, Database Systems, Fourier Analysis, Cognitive Science, Quantum Mechanics, Quantum Computing, Music Technology, Digital Signal Processing, Computational Neuroscience, Orchestra

Hobbies: Music Production, Musician (Violin, Singer, Piano, Guitar), Swimming

WORK EXPERIENCE

CU Electrical Engineering Department - Genetic Logic Lab Boulder, CO

Research Assistant, Software Developer June 2022 – Present

- Design, Implement, and Test frontend/backend frameworks and endpoints using React, Spring, Java, and Javascript for a Genetic info repository, enhancing data accessibility and system reliability. Optimize old code for future scalability
- Execute full stack development from initial design to final implementations as well as rewriting and optimizing old code for a better user experience and optimized server performance. Manage deployment on an Azure and Kubernetes deployment server
- Mentor an undergraduate student on the entire research process including literature review, design principles, project planning, code execution, and testing
- Research the development of hybrid machine learning models and their applications in predicting genetic circuit outputs, contributing to advancements in genetic research methodologies. Summarize research in written reports and conference presentations for clear communication across the research domain

Handshake MOVE Fellowship Remote

AI Trainer - Math Expert, Reviewer (Contract) May 2025 – Present

- Developed and evaluated domain-specific prompts to assess the performance of large language models in math, leading to improved model accuracy and understanding in mathematical problem-solving
- Analyzed LLM outputs for mathematical accuracy, clarity, and depth in specialized subfields, enhancing the precision and reliability of AI-generated mathematical solutions
- Contributed to improving AI understanding of complex math through expert review and feedback, resulting in more accurate and comprehensive AI interpretations of mathematical concepts
- Evaluated other fellows prompts and responses to address complexity, analyze reasoning, and suggest improvements

Space Environment Technologies Denver, CO

Radiation Division Computer Science Intern May 2024 – August 2024

- Automate procedures regarding data upload, processing, and analysis processes using APIs and file system management, resulting in increased speed and ease for users. Optimize code written in IDL
- Analyzed atmospheric radiation data using specialized mathematical models to uncover unexplained phenomena, enhancing understanding of space radiation effects
- Designed and built front-end user apps for flight planning and risk analysis using Agile/Scrum methodologies, improving user experience and decision-making processes

CU Computer Science Department Boulder, CO

Data Science Course Assistant for 300 students August 2023 - December 2023

- Reviewed homework assignments and lecture topics to evaluate the teaching methods implemented in the course and recommend improvements for the benefit of student learning
- Hosted office hours to review topics with students and explain confusing concepts in further detail to ensure understanding and success in the class, including practical coding applications and theoretical mathematical derivations for assignments

ACTIVITIES

Theta Tau Professional Engineering Fraternity Boulder, CO

President, Regional Conference Director, New Member Educator, Committee Head September 2022 – May 2025

- Plan all organization activities and meetings, communicate with the entire chapter and lead discussions, handle all external communications with the national organization or the College of Engineering, coordinate with other leadership positions to delegate necessary tasks, elected executive council head
- Plan meetings for and assist new members who are joining the Fraternity, appointed executive council position
- Take part in philanthropic events to give back to the local community through local outreach organizations

Engineering Excellence Fund Boulder, CO
Chair, Webmaster October 2021 – August 2023

- Evaluated project proposals to provide funding throughout the college of engineering by assessing the merits and impacts of each request, discussing with a diverse board from across the college, and managing funds in an efficient manner
- Promoted innovation and diverse perspectives through unique initiatives dedicated to inclusion within higher education
- Managed all meetings and communications within and outside of the board as well as providing direction and counsel to other members of the board to ensure accountability

Colorado Engineering Magazine Boulder, CO
Writer, Webmaster January 2022 – May 2025

- Identify relevant and current developments within the College of Engineering in order to conduct interviews with subject matter experts in the necessary fields and gain a sufficient understanding in a compressed period of time
- Draft and edit articles to convey technical information in an understandable and concise manner that communicates fundamental concepts in a way that respects those being represented while still being accessible to any reader

TECHNICAL PROJECTS

Hybrid Machine Learning for Improved Genetic Circuit Modelling - Genetic Logic Lab Ongoing

- Developing a hybrid machine learning framework for synthetic gene circuits that combines reaction-based mechanistic ODE models with physics-informed and residual neural networks to capture unmodeled interactions and enhance predictive, interpretable circuit behavior

Synbiohub 2/3, A Genetic Design Repository Ongoing

- Redesigned and extended the SynBioHub synthetic-biology repository, leading development of a modular plugin interface and contributing to a full React-based frontend rewrite (SynBioHub 2) and subsequent Spring-framework backend modernization (SynBioHub 3) to support scalable, standards-compliant integration with SBOL-based genetic-design tools. Used PostgreSQL, React, Redux, Javascript, Express, Node, Docker, HTML/CSS, Java, Jade, Github, and various API interfaces

Senior Capstone - Festo AI Assisted Rapid Prototyper for DevOps - Technical Specialist April 2025

- Worked with a group of 6 to design a web application, from planning to deployment, that meets specifications laid out by the company sponsor Festo. Interfaced with an LLM API to prompt users for an app design, built the foundational code for that design, and allowed users to visualize and edit the code in a live interface until ready to export. Specialized in the AI prompting

Advanced Music Recommendation using Deep Learning and Digital Signal Processing April 2025

- Used Pytorch and Sci-kit, along with advanced digital signal processing techniques (Mel-Frequency Capstone Coefficients, Discrete Wavelet Transforms, Short-Time Fourier Transforms) to survey a collection of user music interests and design, test, and build a multi-modal CNN/RNN deep learning model to learn music preferences based on structural aspects of audio signals

Boundary Integral Equation Ordinary/Partial Differential Equation Solver April 2024

- Used Python, Numpy, Scipy, and Matplotlib to develop quadrature algorithms that approximate one-dimensional Sturm-Liouville ordinary differential equations and Poisson's equation in two dimensions with a variety of different parameterized homogeneous and nonhomogeneous boundary conditions as well as plotting the errors of the algorithm over a specified domain

Airfoil Fluid Simulation Using Conformal Mapping April 2023

- Used MATLAB and advanced complex analysis techniques to simulate the flow of fluid around various shapes modeling an airfoil. Presented these concepts in a LaTex written report and tested real world data against the model for accuracy.

Signal Noise Reducer Using Numerical Matrix Factoring December 2023

- Used Python and the Numpy library to develop a column pivoting matrix factoring algorithm in order to detect numerical rank, sample a signal for noisy characteristics, and extract a cleaned signal

Image Compression Using Discrete Wavelet Transforms December 2022

- Used MATLAB and advanced linear algebra/signal processing concepts to compress and store images in an efficient manner. Presented these concepts in a LaTex written report in order to compare different techniques based on space and time complexity

Technical Skills

Languages: Python, Java, JavaScript, TypeScript, C/C++, SQL, MATLAB, Bash/Zsh, HTML/CSS, LaTeX, Scala, R, Assembly
Frameworks & Tools: SpringBoot, React.js, Node.js/Express, REST API Development, Git/GitHub, Docker, Docker Compose
Software Engineering Practices: Full-stack development, API design, refactoring & optimization, legacy code modernization, system architecture, Agile/Scrum collaboration
Databases & Systems: PostgreSQL, database schema design, authentication (JWT), microservices, cloud/container deployment
DevOps & Platforms: Linux/Ubuntu, macOS Dev, WSL, shell scripting, CI/CD fundamentals, API integrations
ML & AI: Supervised/Unsupervised Learning, Deep Learning, Generative AI, Multimodal Networks, Model Evaluation & Fine-tuning
ML Libraries: PyTorch, NumPy, pandas, SciPy, scikit-learn, Matplotlib, TorchAudio, Librosa
Scientific Research Skills: Literature review, experimental design, hypothesis testing, algorithmic validation, data visualization, LaTeX scientific communication