Chris Gerlach

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Professional Summary

Data scientist and machine learning researcher specializing in healthcare analytics and predictive modeling. Expert in developing ML pipelines for medical imaging and clinical decision support, with proven success improving prediction accuracy by 20% and reducing system resource usage by 97%. Skilled in Python, deep learning frameworks, and statistical analysis.

Core Competencies

- **Machine Learning:** Classification, Regression, Time Series Analysis, Neural Networks, Deep Learning
- **Healthcare Analytics:** Medical Imaging Processing, Clinical Decision Support Systems, Patient Outcome Prediction
- **Programming:** Python, R, MATLAB, SQL, CUDA
- **Statistical Analysis:** Hypothesis Testing, Experimental Design, Longitudinal Data Analysis
- **Machine Learning & Deep Learning Libraries:** Scikit-learn, TensorFlow, Keras, PyTorch
- **Tools:** Jupyter, LaTeX, Bash, High-Performance Computing, Version Control (Git), Data Cleaning, Feature Engineering

Selected Project Experience

Healthcare ML Pipeline Development | Michigan State University | 2024-Present

- Engineered ML pipeline for longitudinal MRI analysis, improving brain cancer classification accuracy by 20%
- Implemented feature engineering techniques for complex, irregularly sampled medical datasets
- Designed automated decision support system for NICU ventilator weaning in collaboration with expert clinicians
- Led computational project communications with Henry Ford & Corewell Health Hospitals
- Technologies: Python, Pytorch, Scikit-learn, Pyradiomics, SITK, Numpy, Pandas

High-Dimensional Data Optimization | Michigan State University | 2023-2024

- Achieved 90%+ forecasting accuracy using hybrid CNN-RNN architecture for complex time series data
- Reduced memory requirements by 97% through innovative data compression techniques
- Technologies: Python, Tensorflow, NumPy, Pandas, Statistical Analysis

Computational Plasma Physics Modeling & Simulation | San Jose State University | 2021-2023

- Created and simulated a novel hydrodynamic model for strongly-coupled plasmas, capturing multiscale behavior.
- Developed early warning system for model instability using anomaly detection
- Technologies: Python, PyTorch, NumPy, Pandas, Statistical Analysis

Blockchain Analytics Research | San Jose State University | 2020-2021

- Led team analysis of Ethereum transaction patterns using game theory and agent-based modeling
- Identified critical system vulnerabilities through statistical analysis of transaction data
- Technologies: Python, Network Analysis, Agent-based Modeling

Education

PhD Computational Mathematics, Science, & Engineering | Michigan State University | GPA: 3.9 | 2023-Present

- Focus: Machine Learning for Healthcare, Biomedical Engineering
- Expected Graduation: Dec. 2026

MS Applied Mathematics | San Jose State University | GPA: 4.0 | 2021-2023

- Thesis: Modeling Strongly-Correlated Plasmas with Hydrodynamic Density Functional Theory
- Focus: Scientific Modeling, Simulation & Analysis

BA Mathematics with Honors | San Jose State University | GPA: 3.5 | 2018-2021

Certifications & Awards

DeepLearning.AI TensorFlow Developer Certificate | 2023

NSF Fellowship: "AI and Data Enabled Predictive Multiscale Modeling across STEM" | 2023

Leadership & Communication

- Mentored undergraduate researchers in time series analysis and ML modeling
- Delivered technical presentations at IEEE and APS conferences
- Developed and taught advanced mathematics and programming curriculum