

BOWEN CUI

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Education

George Mason University <i>Ph.D. in Computer Science</i> Course: Database Systems; Data Mining; LLMs and Programming (Vibe Coding); NLP Theory	Sep 2024 – May 2028 <i>Virginia, US</i>
Washington University in St. Louis <i>M.A. in Statistics</i> Course: Mathematics Statistics; Statistical Computation; Linear Statistical Model; Bayesian Statistics; Stochastic Processes; Applications of Deep Neural Networks; Data Mining; Time Series	Sep 2022 – May 2024 <i>Missouri, US</i>
Xi'an Jiaotong-Liverpool University <i>B.S. in Applied Mathematics</i> Course: Calculus; Multivariable Calculus; Linear Algebra; Ordinary Differential Equation; Analysis; Complex Functions; Statistical Distribution Theory; Numerical Analysis	Sep 2018 – June 2022 <i>Suzhou, China</i>
Research Publications: “A Novel Deep Reinforcement Learning Strategy in Financial Portfolio Management”, with R. Sun and J. Su (2022, Shenzhen, CHINA, ICBDA); “Do Large Language Models Understand Performance Optimization?” with Tejas, Oscar, and Keren (2025, San Diego, USA, ICPP)	

Research Experience

Time-Awareness AI Agent <i>Research Assistant Advisor: Keren Zhou George Mason University</i> • Still Working	Oct 2025 – Present <i>Virginia, US</i>
HPC-Bench: A Comprehensive Benchmark for HPC Codes <i>Research Assistant Advisor: Keren Zhou George Mason University</i> • Still Working	May 2025 – Present <i>Virginia, US</i>
Deep Learning on Geology <i>Research Assistant Advisor: Keren Zhou and Zengyi Sun George Mason University</i> • Still Working	Jan 2025 – Present <i>Virginia, US</i>
Do Large Language Models Understand Performance Optimization? <i>Research Assistant Advisor: Keren Zhou George Mason University</i> • Curated a benchmark suite comprising 26 representative HPC codes across 11 distinct domains commonly found in HPC problems. • Investigated the differences between LLMs and state-of-the-art traditional performance optimization tools. • Proposed a performance optimization agent for optimizing real HPC applications, integrating insights from both LLMs and traditional performance tools to replicate human optimization of HPC code.	May 2024 – Jan 2025 <i>Virginia, US</i>
Fair Machine Learning Models with Genetic Algorithm <i>Research Assistant Advisor: Juan Zhai University of Massachusetts, Amherst</i> • Employed Genetic Algorithm to pinpoint problematic data slices in machine learning models, specifically those showing subpar performance in terms of accuracy and fairness. • Built from scratch a Genetic Algorithm strategy, expanding the search range through crossover and mutation, and consistently selecting from top-n performing individuals using the Elitism and Roulette Wheel Method, leading to the iterative discovery of optimal solutions. • Utilized metrics such as Demographic Parity, Demographic Parity Ratio, and Equal Opportunity as the Genetic Algorithm’s fitness function, enabling the evaluation and enhancement of model performance across all protected attribute categories.	May 2023 – Feb 2024 <i>Amherst, US</i>

Skills

Programming Languages: Python, C, C++, Java, MATLAB, R, SQL

Framework & Libraries: PyTorch, scikit-learn, NumPy, pandas, CUDA

LLM & Model Deployment: vllm, Ollama, Transformers, LangChain

Tools & Environments: Docker, Git, Linux/Unix, Slurm, Spack, Conda, CMake