

BOWEN CUI

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Education

George Mason University

Sep 2024 – May 2028

Ph.D. in Computer Science

Virginia, US

Course: Database Systems; Data Mining; LLMs and Programming (Vibe Coding); NLP Theory

Washington University in St. Louis

Sep 2022 – May 2024

M.A. in Statistics

Missouri, US

Course: Mathematics Statistics; Statistical Computation; Linear Statistical Model; Bayesian Statistics; Stochastic Processes; Applications of Deep Neural Networks; Data Mining; Time Series

Xi'an Jiaotong-Liverpool University

Sep 2018 – June 2022

B.S. in Applied Mathematics

Suzhou, China

Course: Calculus; Multivariable Calculus; Linear Algebra; Ordinary Differential Equation; Analysis; Complex Functions; Statistical Distribution Theory; Numerical Analysis

Research Publications: “A Novel Deep Reinforcement Learning Strategy in Financial Portfolio Management”, with R. Sun and J. Su (2022, Shenzhen, CHINA, ICBD); “Do Large Language Models Understand Performance Optimization?” with Tejas, Oscar, and Keren (2025, San Diego, USA, ICPP)

Research Experience

Time-Awareness AI Agent

Oct 2025 – Present

Research Assistant | Advisor: Keren Zhou | George Mason University

Virginia, US

- Still Working

HPC-Bench: A Comprehensive Benchmark for HPC Codes

May 2025 – Present

Research Assistant | Advisor: Keren Zhou | George Mason University

Virginia, US

- Still Working

Deep Learning on Geology

Jan 2025 – Present

Research Assistant | Advisor: Keren Zhou and Zengyi Sun | George Mason University

Virginia, US

- Still Working

Do Large Language Models Understand Performance Optimization?

May 2024 – Jan 2025

Research Assistant | Advisor: Keren Zhou | George Mason University

Virginia, US

- 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.

Fair Machine Learning Models with Genetic Algorithm

May 2023 – Feb 2024

Research Assistant | Advisor: Juan Zhai | University of Massachusetts, Amherst

Amherst, US

- 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.

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