Alexander Du

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EDUCATION

Duke University

Ph.D., Computer Science (Advisors: Matthew Lentz and Danyang Zhuo) | Aug 2024 – Present (Expected 2029)

- GPA: 4.00 / 4.00
- Relevant Coursework: Advanced Computer Networks, Compiler Construction, Distributed Systems, Language-Based Security, Programming Languages, Systems for Machine Learning

B.S., Computer Science and Mathematics | May 2024

PUBLICATIONS

Papers

J. Qin, **A. Du**, D. Zhang, M. Lentz, and D. Zhuo. Can Large Language Models Verify Systems Software? A Case Study Using FSCQ as a Benchmark. Workshop on Hot Topics in Operating Systems (HotOS). 2025. (Talk)

S. Eom, T. Ma, N. Vutakuri, **A. Du**, Z. Qu, J. Jackson, and M. Gorlatova. Did You Do Well? Real-Time Personalized Feedback on Catheter Placement in Augmented Reality-Assisted Neurosurgical Training. IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW). 2024. (Extended abstract)

Preprints

A. Du, J. Ou, D. Zhuo, and M. Lentz. Trellis: Bringing Compiler-Guided Repair into Agentic Code Generation. arXiv:2605.15238. 2026.

RESEARCH EXPERIENCE

Graduate Research Assistant, Duke University | Aug 2024 – Present

Scavenger Colocation for GPU Cluster Utilization | May 2026 – Present

- Evaluated GPU-sharing policies for scavenger jobs to improve utilization on the Duke Compute Cluster
- Added flow-based job models, DCGM workload reconstruction, and single-GPU cluster emulation to a Slurm simulator
- Implemented a working-set profiler and a profile-guided UVM manager by instrumenting the NVIDIA UVM driver

Efficient Compiler-Constrained Code Generation | Mar 2025 – Apr 2026

- Developed Trellis, a code generation system that constrains LLMs with incremental static analysis (arXiv '26)
- Retrofitted Clang and tsc for incremental analysis, reducing token consumption by up to 70% vs. post-hoc repair
- Built a Trellis-backed model provider that plugs into coding agents such as Codex and OpenCode

LLM-Based Proof Synthesis for Systems Software Verification | Sep 2024 – Apr 2026

- Co-designed a proof search system over LLM-generated Rocq tactics and fine-tuned models on FSCQ (HotOS '25)

Undergraduate Research Assistant, Duke University | May 2022 – May 2024

User Attention for Surgical AR (Advisor: Maria Gorlatova) | Aug 2023 – May 2024

Sparse Point Cloud Object Detection (Advisor: Maria Gorlatova) | Jan 2023 – May 2023

Efficient Video Analytics Workflow Serving (Advisors: Matthew Lentz and Danyang Zhuo) | May 2022 – Jul 2022

Research Intern, University of Southern California | Jul 2023 – Aug 2023

3D Segmentation-Based Traffic Reconstruction (Advisor: Ramesh Govindan) | Jul 2023 – Aug 2023

WORK EXPERIENCE

Software Engineer Intern, Hanson Robotics | Jun 2021 – Aug 2021

TEACHING AND MENTORING

Teaching

COMPSCI 310: Operating Systems | Fall 2023, Spring 2025, Fall 2025

COMPSCI 230: Discrete Mathematics for Computer Science | Fall 2022, Spring 2023, Fall 2023

Mentoring
Jianjun Ou, M.S. student, Computer Science | Nov 2025 – Present

AWARDS

Duke Graduate Fellow | Aug 2024 – May 2026
Duke Summer Research Fellow | Summer 2025, Summer 2026
Duke Conference Travel Fellow | May 2025
Amazon SURE Research Fellow | Summer 2023
Duke CS+ Research Fellow | Summer 2022

SKILLS

Programming Languages: Bash, C, C++, Python, Rust, TypeScript
Machine Learning Systems: Hugging Face, PyTorch, SGLang, vLLM
GPU Infrastructure: MIG, MPS, Nsight Compute, Nsight Systems, UVM
Other Systems and Tools: Clang, Docker, gdb, LLVM, Slurm, tsc