

Justin Garrigus: CV

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Austin, TX 78722

Education

PhD, Electrical Engineering, August 2025 – Current, University of Texas at Austin

- Advisor: Dr. Lizy Kurian John

Master's of Science, Computer Science, January 2023 – December 2024, University of North Texas

- GPA: 3.875
- Thesis: [Hardware and Software Optimizations for Deep Learning Workloads on Graphics Processing Units](#)
- Advisor: Dr. Hui Zhao

Bachelor of Science, Computer Science, August 2020 – December 2022, University of North Texas

- GPA: 3.96
- Dean's List, 2020
- Magna Cum Laude
- President's List, 2021 – 2022
- Thesis: [Syntax as a Tool of Thought](#)
- Honor's College, 2020 – 2022
- Advisor: Dr. Barrett Bryant

Coursework

Master's

- Embedded Hardware
- Computer Architecture
- Empirical Analysis
- Deep Learning
- Parallel Processing
- Analysis of Computer Algorithms

Bachelor's

- Introduction to Compilers
- Systems Programming
- Programming Languages
- Software Engineering
- Database Administration
- Data Structures
- Fundamentals of Database Systems
- Digital Logic Design
- Natural Language Processing
- Assembly and Computer Organization
- Algorithms
- Foundations of Data Structures
- Social Issues in Computing
- Foundations of Computing
- Mathematical Modeling
- Introduction to Computer Science

Skills

Programming Languages and Tools

Advanced proficiency

- C
- GPGPU-Sim
- Python
- C++
- Accel-Sim
- NumPy
- CUDA
- AccelWattch
- PyTorch

Intermediate proficiency

- HTML
- CSS
- Javascript
- MySQL
- PostgreSQL
- R
- LISP
- Lex/YACC

Operating Systems and Platforms

- Linux (Ubuntu, Arch, Ubuntu Server)
- [TACC/Lonestar6 Supercomputer](#)
- Windows

Research

Papers

- **Exploration of LLM Workload Reliability Based On di/dt Effects and Voltage Droops.** Zhixing Jiang, Justin Garrigus, Allison Seigler, Ethan Syed, Yan-Lun Huang, Mehdi Sadi, Tawfik Rahal-Arabi, and Lizy Kurian John. Accepted, HPCA 2026.
- **LiteNoC: Developing Low-Cost Network-on-Chips for Deep Neural Networks.** Khoa Ho, Siamak Biglari, Justin Garrigus, Hui Zhao, Saraju Mohanty. Accepted, [\[GLSVLSI 2025\]](#)
- **Genomics-GPU: A Benchmark Suite for GPU-accelerated Genome Analysis.** Zhuren Liu, Shouzhe Zhang, Justin Garrigus, and Hui Zhao. Accepted, [\[ISPASS 2023\]](#)
- **Applying Transfer Learning to Defect Graph Neural Networks for Defect Formation Energy Predictions.** Justin Garrigus, Thomas Bouchard, Angela Zhang, and Yuanxi Wang. In progress, [\[poster, presentation, video\]](#).
- **Accelerating Weightless Neural Network GPU Programs With a Custom Accelerator.** Shashank Nag, Justin Garrigus, Lizy Kurian John. In progress.
- **Microarchitectural Innovations to Co-Schedule LLM Streams Within SMs.** Ruixiao Huang, Justin Garrigus, Hui Zhao, Adwait Jog, and Yingtao Jiang. In progress.

Service

- **MICRO 2026:** Artifact Evaluator
- **FPGA 2026:** Paper Reviewer
- **HPCA 2026:** Paper Reviewer

Research Experience

- GPU Microarchitecture
 - Performed deep modifications to the Accel-Sim and GPGPU-Sim simulators to implement new microarchitectural ideas and collect per-cycle data.
 - Managed the mass simulation of thousands of parallel Accel-Sim sessions on an NVIDIA DGX A100 server under tight paper-revision deadlines.
 - Studied large language model acceleration across communication, inter-kernel, and intra-kernel barriers.
- Compilers
 - Created new hardware instructions to control the operation of new GPU functional units, simulated with Accel-Sim.

- Developed a compiler which translates sentinels inserted in CUDA code into the new hardware instructions, allowing full NVCC PTX/SASS optimizations to still be performed.
- Deep Learning
 - Showed how transfer learning could be used to improve the performance of a deep learning model in calculating the defect formation energy of crystals with one atom removed.
 - Used real-world reference information from physics to identify a theoretical basis for the improvement before implementing an improvement on an existing model.
 - Performed hyperparameter searches and mass training across transformer- and graph-based models.

Work Experience

Research Associate [AMD] January 2026 – August 2026

- Investigated methods for accelerating scale-in/scale-up GPU systems.
- Collaborated with research and product teams to develop systems and methodologies for both near-term and future GPU systems.

Student Researcher: [UT Austin] August 2025 – current

- Studying GPU microarchitecture enhancements for neural networks.
- Designed and implemented complex architectural modifications to existing GPUs to accelerate specific domains of applications, from large language models to embedded neural networks.

Software Engineering Specialist: [xAI] December 2024 – August 2025

- Used programming expertise to create, modify, and refine high-quality software-engineering-related training data for LLMs.
- Met with high-level engineers and presented findings about LLM performance, strengths, weaknesses, and actionable room for improvement.
- Managed contractors and evaluated employee performance in LLM dataset curation for both internal groups and external companies.
- Hired new software engineering specialists by conducting interviews and reviewing candidates.

Teaching Assistant: [UNT] May 2023 – July 2023; January 2024 – December 2024

- Created assignments and labs that meet the course objectives and allow the student to demonstrate their knowledge of the subject.
- Held office hours for students to request 1-on-1 tutoring on the course subject.
- Led weekly recitations for each class section with personally-created lecture material to aid students in learning the big-picture ideas of the course.
- Graded assignments, proctored students, and assisted the professor wherever required.
 - Assembly and Computer Organization
 - Foundations of Cybersecurity
 - Data Mining
 - Software Engineering
 - Network Administration

Instructional Assistant: [UNT] January 2023 – May 2023; August 2023 – December 2023

- Graded assignments on a regular schedule, and met with students individually to justify grading decisions.

- Held office hours for students to request 1-on-1 tutoring on the course subject.
- Proctored students during exams and assisted the professor throughout the course whenever required.
 - Assembly and Computer Organization
 - Computer Networks

Student Researcher: [UNT] August 2022 – December 2024

- Modified a GPU simulator with new microarchitectural changes that represent new kinds of GPUs that could be made to improve performance on different types of programs.
- Implemented new kinds of deep-learning models, including those that utilize Large Language Models (LLMs) with formatted English datasets and Graph Neural Networks (GNNs) with datasets from materials science.
- Managed the execution of tests that demonstrate the effects of the research project compared to a baseline, and created figures that effectively display the data collected.
- Kept up to date with the latest research in computer architecture, deep learning, and materials physics to help think of new changes that could improve on established baselines.
- Collaborated with PhD students, Master's students, undergraduate students, and professors both inside and outside of UNT.

NSF/UNT Deep Learning REU: May 2022 - July 2022

- Showed how utilizing GPUs for deep-learning workloads leads to massive improvements in performance ([poster](#), [report](#), [GitHub](#)).
- Presented the results of the project to an audience, justifying the motivation for the project, the history of using GPUs in deep learning, and explanations for the results.
- Learned how to successfully complete a research project with the help of graduate students and professors.

Online Private Lessons Instructor: [[iD Tech](#)] January 2021 - June 2022

- Taught over 600 private lessons to students in Algebra, Geometry, Calculus, Game Programming, Data Structures, and Algorithms.
- Helped students complete long-term projects, meeting regularly to assist in solving complex, domain-specific problems.