Sang Yoon Kim

Atlanta, GA | (+1) 404-717-7992 | sangyoon@gatech.edu | personal-website

EDUCATION

Georgia Institute of Technology – *B.S. Computer Science* Expected graduation: 2026.05

- GPA: 4.0/4.0
- Concentration in Theory and Systems/ Architecture

WORK EXPERIENCE

Teaching Assistant – *College of Computing, Georgia Institute of Technology* 2023.01 – present

- Worked at College of Computing, Georgia Institute of Technology as an Assignment-Head TA for Introduction to Object Oriented Programming (CS 1331) with a class size of ~1000 students alongside a team of 40 other TAs
- Organized and taught recitations for 1.5hrs/week with class size of 20 students, constructed and graded assignments/exams, and held office hours for students

Research Intern – *HCIL, SNU* 2024.05 – 2024.10

- Worked at Seoul National University (SNU) Human-Computer Interaction Lab (HCIL) as a research intern
- Developed optimized computational processes for calculating Dimensionality Reduction (DR) distortion metrics, focusing on improving efficiency of HCI research methodologies

Research Intern – *ROPAS, SNU* 2024.05 – 2024.08

- Worked at SNU Research On Program Analysis System (ROPAS), Programming Research Lab as a research intern
- Mastered foundational concepts in lambda calculus, type systems, and static analysis while developing proficiency in OCAML programming for research applications

Research Assistant – *MORIN Lab, KAIST* 2022.02 – 2022.08

- Worked at Korea Advanced Institute of Science & Technology (KAIST) Mobile Robotics & Intelligence (MORIN) Laboratory as a research assistant and an inspector/reviewer for research papers
- Implemented and benchmarked Koopman Theory-based deep learning models in PyTorch, demonstrating comparative performance analysis against established baseline models

RESEARCH PROJECTS

Optimized Matrix Data structure for Sparse Matrix-Matrix Multiplication (SpMM) 2025.08 – present

- Implemented and benchmarked sparse-dense matrix multiplication algorithms in Julia, evaluating bitmap-based formats and structured sparsity schemes against dense implementations to identify optimization opportunities
- Designed speed-ups for previous bitmap-based formats using Intel AVX intrinsics to efficiently handle higher nonzero densities in sparse computing applications

Fixed-Parameter Algorithms for Partial Graph Complementation 2025.08 – present

- Developed fixed-parameter tractable (FPT) algorithms for partial graph complementation problems—finding minimum k for partial graph complements with largest component size being k—and analyzing approximation ratios as well as scaling behavior

Intrinsics within LLVM Clang 2025.04 – 2025.09

- Conducted comprehensive analysis of LLVM's intermediate representation and compiler passes to understand Intel AVX2 intrinsic instruction processing and identify optimal sequencing strategies for computing applications

Side-channel Attack (SCA) preventive Analog to Digital Converter (ADC) 2023.08 – 2024.05

- Led a research project in the Secure Hardware VIP group at Georgia Tech, developing ADC circuitry resistant to side-channel and hardware trojan attacks through Rancode implementation and dummy counters
- Coordinated cross-functional teams between analog design and side-channel testing, delivering monthly research presentations and comprehensive technical documentation for future reference

Use of Out of Band (OOB) in Bluetooth 2023.01 – 2023.05

- Led a security research project in the Secure Hardware VIP group at Georgia Tech, analyzing vulnerabilities in Bluetooth standards and proposing an enhanced pairing solution using Near-Field Communication for out-of-band authentication
- Delivered monthly research presentations documenting project progress and created comprehensive technical documentation to guide future student researchers

Efficiency Comparison of Various Koopman theory-based Deep Learning Algorithms 2022.02 – 2022.08

- Took part in a project at KAIST MORIN lab, which focused on deriving the most efficient Deep Learning algorithm based on the Koopman theory
- Worked on understanding the algorithm utilized in "Deep Variational Koopman Models: Inferring Koopman Observations for Uncertainty-Aware Dynamics Modeling and Control, IJCAI-19" aiming to rewrite the original code from TensorFlow to Pytorch for equal comparison with other algorithms

AWARDS & HONORS

Presidential Science Scholarship 2022 – present

- Awarded to ~20 students out of all Korean university students by the Korea Student Aid Foundation $50,000 annually until graduation

Faculty Honors 2022.08 – present

- Awarded by Georgia Institute of Technology for securing academic GPA of 4.0 while qualifying as a full-time student

LEADERSHIP EXPERIENCE

Teaching Assistant – *Assignment-Head TA* 2023.01 – present

- Worked as an Assignment-Head TA for Introduction to Object Oriented Programming (CS 1331), creating assignments bi-weekly focusing on Java/JavaFX syntax, OOP, and polymorphism
- Organized a pre-testing process for each assignment involving 2 TAs and managed grading procedures with the Autograder,team
- Prepared grading of ~1000 submissions for 40 total Tas and managed weekly regrade requests for assignments and exams

Side-channel Attack preventive Analog to Digital Converter – *Founder, Project Lead* 2023.08 – present

- Created and lead a research project at the Secure Hardware VIP group, consisting of 4 members in two subgroups: Analog circuit design group and SCA testing group
- Prepared a 45 min research presentation once a month and organized project lead meetings 1hrs/week for coordination between subgroups and graduate students
- Created and handled weekly tasks for SCA testing group consisting of background research, executing experiments, and constructing technical documents

REFERENCES

Willow Ahrens, Ph.D.

- Assistant Professor, School of Computer Science
- Georgia Institute of Technology
- ahrens@gatech.edu

Rose McCarty, Ph.D.

- Assistant Professor, School of Mathematics and School of Computer Science
- Georgia Institute of Technology
- rmccarty3@gatech.edu