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Austin Adams

Research Interests

Compilers and programming languages for quantum computers

Education

August 2022 – Present **Ph.D. Student in Computer Science**, *Georgia Institute of Technology*, Atlanta, GA
- Advisors: Prof. Tom Conte and Dr. Jeff Young

August 2020 – May 2022 **Master of Science in Computer Science**, *Georgia Institute of Technology*, Atlanta, GA
- Master's thesis: *Enabling a Programming Environment for an Experimental Ion Trap Quantum Testbed*
- Contributed to the XACC and QCOR open-source quantum compiler projects, including creating an optimizing compiler backend for an ion trap quantum testbed at Georgia Tech Research Institute

August 2016 – December 2018 **Bachelor of Science in Computer Science**, *Georgia Institute of Technology*, Atlanta, GA
- Graduated with Highest Honor. GPA: 3.90/4.00
- Threads: Theory, Systems & Architecture

Work Experience

May 2022 – August 2022 **Research Intern**, *Microsoft*
- Implemented proof-of-concept "notebook mode" in the Q# compiler, which relaxes many fundamental language constraints and ignores Jupyter kernel meta-commands
- Presented and wrote a report about the path forward for canonizing "notebook mode" as an official part of the Q# specification and its impact on the overall Q# notebook architecture

March 2019 – November 2020 **Software Development Engineer**, *Amazon*, Seattle, WA
- Unblocked the launch of new countries and product categories by writing Apache Spark jobs to process huge raw database dumps, reducing the storage needed on service hosts by 100x
- Designed and implemented automated resolution of validation errors for changes to product financial classifications, allowing non-engineers to help handle the high volume of validation override requests
- Wrote design documents and held design review meetings
- Mentored and helped onboard new hires to the team

Teaching Experience

Fall 2023 **Instructor**, *CS 2110 (Computer Organization & Programming)*, Georgia Tech
- 277 students, 37 TAs, 3.44 course GPA, 1,617 Piazza contributions

Spring 2022 **Head Teaching Assistant**, *CS 4290/6290 (High-Performance Computer Architecture)*, Georgia Tech
- 103 students, managed 5 TAs, 496 Piazza contributions
- Rewrote projects for cache and superscalar CPU simulation from scratch

Fall 2018 **Head Teaching Assistant**, *CS 2110 (Computer Organization & Programming)*, Georgia Tech
- 360 students, managed 18 TAs, 1,060 Piazza contributions
- Overhauled autograding infrastructure for class, making class fully autograded for the first time

Publications

March 2025 Austin J. Adams, Sharjeel Khan, Arjun Bhamra, Ryan Abusaada, Anthony M. Cabrera, Cameron Hoechst, Jeffrey S. Young, and Thomas M. Conte. *Compiling Qwerty, a Basis-Oriented Quantum Programming Language*. To appear in *2025 IEEE/ACM International Symposium on Code Generation and Optimization (CGO)*.

April 2024 Austin J. Adams, Sharjeel Khan, Jeffrey S. Young, and Thomas M. Conte. *Qwerty: A Basis-Oriented Quantum Programming Language*, April 2024. arXiv:2404.12603 [quant-ph].

May 2023 Akihiro Hayashi, Austin Adams, Jeffrey Young, Alexander McCaskey, Eugene Dumitrescu, Vivek Sarkar, and Thomas M. Conte. *Enabling Multi-threading in Heterogeneous Quantum-Classical Programming Models*. 2023 Workshop on Quantum Computing Algorithms, Systems, and Applications (Co-located with IPDPS 2023).

November 2021 Austin Adams, Elton Pinto, Jeff Young, Creston Herold, Alex McCaskey, Eugene Dumitrescu, and Thomas M. Conte. *Enabling a Programming Environment for an Experimental Ion Trap Quantum Testbed*. IEEE International Conference on Rebooting Computing (ICRC 2021).

June 2021 Austin Adams, Pulkit Gupta, Blaise Tine, and Hyesoon Kim. *Cryptography Acceleration in a RISC-V GPGPU*. Fifth Workshop on Computer Architecture Research with RISC-V (CARRV 2021) (Co-located with ISCA 2021).