

# Alex Hankin

## Curriculum Vitae

### PERSONAL INFORMATION

Full Name: Alexander R. Hankin

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Website: <https://alexanderhankin.github.io>

### CURRENT POSITION

Research Scientist, Intel Labs

### EDUCATION

2022 Ph.D. Electrical Engineering, Tufts University

2018 M.S. Electrical Engineering, Tufts University

2012-2016 B.S. Computer Engineering, minor in Mathematics, Tufts University

### AWARDS

2022 Greenough Fellow, Tufts University

2021 Best Project Award, Quantum Computing Workshop at ISCA

2015 5-Year Combined B.S. & M.S. Program, Tufts University

2013-2015 Dean's List, Tufts University

### PROFESSIONAL CAREER

2022-present Research Scientist, Intel Labs

2022 Postdoctoral Fellow, Harvard University

2020 Research Intern, Intel

2019 Research Intern, Google

2017-2022 Research and Teaching Assistant, Tufts University

### RESEARCH INTERESTS

Computer Systems and Architecture

Next Generation Computing Systems and Technologies

Analysis and Optimization Technologies for Computer Systems

Hardware Telemetry

Analytical and Abstract Modeling of Program Behavior and Computer Systems

Microservices and Datacenter Workloads

Design and Modeling of Memory System Architectures

Emerging Non-Volatile Memory

Advanced On-Chip Thermal Hotspots

Trapped-Ion Quantum Computer Architecture

### PUBLICATIONS

2024

(pending publication) S. Kataoka, S. Ghimire, **A. Hankin**, and L. Pentecost, "Evaluating Recent Embedded Non-Volatile Memory (eNVM) Advancements and Optimizing Selection for Workload Needs. 10 pages."

**A. Hankin**, A. Mahmoud, M. Hempstead, D. Brooks and G. -Y. Wei, “Exploring the Impact of Weak Links Between Chains in Trapped Ion Quantum Computers,” 2024 IEEE International Symposium on Workload Characterization (IISWC), Vancouver, Canada, 2024. 13 pages.

## 2023

**A. Hankin**, A. Mahmoud, M. Hempstead, D. Brooks and G. -Y. Wei, “VelociTI: An Architecture-level Performance Modeling Framework for Trapped Ion Quantum Computers,” 2023 IEEE International Symposium on Workload Characterization (IISWC), Ghent, Belgium, 2023, pp. 206-210, doi: 10.1109/IISWC59245.2023.00040.

**A. Hankin\***, L. Pentecost\*, D. Min, D. Brooks, and G. Y. Wei (**\*joint first authors**), “Is the Future Cold or Tall: Design Space Exploration of Cryogenic and 3D Embedded Cache Memory,” in 2023 IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS). April 23-25, 2023. Raleigh, North Carolina.

M. Amiraski, D. Werner, **A. Hankin**, J. Sebot, K. Vaidyanathan, M. Hempstead, “Boreas: A Cost-Effective Mitigation Method for Advanced Hotspots using Machine Learning and Hardware Telemetry,” in 2023 IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS). April 23-25, 2023. Raleigh, North Carolina.

## 2022

**A. Hankin**, L. Pentecost, M. Donato, M. Hempstead, G. Y. Wei, and D. Brooks, “The Persistence of Non-Volatile Memory: Exploiting the Growing Design Space,” in Computer Architecture Today, ACM SIGARCH, August 2022.

D. Werner, M. Amiraski, **A. Hankin**, J. Sebot, K. Vaidyanathan, and M. Hempstead, “Utilizing the HotGauge Framework for Hotspot Behavior Analysis,” HotSpots Strike Back (HSSB) Workshop at ISCA 2022.

**A. Hankin**, “Evaluation of Embedded Non-Volatile Memories for Modern Computing Systems”, Tufts University. 119 pages. ProQuest Dissertations and Theses. 2022.

L. Pentecost\*, **A. Hankin\***, M. Donato, M. Hempstead, G. Y. Wei, and D. Brooks (**\*joint first authors**), “NVMEexplorer: A framework for cross-stack comparisons of embedded non-volatile memories,” in 2022 IEEE International Symposium on High-Performance Computer Architecture (HPCA), 2022, pp. 938–956.

## 2021

**A. Hankin\***, D. Werner\*, J. Sebot, K. Vaidyanathan, M. Amiraski, and M. Hempstead (**\*joint first authors**), “HotGauge: A Methodology for Characterizing Hotspots in Next Generation Processors,” 2021 IEEE International Symposium on Workload Characterization (IISWC), November 2021.

**A. Hankin** and M. Hempstead, “Proposal for a Timing Model of Ion Trap Quantum Architectures,” I too can Quantum! (I2Q) at ISCA 2021. **Best project award winner**.

**A. Hankin**, M. Amiraski, K. Sangaiah, and M. Hempstead, “Toward Faster and More Efficient Training on CPUs Using STT-RAM-based Last Level Cache,” 12th Annual Non-Volatile Memories Workshop (NVMW), San Diego, CA, USA, 2021.

## 2019

**A. Hankin**, T. Shapira, K. Sangaiah, M. Lui and M. Hempstead, “Evaluation of Non-Volatile Memory Based Last Level Cache Given Modern Use Case Behavior,” 2019 IEEE International Symposium on Workload Characterization (IISWC), Orlando, FL, USA, 2019, pp. 143-154, doi: 10.1109/IISWC47752-2019.9042051.

## **TEACHING EXPERIENCE**

2021 Teaching Assistant, Introduction to Circuits and Electronics (Fall), Tufts University  
2021 Teaching Assistant, Advanced Computer Architecture (Spring), Tufts University  
2020 Teaching Assistant, Electronics (Spring), Tufts University  
2018 Teaching Assistant, Hardware-Software Image Processing (Fall), Tufts University  
2018 Teaching Assistant, Machine-centric Approach to Programming (Fall), Tufts University  
2018 Teaching Assistant, Advanced Computer Architecture (Spring), Tufts University  
2017 Teaching Assistant, Computer Organization and Design (Fall), Tufts University

## **OPEN SOURCE SOFTWARE**

2023 VelociTI  
2021 HotGauge  
2021 NVMEexplorer

## **WORKSHOPS, TUTORIALS**

2022 NVMEexplorer, International Symposium on Computer Architecture (ISCA)  
2022 HotSpots Strike Back, International Symposium on Computer Architecture (ISCA)

## **CONFERENCE TALKS, WORKSHOP TALKS, POSTERS**

2023 IEEE International Symposium on Workload Characterization (IISWC)  
2023 IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS)  
2022 IEEE International Symposium on High-Performance Computer Architecture (HPCA)  
2021 IEEE International Symposium on Workload Characterization (IISWC)  
2021 I too can Quantum! at IEEE International Symposium on Computer Architecture (ISCA)  
2021 12th Annual Non-Volatile Memories Workshop (NVMW)  
2019 IEEE International Symposium on Workload Characterization (IISWC)

## **PROFESSIONAL SERVICE**

2024 Program Committee, IEEE International Symposium on Workload Characterization (IISWC)  
2024 Program Committee, IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS)  
2023 Program Committee, IEEE International Symposium on Workload Characterization (IISWC)  
2023 Artifact Evaluation Committee, European Conference on Computer Systems (EuroSys)  
2022 Program Committee, IEEE International Symposium on Workload Characterization (IISWC)