Ryan Wong

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Research Interests

Computer architecture; memory & storage systems; emerging memory technologies; hardware accelerators for machine learning and databases; scientific computing

Education

University of Illinois Urbana-Champaign — **Urbana, Illinois**
Ph.D. in Computer Science — *2021-Present*
Advisor: Saugata Ghose

University of Rochester — **Rochester, New York**
M.S. in Electrical Engineering — *2020*
Advisor: Engin Ipek

University of Rochester — **Rochester, New York**
B.S. in Computer Science/B.A. in Chemistry — *2018*
Distinction in Chemistry

Professional Experience

Graduate R&D Intern — **Sandia National Laboratories**
Scalable Computer Architectures — *2024-Present*
Mentor: Ben Feinberg

Radiation Hardened CMOS — *2019-2021*
Co-advisors: Ben Feinberg, Sapan Agarwal

Computer Systems Architecture Laboratory — **University of Rochester**
(Graduate) Research Assistant — *2017-2021*
Advisor: Engin Ipek

NSF-Research Experience for Undergraduates — **Salisbury University**
Research Assistant — *Summer 2018*
Advisor: Lei Zhang

ICODES Test Group — **Tapestry Solutions**
Software Tester — *Summer 2016, 2017*

Publications & Peer-Reviewed Workshops

[TO-APPEAR] R. Wong, N. Kim, A. Das, K. Higgs, E. Ipek, S. Agarwal, S. Ghose, and B. Feinberg, "ANVIL: An In-Storage Accelerator for Name–Value Data Stores", 52^{nd} *International Symposium on Computer Architecture* **(ISCA)**, 2025.

R. Wong, N. Kim, K. Higgs, E. Ipek, S. Agarwal, S. Ghose, and B. Feinberg, "TCAM-SSD: A Framework for Search-Based Computing in Solid-State Drives", 15^{th} Non-Volatile Memories Workshop **(NVMW)**, 2024. *Extended paper available on arXiv:* `https://arxiv.org/abs/2403.06938`

B. Feinberg, **R. Wong**, T. P. Xiao, C. H. Bennett, J. N. Rohan, E. G. Boman, M. J. Marinella, S. Agarwal, and E. Ipek, "An Analog Preconditioner for Solving Linear Systems", 27^{th} *International Symposium on High-Performance Computer Architecture* **(HPCA)**, 2021.

B. Feinberg, B. Heyman, D. Mikhailenko, **R. Wong**, A. Ho, and E. Ipek, "Commutative Data Reordering: A New Technique to Reduce Data Movement Energy on Sparse Linear Algebra Workloads", 47^{th} *International Symposium on Computer Architecture* **(ISCA)**, 2020.

B. Feinberg, B. Heyman, D. Mikhailenko, **R. Wong**, and E. Ipek, "Reducing Data Movement Energy via Commutative Data Reordering", *Government Microcircuit Applications & Critical Technology Conference* **(GOMACTech)**, 2019.

Technical Reports

S. Agarwal, B. Feinberg, J. N. Rohan, T. P. Xiao, C. H. Bennett, E. G. Boman, M. J. Marinella, **R. Wong**, B. C. Heyman, D. Mikhailenko, A. C. Ho, and E. Ipek "High Precision Sparse and Dense Analog Matrix Multiplication", *Sandia Report*, SAND2021-12424, 2021.

Talks and Tutorials

Tutorial: "Simulation for Processing-Using-Memory Systems (PUMPS)". Co-located with *ISCA 2024*.

Awards

Outstanding Teaching Assistant* — **University of Illinois**
Department of Computer Science — *2022*

Hopeman Fellowship — **University of Rochester**
School of Engineering and Applied Sciences — *2019-2020*

Teaching

CS 233H: Computer Architecture Honors — **University of Illinois**
Instructors: Ryan Wong & Prof. Geoffrey Herman — *Fall 2023*
Overall teaching rating 4.63/5, Overall course rating 4.63/5 (16 responses)
On List of Teachers Ranked as Excellent by Their Students

CS 233(H): Computer Architecture* — **University of Illinois**
Instructors: Profs. Geoffrey Herman & Saugata Ghose — *Fall 2022*

Instructors: Profs. Geoffrey Herman & Saugata Ghose — *Fall 2021*
Overall teaching rating: 4.38/5 (8 responses)
On List of Teachers Ranked as Excellent by Their Students

ECE 201/401: Advanced Computer Architecture — **University of Rochester**
Instructor: Prof. Engin Ipek — *Fall 2019*

ECE 200/400: Computer Organization — **University of Rochester**
Instructor: Prof. Engin Ipek — *Spring 2019*

CSC 172: Data Structures and Algorithms — **University of Rochester**
Instructor: Prof. Tamal Biswas — *(Head Workshop Leader) Spring 2018*

Instructor: Prof. Ted Pawlicki — *Spring 2017*

CSC 242: Artificial Intelligence — **University of Rochester**
Instructor: Prof. George Ferguson — *Fall 2017*

CSC 171: Introduction to Computer Science — **University of Rochester**
Instructor: Prof. Ted Pawlicki — *(Head Workshop Leader) Fall 2017*
Instructor: Prof. George Ferguson — *Fall 2016*

Mentoring

Aniket Das — **University of Illinois**
Senior Thesis: Reliability for In-Flash Processing-using-Memory — *2024-Present*

Abhinil Dutt — **University of Illinois**
Adaptive Cache Hierarchies — *2023-Present*

Jenny Liang — **University of Illinois**
Adaptive Cache Hierarchies — *2023-Present*

Rahul Prabhu — **University of Illinois**
Senior Thesis: PUM Architectures — *2023-Present*

Jiwon (Julie) Lee — **University of Illinois**
Senior Thesis: Adaptive Cache Hierarchies — *2022-2023*

Kevin Higgs — **University of Illinois**
ISUR: In-Storage Computing — *2022-2023*

Nikita Kim — **University of Rochester**
In-Storage Computing — *2019-2022*

Service

- Computer Architecture Student Association (CASA) Steering Committee Member
- uArch Mentor (ISCA 2024)
- CS Graduate Student Ambassador (Illinois)
- Illinois: ISUR Mentor, DaRin Butz Mentor