

Education

- 2023–present **PhD, Electrical & Computer Engineering**, Georgia Institute of Technology, Atlanta, GA, USA.
Research Focus: Computer Architecture and VLSI.
Advisor: Steve W. Chaddick school chair and Prof., Arijit Raychowdhury
- 2019–2023 **Bachelor of Engineering, Electronics Science and Technology**, Zhejiang University, Hangzhou, Zhejiang, PRC.

Publications

*: Equal Contributions. Underline: Advisors for the paper. †: Correspondence.

In Conference Proceedings

- MLSys 2023 Zishen Wan, **Che-Kai Liu***, Hanchen Yang*, Chaojian Li*, Haoran You*, Yonggan Fu, Cheng Wan, Tushar Krishna†, Yingyan (Celine) Lin†, and Arijit Raychowdhury†. * **equal contributions**. Towards cognitive ai system: A survey and prospective on neuro-symbolic ai. In *Workshop on Systems for Next-Gen AI Paradigms, Sixth Conference on Machine Learning and Systems*, MLSys 2023.
- ICCAD 2023 Shengxi Shou, **Che-Kai Liu**, Sanggeon Yun, Zishen Wan, Kai Ni, Mohsen Imani, X. Sharon Hu, Jianyi Yang, Cheng Zhuo, and Xunzhao Yin†. See-mcam: A scalable multi-bit fefet content addressable memory for energy efficient associative search. In *Proceedings of the IEEE/ACM International Conference on Computer-Aided Design*. Acceptance rate: 22.9%. IEEE/ACM, ICCAD 2023.
- DATE 2023 Hamza E. Barkam, Sanggeon Yun, Paul R. Genssler, Zhuowen Zou, **Che-Kai Liu**, Hussam Amrouch, and Mohsen Imani†. Hdgim: Hyperdimensional genome sequence matching on unreliable highly-scaled fefet. In *Proceedings of the IEEE/ACM Design Automation and Test in Europe*. Acceptance rate: 25%. IEEE/ACM, DATE 2023.
- ACM SRC 2023 **Che-Kai Liu**†, Mengyuan Li, Mohsen Imani, X. Sharon Hu, and Xunzhao Yin. Compute-in-memory: From device to application. In *ACM Student Research Competition Final*. ACM, ACM SRC 2023.
- ICCAD 2022 **Che-Kai Liu**, Haobang Chen, Mohsen Imani, Kai Ni, Arman Kazemi, Ann Franchesca Laguna, Michael Niemier, Xiaobo Sharon Hu, Liang Zhao, Cheng Zhuo, and Xunzhao Yin†. Cosime: Fefet based associative memory for in-memory cosine similarity search. In *Proceedings of the 41st IEEE/ACM International Conference on Computer-Aided Design*. Acceptance rate: 22%. IEEE/ACM, ICCAD 2022.

Professional Experience

Georgia Institute of Technology, USA

- Jan, 2023 – present **Neuro-Symbolic Computer Architecture and Circuit.**

University of California Irvine, USA

- Aug. 2022 – Jan. 2023 **Vector Symbolic Algorithm, Circuit and Architecture.**

University of Notre Dame, USA

June. 2022 – **Reconfigurable Content Addressable Memory Based on Multi-Variate Non-Linear Optimization.**
Jan. 2023

Zhejiang University, PRC

Dec. 2020 – **In-memory Computing Analog Circuits.**
May. 2022

Fellowships & Awards

- 2023 ACM Student Research Competition **Finalist (Ranked 4th worldwide)**.
- 2023 Outstanding undergraduate thesis award. Thesis title: "Cross-Layer Optimization for Computing-in-Memory Circuits, Architectures and Applications". Issued: Zhejiang University, PRC
- 2022 **First Place**, ACM Student Research Competition at ACM/IEEE Int'l Conference on Computer-Aided Design (ICCAD), 2022. Will represent ACM SIGDA at the ACM banquet 2023.
- 2022 **Best** presentation award at ACM/IEEE ESWEEK EIC workshop, 2022.
- 2022 Research sponsorship from Fellow of IEEE/ACM Prof. X. Sharon Hu, 2022
- 2022 Research scholarship from the University of Notre Dame, IN, USA 2022
- 2022 Third-Class Scholarship for Award of Merits, 2022. Issued: Zhejiang University
- 2022 Scholarship for Hongkong, Macau, Taiwan and Overseas Chinese. Issued: Ministry of Education, PRC
- 2022 Third-Prize of PRC National Talents Training Base, 2022. Issued: Zhejiang University
- 2022 Outstanding student of innovation and entrepreneurship 2022, academic excellence 2022, international engagement 2022. Issued: Zhejiang University.
- 2021 Scholarship for Hongkong, Macau, Taiwan and Overseas Chinese. Issued: Ministry of Education, PRC
- 2020 Scholarship for Hongkong, Macau, Taiwan and Overseas Chinese. Issued: Ministry of Education, PRC

Talks

- 2023 "When Vector Symbolic Architecture meets Compute-in-Memory", ICSR Lab, Georgia Institute of Technology, Virtual
- 2022 Student Research Competition, IEEE/ACM 41st International Conference on Computer-Aided Design (ICCAD), San Diego, CA, USA.
- 2022 Cosime: Fefet based associative memory for in-memory cosine similarity search, IEEE/ACM 41st International Conference on Computer-Aided Design (ICCAD), 2023, San Diego, CA, USA.
- 2022 "Compute-in-Memory: A Cross-Layer Perspective", Bias Lab, University of California, Irvine, CA, USA.
- 2022 "An efficient Associative Memory Engine for Cosine Similarity-Based Nearest Neighbor Search", ACM/IEEE Embedded System Week (ESWEEK), Edge Intelligent Computing workshop, virtual.

Skills

Technical Skill Cadence Virtuoso, Python, C, Synopsys DC/VCS/DVE, (System) Verilog, APR, MATLAB, Assembly (RISC-V)

Reviewer for

2022–present **IEEE JETCAS.**

Research Agencies Participated

2023–present : **Cocosys: Center for the Co-Design of Cognitive Systems**, Center director: Prof. Arijit Raychowdhury.

Courses Participated during Ph.D. @ GaTech ECE

Fall, 2023 : **ECE8903: Special Problems**, Instructor: Prof. Arijit Raychowdhury.

Fall, 2023 : **ECE6130: Advanced VLSI Systems**, Instructor: Prof. Arijit Raychowdhury.

Fall, 2023 : **CS6290/ECE6100: Advanced Computer Architecture**, Instructor: Prof. Cong (Callie) Hao.

Fall, 2023 : **ECE4804: VLSI Theory to Tape-out**, Instructor: Prof. Visvesh S. Sathe, Audit.

References

Dr. Arijit Raychowdhury

Fellow of IEEE

Steve W. Chaddick School Chair and Professor, School of Electrical & Computer Engineering

Georgia Institute of Technology, Atlanta, GA, USA

✉ arijit.raychowdhury@ece.gatech.edu

Dr. Xiaobo Sharon Hu

Fellow of IEEE & ACM

Professor, Department of Computer Science & Engineering

University of Notre Dame, IN, USA

✉ shu@nd.edu

Dr. Mohsen Imani

Assistant Professor, Department of Information & Computer Science

University of California, Irvine, CA, USA

✉ m.imani@uci.edu