Yifan Qin

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EDUCATION

University of Notre Dame — 2022 - present
Ph.D. Candidate, Computer science and engineering
Research interest: Efficient and robust AI accelerator, Soft/hardware co-design for edge AI, Efficient LLM and generative AI.
Honorably work with Prof. Yiyu Shi & Prof. X. Sharon Hu

Huazhong University of Science and Technology — 2018 - 2021
MS, Software engineering
Research interest: quantized low-bit neural networks with RRAM

Huazhong University of Science and Technology — 2013 - 2017
BS, Electronic science and technology

AWARDS AND HONORS

Young Fellow (DAC)	2025
William J. McCalla Best Paper Award Candidate at IEEE/ACM ICCAD (10 out of 802 submissions)	2024
Young Fellow (DAC)	2024
William J. McCalla Best Paper Award at IEEE/ACM ICCAD (2 out of 750 submissions)	2023
Young Fellow (DAC)	2023
Outstanding Graduates (HUST)	2020 - 2021
Outstanding Volunteer Docent (Wuhan Museum)	2015 - 2016
National 2nd Prize (China Undergraduate Mathematical Modeling Contest)	2015

RESEARCH EXPERIENCE

University of Notre Dame — Notre Dame, IN
Doctoral Researcher — August 2022 - present
Established and implemented hardware/software codesign methods to mitigate the impact of device variations and noise on inference of non-volatile AI accelerators. Achieved high robust and efficient solutions for LLM models and AI accelerator.

Hong Kong University of Science and Technology (HKUST)
AI Chip Center for Emerging Smart Systems(ACCESS) — Hong Kong
Intern — May 2024 - July 2024
Designed and implemented a convolutional neural network system for ventricular arrhythmia detection with a 40nm LP TSMC CNN accelerator, delivering a deployable chip demo. Led the full-stack design, from UI to backend, achieving substantial reductions in inference latency and energy consumption through optimized quantization and pruning techniques, demonstrating high-performance real-time detection capabilities.

Huazhong University of Science and Technology — Wuhan, Hubei
Master's Researcher, Research Assistant — August 2018 - June 2022
Designed low-bit quantized CNNs for RRAM accelerators, addressing non-idealities of RRAM crossbars during inference. Developed a novel binary neural network RRAM accelerator with half area and maintained high accuracy.

PUBLICATION

Journal

[1] **Yifan Qin**, Zheyu Yan, Dailin Gan, Jun Xia, Zixuan Pan, Wujie Wen, Xiaobo Sharon Hu, and Yiyu Shi. "NeFT: Negative Feedback Training to Improve Robustness of Compute-In-Memory DNN Accelerators". In: *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD)* (2025).

[2] Han Bao, **Yifan Qin**, Jia Chen, Ling Yang, Jiancong Li, Houji Zhou, Yi Li, and Xiangshui Miao. "Quantization and sparsity-aware processing for energy-efficient NVM-based convolutional neural networks". In: *Frontiers in Electronics* 3 (2022), p. 954661.

[3] **Yifan Qin**, Han Bao, Feng Wang, Jia Chen, Yi Li, and Xiangshui Miao. "Recent progress on memristive convolutional neural networks for edge intelligence". In: *Advanced Intelligent Systems (AIS)* 2.11 (2020), p. 2000114. (**Back Cover**).

[4] **Yifan Qin**, Rui Kuang, Xiaodi Huang, Yi Li, Jia Chen, and Xiangshui Miao. "Design of high robustness BNN inference accelerator based on binary memristors". In: *IEEE Transactions on Electron Devices (TED)* 67.8 (2020), pp. 3435–3441.

Conference

[1] Jianbo Liu, Zephan Enciso, Boyang Cheng, Likai Pei, Steven Davis, **Yifan Qin**, Zhenge Jia, Xiaobo Sharon Hu, Yiyu Shi, and Ningyuan Cao. "A 65nm Uncertainty-quantifiable Ventricular Arrhythmia Detection Engine with 1.75 µJ per Inference". In: *Proceedings of the IEEE International Solid-State Circuits Conference (ISSCC)*. IEEE. 2025.

[2] Zixuan Pan, Jun Xia, Zheyu Yan, Guoyue Xu, **Yifan Qin**, Xueyang Li, Yawen Wu, Zhenge Jia, Jianxu Chen, and Yiyu Shi. "Rethinking Medical Anomaly Detection in Brain MRI: An Image Quality Assessment Perspective". In: *Proceedings of the IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*. IEEE. 2025.

[3] **Yifan Qin**, Zhenge Jia, Zheyu Yan, Jay Mok, Manto Yung, Yu Liu, Xuejiao Liu, Wujie Wen, Luhong Liang, Kwang-Ting Tim Cheng, X. Sharon Hu, and Yiyu Shi. "A 10.60 µW 150 GOPS Mixed-Bit-Width Sparse CNN Accelerator for Life-Threatening Ventricular Arrhythmia Detection". In: *Proceedings of the Asia and South Pacific Design Automation Conference (ASP-DAC)*. ACM. 2025.

[4] Likai Pei*, **Yifan Qin***, Zephan M. Enciso, Boyang Cheng, Jianbo Liu, Steven Davis, Zhenge Jia, Michael Niemier, Yiyu Shi, X. Sharon Hu, and Ningyuan Cao. "Towards Uncertainty-Quantifiable Biomedical Intelligence: Mixed-signal Compute-in-Entropy for Bayesian Neural Networks". In: *2024 IEEE/ACM International Conference on Computer Aided Design (ICCAD)*. IEEE. 2024. (* equal contribution)(acceptance rate 24%)(**2024 William J. McCalla Best Paper Award Candidate, 10 out of 802 submissions**).

[5] **Yifan Qin**, Zheyu Yan, Zixuan Pan, Wujie Wen, Xiaobo Sharon Hu, and Yiyu Shi. "TSB: Tiny Shared Block for Efficient DNN Deployment on NVCIM Accelerators". In: *2024 IEEE/ACM International Conference on Computer Aided Design (ICCAD)*. IEEE. 2024. (acceptance rate 24%).

[6] **Yifan Qin**, Zheyu Yan, Wujie Wen, Xiaobo Sharon Hu, and Yiyu Shi. "Sustainable Deployment of Deep Neural Networks on Non-Volatile Compute-in-Memory Accelerators". In: *International Conference on Hardware/Software Codesign and System Synthesis (CODES+ISSS)*. IEEE. 2024.

[7] Zheyu Yan, **Yifan Qin**, Xiaobo Sharon Hu, and Yiyu Shi. "On the viability of using LLMs for SW/HW co-design: An example in designing CiM DNN accelerators". In: *2023 IEEE 36th International System-on-Chip Conference (SOCC)*. IEEE. 2023, pp. 1–6.

[8] Zheyu Yan, **Yifan Qin**, Wujie Wen, Xiaobo Sharon Hu, and Yiyu Shi. "Improving realistic worst-case performance of NVCiM DNN accelerators through training with right-censored gaussian noise". In: *2023 IEEE/ACM International Conference on Computer Aided Design (ICCAD)*. IEEE. 2023, pp. 1–9. (**2023 William J. McCalla Best Paper Award, 2 out of 750 submissions**).

PRESENTATIONS & TALKS

Computer science department, Shandong University (SDU)	**Aug, 2024**
Electrical engineering department, Zhejiang University (ZJU)	**Aug, 2024**
University of Michigan-Shanghai Jiao Tong University Joint Institute (UMich - SJTU)	**Aug, 2024**
Electrical engineering department, Southern University of Science and Technology (SUSTech)	**July, 2024**
AI Chip Center for Emerging Smart Systems, Hong Kong University of Science and Technology (HKUST)	**June, 2024**

TEACHING EXPERIENCE

CSE-40868 Neural Networks, TA	SP23

REVIWER FOR JOURNALS/CONFERENCE

Scientific Reports

Great Lakes Symposium on VLSI (GLSVLSI)

LEADERSHIP AND SERVICE

Member, Graduate Student Association, Huazhong University of Science and Technology	2019-2020
Volunteer Docent, Wuhan Museum	2015-2016
Team Captain, College Table Tennis Team, Huazhong University of Science and Technology	2016
President, Table Tennis Association, Huazhong University of Science and Technology	2015-2016