

Yifan Qin

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EDUCATION

University of Notre Dame Ph.D. Candidate, Computer science and engineering Research interest: Efficient deep learning, computing-in-memory, AI accelerator with post-CMOS designs Working with Prof. Yiyu Shi & Prof. X. Sharon Hu	2022 - present
Huazhong University of Science and Technology MS, Software engineering Research interest: quantized low-bit neural networks with RRAM	2018 - 2021
Huazhong University of Science and Technology BS, Electronic science and technology	2013 - 2017

AWARDS AND HONORS

Young Fellow (DAC)	2023 - 2024
William J. McCalla Best Paper Award at IEEE/ACM ICCAD (2 out of 750 submissions)	2023
Young Fellow (DAC)	2022 - 2023
Outstanding Graduates (HUST)	2020 - 2021
Outstanding Volunteer Docent (Wuhan Museum)	2015 - 2016
National 2nd Prize (Contemporary Undergraduate Mathematical Contest in Modeling)	2015

RESEARCH EXPERIENCE

University of Notre Dame <i>Doctoral Researcher</i> Established and implemented several methods to mitigate the impact of device variations on inference of NVCIM accelerators. Achieved high robust and efficient algorithms for NVCIM training and deployment.	Notre Dame, IN August 2022 - present
AI Chip Center for Emerging Smart Systems(ACCESS) <i>Visiting student</i> Developed and implemented a fully quantized 1D convolutional system for ventricular arrhythmia detection on a CNN accelerator (40nm, TSMC). Led the full-stack design, from UI to backend, achieving low inference latency and high energy efficiency.	Hong Kong May 2024 - July 2024
Huazhong University of Science and Technology <i>Master's Researcher, Research Assistant</i> 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.	Wuhan, Hubei August 2018 - June 2022

PUBLICATION

Journal

- [1] 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.
- [2] 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* 2.11 (2020), p. 2000114. ([Back Cover](#)).
- [3] 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* 67.8 (2020), pp. 3435–3441.

Conference

- [1] Jianbo Liu, Zephan Enciso, Boyang Cheng, Likai Pei, Steven Davis, Yifan Qin, Zheng Jia, Xiaobo Sharon Hu, Yiyu Shi, and Ningyuan Cao. “A 65nm Uncertainty-quantifiable Ventricular Arrhythmia Detection Engine with 1.75 μ J per Inference”. In: *Proceedings of the IEEE International Solid-State Circuits Conference (ISSCC)*. IEEE. 2025.
- [2] Yifan Qin, Zheng 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 μ W 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.
- [3] Likai Pei*, Yifan Qin*, Zephan M. Enciso, Boyang Cheng, Jianbo Liu, Steven Davis, Zheng 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. (* contributed equally)(acceptance rate 24%).
- [4] 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%).
- [5] 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.
- [6] Yifan Qin, Zheyu Yan, Wujie Wen, Xiaobo Sharon Hu, and Yiyu Shi. “Negative Feedback Training: A Novel Concept to Improve Robustness of NVCiM DNN Accelerators”. In: *arXiv preprint arXiv:2305.14561*. 2023. (under review).
- [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, Shanghai Jiao Tong University (SJTU)	Aug, 2024
Electrical engineering department, Southern University of Science and Technology (SUSTech)	July, 2024
AI Chip Center for Emerging Smart Systems (ACCESS), HK, PostGraduateStudent Sharing Session	June, 2024

TEACHING EXPERIENCE

CSE-40868 Neural Networks, TA	SP23
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REVIEWER FOR JOURNALS/CONFERENCE

ACM/IEEE International Conference on Computer-Aided Design (ICCAD)	2024
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LEADERSHIP AND SERVICE

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