# Yifan Qin

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EDUCATION	
University of Notre Dame	2022 - present
Ph.D. Candidate, Computer science and engineering	
Research interest: computing-in-memory, AI accelerator with post-CMOS designs	
Working 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)	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	Notre Dame, IN
Doctoral Researcher	August 2022 - present
Established and implemented several methods to mitigate the impact of device variation	ons on inference of NVCIM
accelerators. Achieved high robust and efficient algorithms for NVCIM training and depl	oyment.

## AI Chip Center for Emerging Smart Systems (ACCESS)

Visiting student May 2024 - July 2024 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.

## 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]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.
- Yifan Qin, Han Bao, Feng Wang, Jia Chen, Yi Li, and Xiangshui Miao. "Recent progress on memristive convo-[2]lutional neural networks for edge intelligence". In: Advanced Intelligent Systems 2.11 (2020), p. 2000114. (Back Cover).
- Yifan Qin, Rui Kuang, Xiaodi Huang, Yi Li, Jia Chen, and Xiangshui Miao. "Design of high robustness BNN [3]inference accelerator based on binary memristors". In: IEEE Transactions on Electron Devices 67.8 (2020), pp. 3435–3441.

Hong Kong

## Conference

- [1] Likai Pei<sup>\*</sup>, Yifan Qin<sup>\*</sup>, 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: Mixedsignal Compute-in-Entropy for Bayesian Neural Networks". In: 2024 IEEE/ACM International Conference on Computer Aided Design (ICCAD). IEEE. 2024. (\* contributed equally).
- [2] 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.
- [3] 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 Hard-ware/Software Codesign and System Synthesis (CODES+ISSS). IEEE. 2024.
- [4] 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).
- [5] 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.
- [6] 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. (Best Paper,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)	<b>July</b> , 2024
AI Chip Center for Emerging Smart Systems (ACCESS), HK, PostGraduateStudent Sharing Session	June, 2024

## TEACHING EXPERIENCE

CSE-40868	Neural	Networks,	ΤА
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## REVIWER FOR JOURNALS/CONFERENCE

ACM/IEEE International Conference on Computer-Aided Design (ICCAD)

## 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 SP23

2024