QI SUN

ZJU100 Young Professor, Zhejiang University
qisunchn@zju.edu.cn, Hangzhou, Zhejiang, China

RESEARCH TOPICS

- Machine Learning in EDA
- Design Space Exploration
- DNN Hardware Acceleration
- RISC-V SoC

EXPERIENCE

Zhejiang University, Hangzhou, China Aug. 2023 – Now
ZJU100 Young Professor, College of Integrated Circuits, Zhejiang University

Cornell University, Ithaca, NY, USA Sept. 2022 – Aug. 2023
Post-Doctoral Associate, School of ECE, Computer Systems Laboratory
Supervisor: Prof. Zhiru Zhang

SmartMore Technology Co., Ltd., Hong Kong Mar. 2020 – Jun. 2022
Research Intern
Heterogeneous Computing Group
Topic: Deep Neural Network Hardware Acceleration

EDUCATION

The Chinese University of Hong Kong, NT, Hong Kong Aug. 2018 – Jul. 2022
Ph.D., Department of Computer Science & Engineering.
Supervisor: Prof. Bei Yu

Xidian University, Xi'an, P.R. China Aug. 2014 – Jul. 2018
B.Eng., Software Engineering.

PUBLICATIONS

Conference Papers

[C21] Hongquan He, Guowen Kuang, **Qi Sun**, Hao Geng, "Point Cloud and Large Pre-trained Model Catch Mixed-type Wafer Defect Pattern Recognition", IEEE/ACM Proceedings Design, Automation and Test in Europe (**DATE**), Valencia, Spain, Mar. 25-27, 2024.

[C20] Donger Luo, **Qi Sun**, Qi Xu, Tinghuan Chen, Hao Geng, "Attention-Based EDA Tool Parameter Explorer: From Hybrid Parameters to Multi-QoR metrics", IEEE/ACM Proceedings Design, Automation and Test in Europe (**DATE**), Valencia, Spain, Mar. 25-27, 2024.

[C19] Chenyi Wen, Haonan Du, Zhengrui Chen, Li Zhang, **Qi Sun**, Cheng Zhuo, "PACE: A Piece-Wise Approximate and Configurable Floating-Point Divider for Energy-Efficient Computing", IEEE/ACM Proceedings Design, Automation and Test in Europe (**DATE**), Valencia, Spain, Mar. 25-27, 2024.

[C18] Erika S. Alcorta, Andreas Gerstlauer, Chenhui Deng, **Qi Sun**, Zhiru Zhang, Ceyu Xu, Lisa Wu Wills, Daniela Sánchez Lopera, Wolfgang Ecker, Siddharth Garg, and Jiang Hu, "Machine Learning for Embedded System Design", International Conference on Hardware/Software Codesign and System Synthesis (**CODES+ISSS**), Sep. 2023. (Invited Paper)

[C17] Yuxuan Zhao, **Qi Sun#**, Zhuolun He, Yang Bai, Bei Yu, "AutoGraph: Optimizing DNN Computation Graph for Parallel GPU Kernel Execution", AAAI Conference on Artificial Intelligence (**AAAI**), Feb. 7–14, 2023.

[C16] Xufeng Yao, Yang Bai, Xinyun Zhang, Yuechen Zhang, **Qi Sun**, Ran Chen, Ruiyu Li, Bei Yu, "PCL: Proxy-based Contrastive Learning for Domain Generalization", IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), New Orleans, Jun. 19–24, 2022.

[C15] **Qi Sun**, Xinyun Zhang, Hao Geng, Yuxuan Zhao, Yang Bai, Haisheng Zheng, Bei Yu, "GTuner: Tuning DNN Computations on GPU via Graph Attention Network", ACM/IEEE Design Automation Conference (**DAC**), San Francisco, CA, Jul. 10–14, 2022.

[C14] Xinyun Zhang, Binwu Zhu, Xufeng Yao, **Qi Sun**, Ruiyu Li, Bei Yu, "Context-based Contrastive Learning for Scene Text Recognition", AAAI Conference on Artificial Intelligence (**AAAI**), Feb. 22–Mar. 1, 2022.

[C13] Hao Geng, Tinghuan Chen, **Qi Sun**, Bei Yu, "Techniques for CAD Tool Parameter Auto-tuning in Physical Synthesis: A Survey", IEEE/ACM Asian and South Pacific Design Automation Conference (**ASPDAC**), Jan. 17–20, 2022. (Invited Paper)

[C12] **Qi Sun**, Chen Bai, Tinghuan Chen, Hao Geng, Xinyun Zhang, Yang Bai, Bei Yu, "Fast and Efficient DNN Deployment via Deep Gaussian Transfer Learning", International Conference on Computer Vision (**ICCV**), Oct. 11-17, 2021.

[C11] Wenqian Zhao, **Qi Sun**, Yang Bai, Haisheng Zheng, Wenbo Li, Bei Yu, Martin D.F. Wong, "A High-Performance Accelerator for Super-Resolution Processing on Embedded GPU", IEEE/ACM International Conference on Computer-Aided Design (**ICCAD**), Nov. 1–4, 2021.

[C10] Chen Bai, **Qi Sun**, Jianwang Zhai, Yuzhe Ma, Bei Yu, Martin D.F. Wong, "BOOM-Explorer: RISC-V BOOM Microarchitecture Design Space Exploration Framework", IEEE/ACM International Conference on Computer-Aided Design (**ICCAD**), Nov. 1–4, 2021. **(William J. McCalla Best Paper Award)**

[C9] Yang Bai, Xufeng Yao, **Qi Sun**, Bei Yu, "AutoGTCO: Graph and Tensor Co-Optimize for Image Recognition with Transformers on GPU", IEEE/ACM International Conference on Computer-Aided Design (**ICCAD**), Nov. 1–4, 2021.

[C8] Tinghuan Chen, **Qi Sun**, Bei Yu, "Machine Learning in Nanometer AMS Design for Reliability", IEEE International Conference on ASIC (**ASICON**), Kunming, Oct. 26–29, 2021. (Invited Paper)

[C7] **Qi Sun**, Tinghuan Chen, Siting Liu, Jin Miao, Jianli Chen, Hao Yu, Bei Yu, "Correlated Multi-objective Multi-fidelity Optimization for HLS Directives Design", IEEE/ACM Proceedings Design, Automation and Test in Europe (**DATE**), Feb. 01–05, 2021. **(Best Paper Award Nomination)**

[C6] **Qi Sun**, Chen Bai, Hao Geng, Bei Yu, "Deep Neural Network Hardware Deployment Optimization via Advanced Active Learning", IEEE/ACM Proceedings Design, Automation and Test in Europe (**DATE**), Feb. 01–05, 2021.

[C5] Siting Liu, **Qi Sun**, Peiyu Liao, Yibo Lin, Bei Yu, "Global Placement with Deep Learning-Enabled Explicit Routability Optimization", IEEE/ACM Proceedings Design, Automation and Test in Europe (**DATE**), Feb. 01–05, 2021.

[C4] Tinghuan Chen, **Qi Sun**, Canhui Zhan, Changze Liu, Huatao Yu, Bei Yu, "Analog IC Aging-induced Degradation Estimation via Heterogeneous Graph Convolutional Networks", IEEE/ACM Asian and South Pacific Design Automation Conference (**ASPDAC**), Jan. 18–21, 2021.

[C3] **Qi Sun**, Arjun Ashok Rao, Xufeng Yao, Bei Yu, Shiyan Hu, "Counteracting Adversarial Attacks in Autonomous Driving", IEEE/ACM International Conference on Computer-Aided Design (**ICCAD**), Nov. 2–5, 2020. (Invited Paper)

[C2] **Qi Sun**, Tinghuan Chen, Jin Miao, Bei Yu, "Power-Driven DNN Dataflow Optimization on FPGA", IEEE/ACM International Conference on Computer-Aided Design (**ICCAD**), Westminster, CO, Nov. 4–7, 2019. (Invited Paper)

[C1] Wei Li, Yuzhe Ma, **Qi Sun**, Yibo Lin, Iris Hui-Ru Jiang, Bei Yu, David Z. Pan, "OpenMPL: An Open Source Layout Decomposer", IEEE International Conference on ASIC (**ASICON**), Chongqing, China, Oct. 29–Nov. 1, 2019. (Invited Paper)

Journal Papers

[J10] Chen Bai, **Qi Sun#**, Jianwang Zhai, Yuzhe Ma, Bei Yu, Martin D.F. Wong, "BOOM-Explorer: RISC-V BOOM Microarchitecture Design Space Exploration", accepted by ACM Transactions on Design Automation of Electronic Systems (**TODAES**).

[J9] Yang Bai, Xufeng Yao, **Qi Sun**, Wenqian Zhao, Shixin Chen, Zixiao Wang, Bei Yu, "GTCO: Graph and Tensor Co-Design for Transformer-based Image Recognition on Tensor Cores", accepted by IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (**TCAD**).

[J8] Wenqian Zhao, Yang Bai, **Qi Sun**, Wenbo Li, Haisheng Zheng, Nianjuan Jiang, Jiangbo Lu, Bei Yu, Martin D.F. Wong, "A High-Performance Accelerator for Super-Resolution Processing on Embedded GPU", accepted by IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (**TCAD**).

[J7] **Qi Sun**, Xufeng Yao, Arjun Ashok Rao, Bei Yu, Shiyan Hu, "Counteracting Adversarial Attacks in Autonomous Driving", accepted by IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (**TCAD**).

[J6] **Qi Sun**, Tinghuan Chen, Siting Liu, Jianli Chen, Hao Yu, Bei Yu, "Correlated Multi-objective Multi-fidelity Optimization for HLS Directives Design", ACM Transactions on Design Automation of Electronic Systems (**TODAES**), vol. 27, no. 4, 2022.

[J5] Qi Xu, Junpeng Wang, **Qi Sun**, Bo Yuan, Song Chen, Bei Yu, Yi Kang, Feng Wu, "Reliability-Driven Memristive Crossbar Design in Neuromorphic Computing Systems", accepted by IEEE Transactions on Automation Science and Engineering (**TASE**).

[J4] Guojin Chen, Wanli Chen, **Qi Sun**, Yuzhe Ma, Haoyu Yang, Bei Yu, "DAMO: Deep Agile Mask Optimization for Full Chip Scale", accepted by IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (**TCAD**).

[J3] Tinghuan Chen, **Qi Sun**, Canhui Zhan, Changze Liu, Huatao Yu, Bei Yu, "Deep H-GCN: Fast Analog IC Aging-induced Degradation Estimation", accepted by IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (**TCAD**).

[J2] Tinghuan Chen, Bin Duan, **Qi Sun**, Meng Zhang, Guoqing Li, Hao Geng, Qianru Zhang, Bei Yu, "An Efficient Sharing Grouped Convolution via Bayesian Learning", IEEE Transactions on Neural Networks and Learning Systems (**TNNLS**), 2021.

[J1] Wei Li, Yuzhe Ma, **Qi Sun**, Zhang Lu, Yibo Lin, Iris Hui-Ru Jiang, Bei Yu, David Z. Pan, "OpenMPL: An Open Source Layout Decomposer", IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (**TCAD**), vol. 40, no. 11, pp. 2331–2344, 2021.

SELECTED AWARDS AND HONORS

Qizhen Scholar Foundation	ZJU Education Foundation	2023
3rd Place of Student Research Competition	ICCAD	2021
William J. McCalla Best Paper Award	ICCAD	2021
Best Paper Award Nomination	DATE	2021
Full Postgraduate Studentship	CUHK	2018
Outstanding Graduate	Xidian University	2018
National Scholarship	Xidian University	2017
The First Class Scholarship	Xidian University	2014 - 2016

TEACHING ASSISTANT

Fall 2018	CSCI2720 Building Web Application
Spring 2019	CSCI1020 Hands-on Introduction to C++
Fall 2019	CSCI3230 Fundamentals of Artificial Intelligence
Fall 2020	CENG4480 Embedded System Development and Applications
Fall 2020	CMSC5743 Efficient Computing of Deep Neural Networks
Spring 2021	CENG5030 Energy Efficient (Deep Neural Network) Computing

GRADUATE LEVEL COURSES

ENGG5781	Matrix Analysis and Computations
IERG5130	Probabilistic Models and Inference Algorithms for Machine Learning
CSCI5030	Machine Learning Theory
CENG5030	Energy Efficient Computing
CSCI5390	Advanced GPU Programming
ENGG5130	Techniques for Data Mining
ENGG5202	Pattern Recognition

TECHNICAL SKILLS

Languages	C/C++, Vivado HLS C++, Python, CUDA C/C++, LaTeX
Operating Systems	Linux/UNIX