

# QI SUN

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## RESEARCH TOPICS

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- Machine Learning in Electronic Design Automation
- DNN Hardware Acceleration
- Design Space Exploration

## EXPERIENCE

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**Cornell University, Ithaca, NY, USA** Aug. 2022 – Now  
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

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**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, Elite Class, Graduated with Honors (top 1%).

## PUBLICATIONS

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### Conference Papers

- [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.
- [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.
- [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.
- [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.
- [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.

### Journal Papers

- [J8] Wenqian Zhao, Yang Bai, **Qi Sun**, Haisheng Zheng, Wenbo Li, 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

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Student Research Competition Bronze Medal	ICCAD	2021
William J. McCalla Best Paper Award	ICCAD	2021
Best Paper Award Nomination	DATE	2021
Excellent Teaching Assistantship Award × 2	CUHK	2019
Full Postgraduate Studentship	CUHK	2018
Outstanding Graduate Award	Xidian University	2018
National Scholarship	Xidian University	2017
The First Class Scholarship × 3	Xidian University	2014 - 2016

## PROFESSIONAL SERVICE

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### Journal Review

- IEEE Transaction on Computer-Aided Design of Integrated Circuits and Systems (TCAD)
- ACM Transaction on Design Automation of Electronic Systems (TODAES)
- IEEE Internet of Things Journal (IoT-J)

### Conference Review

- 2023 IEEE Computer Society Annual Symposium on VLSI (ISVLSI)
- 2023 AAAI Conference on Artificial Intelligence (AAAI)
- 2023 IEEE International Symposium on Circuits and Systems (ISCAS)
- 2022 IEEE International Conference on Computer Design (ICCD)
- 2020 ACM/IEEE Workshop on Machine Learning for CAD (MLCAD)
- 2019 IEEE International Conference on Embedded Software and Systems (ICCESS)
- 27th IFIP/IEEE International Conference on Very Large Scale Integration (VLSI-SoC)
- 22nd ACM/IEEE International Workshop on System-Level Interconnect Pathfinding (SLIP)

## TEACHING ASSISTANT

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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

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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

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**Languages**

C/C++, Vivado HLS C++, Python, CUDA C/C++, L<sup>A</sup>T<sub>E</sub>X

**Operating Systems**

Linux/UNIX