Jiajun Wu

PhD Candidate · Electrical and Electronic Engineering

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Education

University of Hong Kong (HKU) *Hong Kong SAR*

PhD Candidate *2021 - present*

- Supervisor: Dr. Hayden Kwok-Hay So
- Research Field: *Hardware Acceleration Systems for AI Applications*

Huazhong University of Science and Technology (HUST) *China*

BEng, Integrated Circuit Design *2017 - 2021*

- Honored Thesis & Honored Graduate
- GPA: 3.89/4.0
- Supervisor: Prof. Chao Wang

Experience

University of Hong Kong - PhD Candidate *Hong Kong SAR*

Advisor: Dr. Hayden Kwok-Hay So *Sep. 2021 - Present*

- Probation: Mixed-Precision DNN Training and Acceleration: An Efficient Algorithm-Hardware Co-Design Approach

Huazhong University of Science and Technology - Research Assistant *Wuhan, China*

Advisors: Prof. Chao Wang and Dr. Guoyi Yu *2019-2021*

- Research Topic: Energy-Efficient Brain-Inspired Computing

University of Macau - Research Intern *Zhuhai, China*

Advisor: Prof. Sai-Weng Sin *Jul. 2020-Oct. 2020*

- Research Topic: Analog Computing in the event sensor front-end

Singapore University of Technology and Design - Visiting Student *Singapore*

Advisor: Dr. Shaowei Lin *Jan. 2020-Feb. 2020*

- Project: Study of neuromorphic computing in machine learning algorithms

Publications

Published

J. Wu, J. Zhou, Y. Gao, Y. Ding, N. Wong and H. K. -H. So, "MSD: Mixing Signed Digit Representations for Hardware-efficient DNN Acceleration on FPGA with Heterogeneous Resources," 2023 IEEE 31st Annual International Symposium on Field-Programmable Custom Computing Machines (FCCM), Marina Del Rey, CA, USA, 2023, pp. 94-104.

Y. Ding[1], **J. Wu**[1], Y. Gao, M. Wang and H. K. -H. So, "Model-Platform Optimized Deep Neural Network Accelerator Generation through Mixed-Integer Geometric Programming," 2023 IEEE 31st Annual International Symposium on Field-Programmable Custom Computing Machines (FCCM), Marina Del Rey, CA, USA, 2023, pp. 83-93.

J. Wu, X. Huang, L. Yang, J. Wang, B. Liu, Z. Wen, J. Li, G. Yu, K. -S. Chong and C. Wang, "An Energy-Efficient Deep Belief Network Processor Based on Heterogeneous Multi-Core Architecture With Transposable Memory and On-Chip Learning," in IEEE Journal on Emerging and Selected Topics in Circuits and Systems, vol. 11, no. 4, pp. 725-738, Dec. 2021

J. Wu, Y. Zhan, Z. Peng, X. Ji, G. Yu, R. Zhao and C. Wang, "Efficient Design of Spiking Neural Network With STDP Learning Based on Fast CORDIC," in IEEE Transactions on Circuits and Systems I: Regular Papers, vol. 68, no. 6, pp. 2522-2534, June 2021

[1]Equal Contribution

J. Wu, X. Huang, L. Yang, L. Wang, J. Wang, Z. Liu, K. -S. Chong, S. Lin and C. Wang, "An Energy-efficient Multi-core Restricted Boltzmann Machine Processor with On-chip Bio-plausible Learning and Reconfigurable Sparsity," 2020 IEEE Asian Solid-State Circuits Conference (A-SSCC), Hiroshima, Japan, 2020, pp. 1-4

J. Zhou[2], **J. Wu**[2], Y. Gao, Y. Ding, C. Tao, B. Li, F. Tu, K. -T. Cheng, H. K. -H. So, and N. Wong, "DyBit: Dynamic Bit-Precision Numbers for Efficient Quantized Neural Network Inference,", in IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (Early Access).

J. Xu, Y. Zhan, Y. Li, **J. Wu**, X. Ji, G. Yu, W. Jiang, R. Zhao and C. Wang, "In situ aging-aware error monitoring scheme for IMPLY-based memristive computing-in-memory systems," IEEE Transactions on Circuits and Systems I: Regular Papers, 69(1), pp.309-321.

B. Liu, Z. Wen, H. Zhu, J. Lai, **J. Wu**, H. Ping, W. Liu, G. Yu, J. Zhang, Z. Liu, H. Zeng and C. Wang "Energy-efficient intelligent pulmonary auscultation for post COVID-19 era wearable monitoring enabled by two-stage hybrid neural network," in 2022 IEEE International Symposium on Circuits and Systems (ISCAS), pp. 2220-2224. IEEE, 2022.

Q. Wang, Y. Zhan, B. Liu, **J. Wu**, Y. Shi, G. Yu, and C. Wang. "A Reconfigurable Area and Energy Efficient Hardware Accelerator of Five High-order Operators for Vision Sensor Based Robot Systems," in 2021 IEEE International Conference on Integrated Circuits, Technologies and Applications (ICTA), pp. 189-190. IEEE, 2021.

Accepted, To Be Pulished

M. Song, **J. Wu**, Y. Ding and H. K. -H. So, "SqueezeBlock: A Transparent Weight Compression Scheme for Deep Neural Networks," in International Conference on Field Programmable Technology (FPT) 2023, Yokohama, Japan.

Under Review

J. Wu, M. Song, J. Zhao, J. Zhou, N. Wong and H. K. -H. So, "TATA: Transformer Acceleration with Transformable Arithmetic Processing," in ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS) 2024, under review.

Selected Awards

2021	**Postgraduate Research Scholarship**, University of Hong Kong	*HK$ 18,830/m*
	Honored Thesis & Honored Graduate, Huazhong University of Science and Technology	
2019	**Second Prize in Challenge Cup College Students' Extracurricular Academic Science and Technology Works Contest**, Ministry of Education, P. R. China	*¥ 10,000*
	Second Prize in China University Intelligent Robot Creative Competition, China Association for Science and Technology	*¥ 3,000*
	Third Prize in TI Cup College Students' Electronic Design Competition, Texas Instruments, and Ministry of Education, P. R. China	
	Merit Student, HUST, Huazhong University of Science and Technology	*¥ 2,000*
2018	**First Prize in TI Cup College Students' Electronic Design Competition**, Texas Instruments, and Ministry of Education, P. R. China	*¥ 500*

Academic Presentations

Spring 2023. *MSD: Mixing Signed Digit Representations for Hardware-efficient DNN Acceleration on FPGA with Heterogeneous Resources*. In 2023 IEEE 31st Annual International Symposium on Field-Programmable Custom Computing Machines (FCCM), CA, USA

Summer 2021. *Energy-efficient DNN Hardware Accelerator with On-chip Learning – A Deep Belief Network Processor Case*. Invited by IEEE CASS-EDS-SSCS HUST Student Branch Chapter, Wuhan, China.

Autumn 2020. *An Energy-efficient Multi-core Restricted Boltzmann Machine Processor with On-chip Bio-plausible Learning and Reconfigurable Sparsity*. In 2020 IEEE Asian Solid-State Circuits Conference (A-SSCC), Virtual Event.

[2]Equal Contribution

Teaching Experience

2023 **ELEC3342,** `Digital system design`, Teaching Assistant *HKU*
2022 **ELEC3342,** `Digital system design`, Teaching Assistant *HKU*
2022 **ELEC6036,** `High performance computer architecture`, Teaching Assistant *HKU*

Outreach & Professional Development

- Reviewer of IEEE Transactions on Circuits and Systems I: Regular Papers (TCAS-I)
- IEEE Member
- IEEE Student Member in IEEE CASS-EDS-SSCS HUST Student Branch Chapter