Yilong Zhao

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EDUCATION

2018.9 – Present **Shanghai Jiao Tong University (SJTU), Shanghai, China**
M.Eng. , Major: Computing Technology GPA: 3.49/4.0

2014.9 – 2018.6 **Shanghai Jiao Tong University (SJTU), Shanghai, China**
B.Eng. Major: Electronic Science and Technology GPA: 3.51/4.3
Major: Business Administration

PUBLICATIONS & PATENT

- Yanan Sun, Chang Ma, Zhi Li, **Yilong Zhao**, Jiachen Jiang, Weikang Qian, Rui Yang, Zhezhi He and Li Jiang, "Unary Coding and Variation-Aware Optimal Mapping Scheme for Reliable ReRAM-based Neuromorphic Computing," in IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems, doi: 10.1109/TCAD.2021.3051856.
- Zhuoran Song, **Yilong Zhao**, Yanan Sun, Xiaoyao Liang and Li Jiang. "ESNreram: An Energy-Efficient Sparse Neural Network Based on Resistive Random-Access Memory, " To appear in ACM Great Lakes Symposium on VLSI, GLSVLSI, 2020
- Chaoqun Chu, Yanzhi Wang, **Yilong Zhao**, Xiaolong Ma, Shaokai Ye, Yunyan Hong, Xiaoyao Liang, Yinhe Han and Li Jiang. "PIM-Prune: Fine-Grain DCNN pruning for Crossbar-based Process-In-Memory architecture, " ACM/IEEE Design Automation Conference, DAC, 2020
- Jia Wang, **Yilong Zhao**, Xin Huang and Guangqiang He. "High Speed Polarization-Division Multiplexing Transmissions Based on the Nonlinear Fourier Transform, " ZTE COMMUNICATIONS 17, 3 (2019).
- Aiguo Sheng, **Yilong Zhao**, and Guangqiang He, "Characterization of Kerr Solitons in Microresonators with Parameter Optimization and Nonlinear Fourier Spectrum," in Conference on Lasers and Electro-Optics, OSA Technical Digest (Optical Society of America, 2019), paper JW2A.47.
- Aiguo Sheng, **Yilong Zhao**, and Guangqiang He, "Quadratic soliton combs in doubly resonant half-harmonic generation," in Nonlinear Optics (NLO), OSA Technical Digest (Optical Society of America, 2019), paper NTu4A.18.

Under Review/In Preparation

- Weidong Cao, **Yilong Zhao**, Adith Boloor, Yinhe Han, Xuan Zhang, and Li Jiang, "Neural-PIM: Efficient Processing-In-Memory with Neural Approximation of Peripherals, " in IEEE Transactions on Computers, under review
- **Yilong Zhao**, Zhezhi He, Naifeng Jing, Xiaoyao Liang, Li Jiang, "Re2PIM: A Reconfigurable ReRAM-based PIM Design for Variable-sized Vector-Matrix Multiplication, " GLVLSI, under review

Patent

- Li Jiang, Yilong Zhao, "Reconfigurable Architecture, Accelerator, Circuit Deployment and Dataflow Methods," Application No. 202010910280.5

- Li Jiang, Yilong Zhao, Xiaosong Cui, Yun Chen, Jianxing Liao, "Neural Network Circuit," Application No. 202010729402.0

SCIENTIFIC RESEARCH EXPERIENCE

Advanced Computer Architecture Laboratory, SJTU,
Supervisor: Prof. Li Jiang

A Reconfigurable ReRAM-based DNN Accelerator Architecture **Aug 2019 – Dec 2020**

Design a ReRAM-based DNN accelerator which can significantly reduce the peripheral circuit's overhead.

- Propose an energy-efficient ReRAM-based accelerator's peripheral circuit implement. Compare to some state-of-art architectures, the architecture improves the energy efficiency by 5.36×.
- Design a reconfigurable ReRAM-based DNN accelerator. Compare to some state-of-art architectures, the architecture improves the energy efficiency by 27×.

ReRAM-based Efficient and Reliable DNN Accelerator Project **Apr 2019 – Apr 2020**

The project investigates the enhancement of computational reliability and the utilizes sparsity to improve energy efficiency in ReRAM-based DNN accelerator. I am responsible for the following work:

- Design and code a cycle-accurate simulator for the ReRAM-based NN accelerator. The simulator is built based on GEM5.
- Rewrite the simulator to evaluate the reliability and performance of architecture for pruned NN, The results of the simulator are used as an important metric for the project evaluation.
- Design a ReRAM-based DNN accelerator for pruned NN.

Laboratory of Quantum Nonlinear Photonics (QNP), SJTU,
Supervisor: Prof. Guangqiang He

Conditions for the Generation and Evolution of Optical Frequency Combs **Mar 2018 – Jun 2018**

- Study the evolutionary conditions of optical soliton and optical frequency comb generation in optical microcavities, and build a simulation system.
- Analyze the evolution of an optical frequency comb in an optical microcavity with nonlinear eigenvalues for the first time and obtain the relationship between the number of optical solitons and nonlinear eigenvalues.

Quantum Entangled Optical Frequency Comb Generation and Transmission based on Silicon-based Micro-nano Resonant Cavity Project **June 2017 – Mar 2018**

The project investigates the use of nonlinear frequency domain coding to solve the problem of evolutionary decay of optical signals during long distance transmission. I am responsible for the following work:

- Code the nonlinear Fourier transform and its inversion modules in systems with Matlab.
- Construct the fiber optic signal transmission simulation system.

University Student Innovation Program, SJTU,
Supervisor: Prof. Chunyu Zhao

Development of DTU with Bluetooth Interface Project **Dec 2015 – Dec 2016**

Design a data transmission unit (DTU) circuit with data analysis display program. I am responsible for the following work:

- As the project leader, responsible for the progress and final reporting of the project.

- Designed and developed a DTU, including circuit design, soldering and embedded programming, and solved the problem of electromagnetic interference of the circuit in the application scenario.

TA,

Algorithm design and analysis (CS222) **SJTU, 2019-2020 Autumn**