

# Yanyue Xie

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## RESEARCH INTERESTS

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- Efficient deep learning (quantization and pruning)
- Algorithm-hardware co-design
- FPGA acceleration for deep learning
- Electronic design automation

## EDUCATION

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### Northeastern University, Boston, MA, USA

*Sept. 2020 – Aug. 2025 (Expected)*

Ph.D. student, Department of Electrical and Computer Engineering

Advisors: Prof. [Xue \(Shelley\) Lin](#) and Prof. [Yanzhi Wang](#)

GPA 3.97/4.0

### Fudan University, Shanghai, China

*Sept. 2016 – June 2020*

B.E. in Microelectronic Science and Engineering

GPA 3.60/4.0

## PROFESSIONAL EXPERIENCE

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### ByteDance Inc., CA, USA

*May. 2024 – Aug. 2024*

*Research Intern, Seed Foundation Machine Learning System Team*

Mentor: An Xu, Zhi Zhang

Large language model pruning

### Futurewei Technologies Inc., CA, USA

*May. 2023 – Sept. 2023*

*Research Intern, Strategy Technology Team*

Mentor: Wei Wang, Wei Jiang

Efficient learned image compression model

## PUBLICATIONS

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- [C17] **Yanyue Xie**, Zhi Zhang, Ding Zhou, Cong Xie, Ziang Song, Xin Liu, Yanzhi Wang, Xue Lin, and An Xu, “[MoE-Pruner: Pruning Mixture-of-Experts Large Language Model using the Hints from Its Router](#)”, (*Under review*).
- [C16] **Yanyue Xie**, Zhengang Li, Dana Diaconu, Suranga Handagala, Miriam Leeser, and Xue Lin, “[LUTMUL: Exceed Conventional FPGA Roofline Limit by LUT-based Efficient Multiplication for Neural Network Inference](#)”, *30th Asia and South Pacific Design Automation Conference (ASPDAC 2025)*.
- [C15] Lei Lu, **Yanyue Xie**, Wei Jiang, Wei Wang, Xue Lin, and Yanzhi Wang, “[HybridFlow: Infusing Continuity into Masked Codebook for Extreme Low-Bitrate Image Compression](#)”, *32nd ACM Multimedia (ACMMM 2024)*.
- [C14] Geng Yang, **Yanyue Xie**, Zhong Jia Xue, Sung-En Chang, Yanyu Li, Peiyan Dong, Jie Lei, Weiyang Xie, Yanzhi Wang, Xue Lin, and Zhenman Fang, “[SDA: Low-Bit Stable Diffusion Acceleration on Edge FPGAs](#)”, *34th International Conference on Field-Programmable Logic and Applications (FPL 2024)*.
- [C13] Zhengang Li, Alec Lu, **Yanyue Xie**, Zhenglun Kong, Mengshu Sun, Hao Tang, Zhong Jia Xue, Peiyan Dong, Caiwen Ding, Yanzhi Wang, Xue Lin, and Zhenman Fang, “[Quasar-ViT: Hardware-Oriented Quantization-Aware Architecture Search for Vision Transformers](#)”, *ACM International Conference on Supercomputing (ICS 2024)*.
- [C12] **Yanyue Xie\***, Peiyan Dong\*, Geng Yuan, Zhengang Li, Masoud Zabihi, Chao Wu, Sung-En Chang, Xufeng Zhang, Xue Lin, Caiwen Ding, Nobuyuki Yoshikawa, Olivia Chen, and Yanzhi Wang, “[SuperFlow: A Fully-Customized RTL-to-GDS Design Automation Flow for Adiabatic Quantum-Flux-Parametron Superconducting Circuits](#)”, *2024 Design, Automation & Test in Europe Conference (DATE 2024)* (*\*Equal contributions*).

- [C11] Zhengang Li, Geng Yuan, Tomoharu Yamauchi, Masoud Zabihi, **Yanyue Xie**, Peiyan Dong, Xulong Tang, Nobuyuki Yoshikawa, Devsh Tiwari, Yanzhi Wang, and Olivia Chen, “[SuperBNN: Randomized Binary Neural Network Using Adiabatic Superconductor Josephson Devices](#)”, *56th IEEE/ACM International Symposium on Microarchitecture (MICRO 2023)*.
- [C10] Dana Diaconu, **Yanyue Xie**, Mehmet Gungor, Suranga Handagala, Xue Lin, and Miriam Leeser, “[Machine Learning Across Network-Connected FPGAs](#)”, *2023 IEEE High Performance Extreme Computing Conference (HPEC 2023)*.
- [C9] Zhengang Li\*, **Yanyue Xie\***, Peiyan Dong\*, Olivia Chen, and Yanzhi Wang, “[Algorithm-Software-Hardware Co-Design for Deep Learning Acceleration](#)”, *60th ACM/IEEE Design Automation Conference (DAC 2023)* (\*Equal contributions).
- [C8] Sung-En Chang, Geng Yuan, Alec Lu, Mengshu Sun, Yanyu Li, Xiaolong Ma, Zhengang Li, **Yanyue Xie**, Minghai Qin, Xue Lin, Zhenman Fang, and Yanzhi Wang, “[ESRU: Extremely Low-Bit and Hardware-Efficient Stochastic Rounding Unit Design for 8-Bit DNN Training](#)”, *2023 Design, Automation & Test in Europe Conference & Exhibition (DATE 2023)*.
- [C7] Zhenglun Kong, Haoyu Ma, Geng Yuan, Mengshu Sun, **Yanyue Xie**, Peiyan Dong, Xin Meng, Xuan Shen, Hao Tang, Minghai Qin, Tianlong Chen, Xiaolong Ma, Xiaohui Xie, Zhangyang Wang, and Yanzhi Wang, “[Peeling the Onion: Hierarchical Reduction of Data Redundancy for Efficient Vision Transformer Training](#)”, *37th AAAI Conference on Artificial Intelligence (AAAI 2023)*.
- [C6] Peiyan Dong, Mengshu Sun, Alec Lu, **Yanyue Xie**, Kenneth Liu, Zhenglun Kong, Xin Meng, Zhengang Li, Xue Lin, Zhenman Fang, and Yanzhi Wang, “[HeatViT: Hardware-efficient adaptive token pruning for vision transformers](#)”, *29th IEEE International Symposium on High-Performance Computer Architecture (HPCA 2023)*.
- [C5] Geng Yuan, Sung-En Chang, Qing Jin, Alec Lu, Yanyu Li, Yushu Wu, Zhenglun Kong, **Yanyue Xie**, Peiyan Dong, Minghai Qin, Xiaolong Ma, Xulong Tang, Zhenman Fang, and Yanzhi Wang, “[You Already Have It: A Generator-Free Low-Precision DNN Training Framework using Stochastic Rounding](#)”, *European Conference on Computer Vision (ECCV 2022)*.
- [C4] Zhengang Li, Mengshu Sun, Alec Lu, Haoyu Ma, Geng Yuan, **Yanyue Xie**, Hao Tang, Yanyu Li, Miriam Leeser, Zhangyang Wang, Xue Lin, and Zhenman Fang, “[Auto-ViT-Acc: An FPGA-Aware Automatic Acceleration Framework for Vision Transformer with Mixed-Scheme Quantization](#)”, *32nd International Conference on Field-Programmable Logic and Applications (FPL 2022)*.
- [C3] Peiyan Dong\*, **Yanyue Xie\***, Hongjia Li\*, Mengshu Sun, Olivia Chen, Nobuyuki Yoshikawa, and Yanzhi Wang, “[TAAS: A Timing-Aware Analytical Strategy for AQFP-Capable Placement Automation](#)”, *59th ACM/IEEE Design Automation Conference (DAC 2022)* (\*Equal contributions).
- [C2] Zhifeng Lin, **Yanyue Xie**, Gang Qian, Jianli Chen, Sifei Wang, Jun Yu, and Yao-Wen Chang, “[Timing-Driven Placement for FPGAs with Heterogeneous Architectures and Clock Constraints](#)”, *2021 Design, Automation & Test in Europe Conference & Exhibition (DATE 2021)*.
- [C1] Zhifeng Lin, **Yanyue Xie**, Gang Qian, Sifei Wang, Jun Yu, and Jianli Chen, “[Late Breaking Results: An Analytical Timing-Driven Placer for Heterogeneous FPGAs](#)”, *57th ACM/IEEE Design Automation Conference (DAC 2020)*.
- [J2] Jianli Chen, Zhifeng Lin, **Yanyue Xie**, Wenxing Zhu, and Yao-Wen Chang, “[Mixed-Cell-Height Placement with Complex Minimum-Implant-Area Constraints](#)”, *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, vol. 41, no. 11, pp. 4639-4652, Nov. 2022, doi: 10.1109/TCAD.2021.3133855.
- [J1] Zhifeng Lin, **Yanyue Xie**, Peng Zou, Sifei Wang, Jun Yu, and Jianli Chen, “[An Incremental Placement Flow for Advanced FPGAs with Timing Awareness](#)”, *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, vol. 41, no. 9, pp. 3092-3103, Sept. 2022, doi: 10.1109/TCAD.2021.3120070.
- [P1] Masoud Zabihi, **Yanyue Xie**, Zhengang Li, Peiyan Dong, Geng Yuan, Olivia Chen, Massoud Pedram, and Yanzhi Wang, “[A Life-Cycle Energy and Inventory Analysis of Adiabatic Quantum-Flux-Parametron Circuits](#)”, *arXiv preprint arXiv:2307.12216*.

## RESEARCH EXPERIENCES

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**Accelerating Sparse Neural Networks on FPGA with Dataflow Architecture** Jan. 2021 – May 2024  
 Research Assistant

Advisor: Prof. Xue (Shelley) Lin and Prof. Miriam Leeser, Northeastern University

- Pruned neural networks by applying the ADMM-based pruning algorithm and trained neural networks using quantization-aware training,
- Designed a dataflow architecture to accelerate compressed neural networks inference on FPGAs [C10], [C16]
- Efficient implementation of vision transformer models on FPGAs including mixed-scheme quantization [C4], [C13] and token pruning [C6], [C7], and stable diffusion UNet model on FPGAs [C14].

#### Timing-Driven Placement for AQFP Superconducting Circuits

*Feb. 2021 – May 2024*

*Research Assistant*

Advisor: Prof. Yanzhi Wang, Northeastern University

- Proposed a timing model for the deep-pipelined, four-phase AQFP superconducting circuits,
- Integrated timing cost into the objective function of an analytical placer and improved the maximum operating frequency by 19.17% on average compared with previous methods [C3], [C12],
- Efficient implementation of binarized neural networks on AQFP-based crossbar synapse array [C9], [C11].

#### Timing-Driven Placement Algorithm for FPGAs

*Sept. 2019 – May 2021*

*Research Assistant*

Advisor: Prof. Jianli Chen, School of Microelectronics, Fudan University

- Proposed a timing model for xc7k325t device, validated using Vivado, and integrated the model into a timing-driven placer [C1], [C2], [J1].

#### AWARDS

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DAC Young Fellow	Design Automation Conference	2021
First Prize Scholarship	Fudan University	2020

#### SKILLS

##### Programming Languages

Python, C/C++, Verilog, MATLAB, L<sup>A</sup>T<sub>E</sub>X

**Deep Learning Frameworks:** PyTorch, TensorFlow, ONNX

**EDA Tools:** Xilinx Vitis/Vivado Design Suite, Synopsys Design Compiler, Modelsim

#### COURSES

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EECE7205: Fundamentals of Computer Engineering	<i>Prof. Xue (Shelley) Lin</i>
EECE7352: Computer Architecture	<i>Prof. Fabrizio Lombardi</i>
EECE7390: Computer Hardware Security	<i>Prof. Xiaolin Xu</i>
EECE7398: Special Topics: Advances in Deep Learning	<i>Prof. Yanzhi Wang</i>
EECE5640: High-Performance Computing	<i>Prof. David Kaeli</i>
EECE5644: Machine Learning/Pattern Recognition	<i>Prof. Deniz Erdogmus</i>
EECE5642: Data Visualization	<i>Prof. Yun Raymond Fu</i>
EECE7374: Fundamentals of Computer Networks	<i>Prof. Dimitrios Koutsonikolas</i>
EECE5699: Computer Hardware and System Security	<i>Prof. Yunsu Fei</i>
EECE7370: Advanced Computer Vision	<i>Prof. Octavia Camps</i>
EECE7397: Advanced Machine Learning	<i>Prof. Jennifer G. Dy</i>
DS5220: Supervised Machine Learning	<i>Prof. Yanzhi Wang</i>