

# Yanyue Xie

xie.yany@northeastern.edu ◊ <https://yanyuexie.com>

## RESEARCH INTERESTS

---

- Algorithm/hardware co-design
- FPGA acceleration for deep learning
- Electronic design automation

## EDUCATION

---

### Northeastern University, Boston, MA, USA

Sept. 2020 – Present

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

### Nanyang Technological University, Singapore

Jan. 2019 – May 2019

Exchange student, School of Electrical and Electronic Engineering

GPA 4.83/5.0

## PUBLICATIONS

---

- [W1] **Yanyue Xie**, Peiyan Dong, Geng Yuan, Zhengang Li, Chao Wu, Sung-En Chang, Xufeng Zhang, Olivia Chen, Nobuyuki Yoshikawa, and Yanzhi Wang, “SuperFlow: An RTL-to-GDS Design Automation Flow for AQFP Superconducting Devices”, *Work-In-Progress Poster at Design Automation Conference (DAC 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)*, 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)*, 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)*, San Francisco, Jul 10-14, 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)*, pp. 1564-1569, 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)*, pp. 1-2, San Francisco, Jul 20-24, 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.

## RESEARCH EXPERIENCES

**Accelerating Sparse Neural Networks on FPGA Using Data-Flow Architecture** Jan. 2021 - Present  
Research Assistant

Advisor: Prof. Xue (Shelley) Lin, Department of Electrical and Computer Engineering, Northeastern University  
Prof. Miriam Leeser, Department of Electrical and Computer Engineering, Northeastern University

- Pruned convolutional neural networks by applying the ADMM-based pruning algorithm and trained neural networks using quantization-aware training,
- Modified a data-flow architecture to make the compressed neural networks suitable for inference on FPGAs.

**Timing-Driven Placement for AQFP Superconducting Devices**

Feb. 2021 - Present

Research Assistant

Advisor: Prof. Yanzhi Wang, Department of Electrical and Computer Engineering, Northeastern University

- Proposed a timing model for the deep-pipelined, four-phase AQFP superconducting devices,
- 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.

**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.

## AWARDS

DAC Young Fellow	Design Automation Conference	2021
First Prize Scholarship	Fudan University	2020
Second Prize Scholarship	Fudan University	2018
Third Prize Scholarship	Fudan University	2017

## SKILLS

**Programming Languages**

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

**Tools**

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

**Deep Learning:** PyTorch, ONNX

## COURSES

EECE7205: Fundamentals of Computer Engineering	Prof. Xue (Shelley) Lin
EECE7352: Computer Architecture	Prof. Fabrizio Lombardi
EECE7390: Computer Hardware Security	Prof. Xiaolin Xu
EECE7398: Special Topics: Advances in Deep Learning	Prof. Yanzhi Wang
EECE5640: High-Performance Computing	Prof. David Kaeli
EECE5644: Machine Learning/Pattern Recognition	Prof. Deniz Erdogmus

EECE5642: Data Visualization  
EECE7374: Fundamentals of Computer Networks  
EECE5699: Computer Hardware and System Security  
EECE7370: Advanced Computer Vision

*Prof. Yun Raymond Fu*  
*Prof. Dimitrios Koutsonikolas*  
*Prof. Yunsu Fei*  
*Prof. Octavia Camps*