

# Hanqing Zhu

Graduate Research Assistant - University of Texas at Austin

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## Research Interests

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Efficient AI computing with emerging technology and machine learning for design automation.

## Education

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### University of Texas at Austin(UT-Austin)

*Ph.D. in Dept. of Electrical and Computer Engineering*

Advisor: David Z. Pan

Co-advisor: Ray T. Chen

GPA: **3.92**/4.00

### Shanghai Jiao Tong University(SJTU)

*B.E. in Dept. of Microelectronics science and technology*

Overall GPA: **3.81**/4.00(Rank: top 2/57)

**Austin, USA**

*Sept 2020 - Present*

**Shanghai, China**

*Sept 2016- Jun 2020*

## Experience

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### The University of Texas at Austin

*Graduate research assistant at UTDA lab*

**Austin, USA**

*Sept 2019- Present*

#### ○ Efficient AI computing system with photonics [C5, C4, C2, C1]

- Proposed an synergistic aging-aware co-optimization framework for emerging photonic in-memory computing paradigm, achieved  $> 40\times$  dynamic energy cost reduction and significant lifetime enhancement.
- Collaborated on efficient on-chip learning protocol for optical computing system.
- Collaborated on quantization-aware training scheme in the unitray manifold to enable robust optical neural networks.

#### ○ Hardware-efficient machine learning[C3]

- Collaborated on memory-efficient neural network designs for emerging neurocomputing system via multi-level in-situ parameters generation.

## Honors and Awards

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Shanghai Outstanding Graduate	Shanghai	2020
Department Excellent Undergraduate Thesis	Shanghai Jiao Tong University	2020
Hongyi Scholarship(\$ 4000)	Shanghai Jiao Tong University	2019
Outstanding Undergraduate Scholarship(\$ 4600)	Shanghai Jiao Tong University	2019
Samsung Scholarship	Shanghai Jiao Tong University	2018
Zhiyuan College Honors Scholarship	Shanghai Jiao Tong University	2018
1st Prize, National Mathematical Contest in Modeling	Shanghai Division	2018
Academic Excellence Scholarship	Shanghai Jiao Tong University	2017&2018&2019

## Publications

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### Conference Papers

[C5]**Hanqing Zhu**, Jiaqi Gu, Chenghao Feng, Mingjie Liu, Zixuan Jiang, Ray T. Chen, and David Z. Pan, "ELight: Enabling Efficient Photonic In-Memory Neurocomputing with Life Enhancement," in *IEEE/ACM Asia and South Pacific Design Automation Conference (ASPDAC)*, Jan. 2022.

[C4]Jiaqi Gu, **Hanqing Zhu**, Chenghao Feng, Zixuan Jiang, Ray T. Chen, and David Z. Pan, "L2ight:

Enabling On-Chip Learning for Optical Neural Networks via Efficient in-situ Subspace Optimization,” in *Conference on Neural Information Processing Systems (NeurIPS)*, Dec. 2021.

[C3]Jiaqi Gu, **Hanqing Zhu**, Chenghao Feng, Mingjie Liu, Zixuan Jiang, Ray T. Chen, and David Z. Pan, “Towards Memory-Efficient Neural Networks via Multi-Level in situ Generation,” in *International Conference on Computer Vision (ICCV)*, Oct. 2021.

[C2]Chenghao Feng, Jiaqi Gu, **Hanqing Zhu**, David Z. Pan, and Ray T. Chen, “Experimental Demonstration of a WDM-based Integrated Optical Decoder for Compact Optical Computing,” in *Conference on Lasers and Electro-Optics*, May 2021.

[C1]Jiaqi Gu, Zheng Zhao, Chenghao Feng, **Hanqing Zhu**, Ray T. Chen, and David Z. Pan, “[ROQ: A Noise-Aware Quantization Scheme Towards Robust Optical Neural Networks with Low-bit Controls](#),” in *IEEE/ACM Proceedings Design, Automation and Test in Europe (DATE)*, Mar. 2020.

## Courses

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|---|------------------------------|
| o EE381V: Combinatorial Optimization                  | Prof. Constantine Caramanis  |
| o EE382M: VLSI CAD and Optimization                   | Prof. David Z. Pan           |
| o EE382N: Computer Architecture: Parallelism/Locality | Prof. Mattan Erez            |
| o EE381V: Advanced Topics in Computer Vision          | Prof. Zhangyang (Atlas) Wang |
| o EE381K: Convex Optimization (in progress)           | Prof. Constantine Caramanis  |
| o EE382M: VLSI I (in progress)                        | Prof. David Z. Pan           |

## Skills

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- o **Programming Languages:** python, C++, CUDA, MATLAB, Verilog
- o **EDA tools:** Cadence Virtuoso, Synopsys Design Compiler, Hspice, Xilinx Vivado Design Suite