YINGJIE LI

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RESEARCH INTEREST

- **Physics-driven Computing System**
- **Physics-aware Hardware-Software Co-design**
- **Intelligent Electronic Design Automation**
- **Open-source Hardware Research**

EDUCATION

University of Maryland, College Park (transferred) *2023-Present*
University of Utah *2020-2023*
Ph.D. (post-candidacy), Computer Engineering (Advisor: Prof. Cunxi Yu)
Cornell University *2018-2019*
M.Eng, Electrical and Computer Engineering
Huazhong University of Science and Technology *2014-2018*
B.S., Electrical and Computer Engineering (Honor)

EMPLOYMENT

Google X *05/2024 - 11/2024*
Research Intern, *Electronic Design Automation* *Manager: Xiaoqing Xu*
NVIDIA Research *Summer 2023*
Research Intern, *ML/RL for EDA* *Manager: Mark Haoxing Ren*
DELL EMC, Shanghai, China *2019-2020*
Hardware Engineer

AWARDS

- **ML and Systems Rising Stars 2024**
- **2nd Place at ACM Student Research Competition** (ICCAD 2023)
- **EECS Rising Star 2023**
- **Best Paper Award**, Design Automation Conference (DAC 2023)
- **Best Poster Honorable Mention**, American Physics Society DLS (2022)
- **DAC Young Student Fellow**, 2020 (**winning presentation**), 2021, 2022
- **Outstanding Graduates**, Huazhong University of Science and Technology, 2018
- **Social Service Award**, Huazhong University of Science and Technology, 2016

PUBLICATIONS

Under review

- **Yingjie Li***, Shanglin Zhou*, Caiwen Ding, Cunxi Yu. *HoloGraph: All-Optical Graph Learning via Light Diffraction* The International Conference on Computer-Aided Design (ICCAD). *under review*

2024

- **Yingjie Li***, Mingju Liu*, Jiaqi Yin, Zhiru Zhang, Cunxi Yu. *Differentiable Combinatorial Scheduling at Scale* International Conference on Machine Learning (ICML'24).
- **Yingjie Li**, Mingju Liu, Mark Ren, Alan Mishchenko, Cunxi Yu. *DAG-aware Synthesis Orchestration* IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD'24). *to appear*
- **Yingjie Li**, Anthony Agnesina, Yanqing Zhang, Haoxing Ren and Cunxi Yu. *BoolGebra: Attributed Graph-learning for Boolean Algebraic Manipulation* Design Automation and Test in Europe (DATE'24).
- Nan Wu, **Yingjie Li**, Hang Yang, Hanqiu Chen, Steve Dai, Cong Hao, Cunxi Yu, Yuan Xie. *Survey of Machine Learning for Software-assisted Hardware Design Verification: Past, Present, and Prospect* ACM Transactions on Design Automation of Electronic Systems (TODAES'24).

2023

- **Yingjie Li**, Mingju Liu, Alan Mishchenko, Cunxi Yu. *Invited Paper: Verilog-to-PyG – A Framework for Graph Learning and Augmentation on RTL Designs* The International Conference on Computer-Aided Design (ICCAD'23). Web
- **Yingjie Li**, Ruiyang Chen, Minhan Lou, Berardi Sensale-Rodriguez, Weilu Gao, Cunxi Yu. *LightRidge: An End-to-end Agile Design Framework for Diffractive Optical Neural Networks* The ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS'23).
- **Yingjie Li**, Weilu Gao, Cunxi Yu. *Rubik's Optical Neural Networks: Multi-task Learning with Physics-aware Rotation Architecture.* The 32nd International Joint Conference on Artificial Intelligence (IJCAI-23).
- **Yingjie Li***, Shanglin Zhou*, Cunxi Yu, and Caiwen Ding. *Physics-aware Roughness Optimization for Diffractive Optical Neural Networks.* IEEE/ACM 60th Design Automation Conference (DAC '23).
- Nan Wu, **Yingjie Li**, Cong "Callie" Hao, Steve Dai, Cunxi Yu and Yuan Xie. *Gamora: Graph Learning based Symbolic Reasoning for Large-Scale Boolean Networks.* IEEE/ACM 60th Design Automation Conference (DAC '23). (**Best Paper Award**). (Open-source: https://github.com/Yu-Maryland/Gamora)
- Jiaqi Yin, **Yingjie Li**, Daniel Robinson, Cunxi Yu. *RESPECT: Reinforcement Learning based Edge Scheduling on Pipelined Coral Edge TPUs.* IEEE/ACM 60th Design Automation Conference (DAC '23).
- Minhan Lou, **Yingjie Li**, Cunxi Yu, Berardi Sensale-Rodriguez, Weilu Gao. *Effects of interlayer Reflection and Interpixel Interaction in Diffractive Optical Neural Networks.* Optical Letter. Jan 2023.

2022

- Walter Lau Neto, **Yingjie Li**, Pierre-Emmanuel Gaillardon, and Cunxi Yu. *FlowTune: End-to-end Automatic Logic Optimization Exploration via Domain-specific Multi-armed Bandits.* IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD'22).
- **Yingjie Li***, Ruiyang Chen*, Minhan Lou, Jichao Fan, Yingheng Tang, Berardi Sensale-Rodriguez, Cunxi Yu, Weilu Gao. *Physics-aware Complex-valued Adversarial Machine Learning in Recon-*

figurable Diffractive All-optical Neural Network. Laser & Photonics Reviews. Vol 16, July 2022. (IF:13.2) Media

- **Yingjie Li**, Ruiyang Chen, Weilu Gao, and Cunxi Yu. *Physics-aware Differentiable Discrete Codesign for Diffractive Optical Neural Networks.* The International Conference on Computer-Aided Design (ICCAD'22). Media
- Ruiyang Chen, **Yingjie Li**, Minhan Lou, Cunxi Yu, Weilu Gao. *Complex-valued Reconfigurable Diffractive Optical Neural Networks using Cost-effective Spatial Light Modulators.* Conference on Lasers and Electro-Optics (CLEO'22).

2021

- **Yingjie Li**, Cunxi Yu. *Physical Adversarial Attacks of Diffractive Deep Neural Networks.* IEEE/ACM 58th Design Automation Conference (DAC'21).
- **Yingjie Li**, Ruiyang Chen, Berardi Sensale Rodriguez, Weilu Gao, and Cunxi Yu. *Multi-task Learning in Diffractive Deep Neural Networks via Hardware-software Co-design.* Spinger Nature *Scientific Reports*, 11, 11013 (2021).
- Walter Lau Neto, Matheus Trevisan Moreira, **Yingjie Li**, Luca Amaru, Cunxi Yu, and Pierre-Emmanuel Gaillardon. *SLAP: A Supervised Learning Approach for Priority Cuts Technology Mapping.* IEEE/ACM 58th Design Automation Conference (DAC'21).

TALKS

- **Yingjie Li**, Minhan Lou, Ruiyang Chen, Jichao Fan, Berardi Sensale Rodriguez, Weilu Gao and Cunxi Yu. *LightRidge: An Agile Co-designing Framework for Diffractive Optical Neural Networks.* First Workshop on Open-Source Computer Architecture Research (OSCAR) held in conjunction with ISCA (ISCA'49), June 2022.
- **Yingjie Li**, Ruiyang Chen, Minhan Lou, Jichao Fan, Yingheng Tang, Berardi Sensale-Rodriguez, Cunxi Yu, Weilu Gao. *Invited: Physics-aware Adversarial Machine Learning: An Experimental Study in Diffractive Optical Neural Networks.* 3rd ROAD4NN Workshop @ Design Automation Conference *(DAC'22 ROAD4NN).* San Francisco, July 2022.
- **Yingjie Li**, Minhan Lou, Ruiyang Chen, Jichao Fan, Berardi Sensale Rodriguez, Weilu Gao and Cunxi Yu. *LightRidge: End-to-end Photonic Compiler Framework for Diffractive Optical Neural Networks.* 2nd ROAD4NN Workshop @ Design Automation Conference *(DAC'21 ROAD4NN).* San Francisco, December 2021.

OPEN-SOURCED FRAMEWORKS

- Verilog-to-PyG: A framework for Graph Learning on RTL Designs. (V2PyG)
- LightRidge: Agile design framework for diffractive optical neural networks. (LightRidge)
- Gamora: Graph Learning based Symbolic Reasoning for Large-Scale Boolean Networks. (Gamora)
- RESPECT: Reinforcement Learning based Scheduling Framework (RESPECT)
- FlowTune: End-to-end Automatic Logic Optimization Exploration via Domain-specific Multi-armed Bandits. (FlowTune)

SERVICES

Organizing Committee

- DAC Young Fellow 2023

- IWLS 2023

Journal Review

- IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD)
- Nanophotonics
- Springer Nature Scientific Reports

Conference Reviewer

- DAC 2021, ICCAD 2022, DATE 2023, DAC 2023, ICCAD 2023.

TEACHING EXPERIENCE

- **ECE/CS 3700 – Digital System Design**, Teaching Assistant, Fall'22, Fall'21
- **ECE/CS 5470/6470 CAD of Digital Circuits**, Teaching Assistant, Spring'22, Spring' 21

REFERENCE LIST

- **Prof. Cunxi Yu**, Assistant Professor, University of Maryland, College Park, cunxiyu@umd.edu
- **Prof. Weilu Gao**, Assistant Professor, University of Utah, weilu.gao@utah.edu
- **Dr. Alan Mishchenko**, Full Researcher, University of California, Berkeley, alanmi@berkeley.edu
- **Prof. Zhiru Zhang**, Associate Professor, Cornell University, zhiruz@cornell.edu