

# Guojin Chen

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## Current Position

**Visiting Student**, *The University of Texas at Austin* 2023.08 – Present  
Supervisor : Prof. David Z. Pan

**Ph.D. Candidate**, *The Chinese University of Hong Kong* 2021.08 – Present  
Supervisor : Prof. Bei Yu

## Education

**Ph.D. in Computer Science**, *The Chinese University of Hong Kong* 2021 – Present

**M.S. in Computer Science**, *The Chinese University of Hong Kong* 2019 – 2020

**B.S. in Computer Science**, *Huazhong University of Science and Technology* 2015 – 2019

## Research Interests

- Scaling deep learning: large language models, LLM on EDA, large-scale layout representation learning.
- Design for manufacturing: computational lithography, mask optimization, OPC, SMO.
- Deep learning in VLSI design: physics-informed networks for EDA problems
- Optimization: bi-level & multi-level optimization, GPU acceleration, level-set optimization.

## Publications [Google Scholar; 137+ citations, h-index: 6+]

Representative publications that I am a primary author on are highlighted.

### Conference papers

- [C15] Efficient Bilevel Source Mask Optimization  
**Guojin Chen**, Hongquan He, Peng Xu, Hao Geng, and Bei Yu  
(DAC 2024) *ACM/IEEE Design Automation Conference*
- [C14] Fracturing-aware Curvilinear ILT via Circular E-beam Mask Writer  
Xinyun Zhang, Su Zheng, **Guojin Chen**, Binwu Zhu, Hong Xu, and Bei Yu  
(DAC 2024) *ACM/IEEE Design Automation Conference*
- [C13] Performance-driven Analog Routing via Heterogeneous 3DGNN and Potential Relaxation  
Peng Xu, **Guojin Chen**, Keren Zhu, Tinghuan Chen, Tsung-Yi Ho, and Bei Yu  
(DAC 2024) *ACM/IEEE Design Automation Conference*
- [C12] Open-Source Differentiable Lithography Imaging Framework  
**Guojin Chen**, Hao Geng, Bei Yu, and David Z. Pan  
(SPIE 2024) *SPIE Advanced Lithography + Patterning*
- [C11] AlphaSyn: Logic Synthesis Optimization with Efficient Monte Carlo Tree Search  
Zehua Pei, Fangzhou Liu, Zhuolun He, **Guojin Chen**, Haisheng Zheng, Keren Zhu, and Bei Yu  
(ICCAD 2023) *Proceedings of the 42th International Conference on Computer-Aided Design*
- [C10] Physics-Informed Optical Kernel Regression Using Complex-valued Neural Fields  
**Guojin Chen**, Zehua Pei, Haoyu Yang, Yuzhe Ma, Bei Yu, and Martin Wong  
(DAC 2023) *ACM/IEEE Design Automation Conference* (Best score in DFM track.)
- [C9] DiffPattern: Layout Pattern Generation via Discrete Diffusion  
Zixiao Wang, Yunheng Shen, Wenqian Zhao, Yang Bai, **Guojin Chen**, Farzan Farnia, and Bei Yu  
(DAC 2023) *ACM/IEEE Design Automation Conference*
- [C8] GPU-accelerated Matrix Cover Algorithm for Multiple Patterning Layout Decomposition  
**Guojin Chen**, Haoyu Yang, and Bei Yu  
(SPIE 2023) *DTCO and Computational Patterning II*

- [C7] Efficient Point Cloud Analysis Using Hilbert Curve.  
Wanli Chen, Xinge Zhu, **Guojin Chen**, and Bei Yu  
(**ECCV 2022**) *European Conference on Computer Vision*
- [C6] AdaOPC: A Self-Adaptive Mask Optimization Framework For Real Design Patterns  
Wenqian Zhao, Xufeng Yao, Ziyang Yu, **Guojin Chen**, Yuzhe Ma, Bei Yu, and Martin Wong  
(**ICCAD 2022**) *Proceedings of the 41th International Conference on Computer-Aided Design*
- [C5] LayoutTransformer: Generating Layout Patterns with Transformer via Sequential Pattern Modeling  
Liangjian Wen, Yi Zhu, Lei Ye, **Guojin Chen**, Bei Yu, Jianzhuang Liu, and Chunjing Xu  
(**ICCAD 2022**) *Proceedings of the 41th International Conference on Computer-Aided Design*
- [C4] DevelSet: Deep Neural Level Set for Instant Mask optimization  
**Guojin Chen**, Ziyang Yu, Hongduo Liu, Yuzhe Ma, and Bei Yu  
(**ICCAD 2021**) *Proceedings of the 40th International Conference on Computer-Aided Design*
- [C3] Learning Point Clouds in EDA.  
Wei Li, **Guojin Chen**, Haoyu Yang, Ran Chen, and Bei Yu  
(**ISPD 2021**) *ACM International Symposium on Physical Design*
- [C2] DAMO: Deep Agile Mask Optimization for Full Chip Scale  
**Guojin Chen**, Wanli Chen, Yuzhe Ma, Haoyu Yang, and Bei Yu  
(**ICCAD 2020**) *Proceedings of the 39th International Conference on Computer-Aided Design*
- [C1] A GPU-enabled Level Set Method for Mask Optimization  
Ziyang Yu, **Guojin Chen**, Yuzhe Ma, and Bei Yu  
(**DATE 2020**) *IEEE/ACM Proceedings Design, Automation and Test in Europe*

## Journal papers.....

- [J5] Ultra-Fast Source Mask Optimization via Conditional Discrete Diffusion  
**Guojin Chen**, Zixiao Wang, Bei Yu, David Z. Pan, and Martin D.F. Wong  
(**TCAD 2024**) *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*
- [J4] L2O-ILT: Learning to Optimize Inverse Lithography Techniques  
Binwu Zhu, Su Zheng, Ziyang Yu, **Guojin Chen**, Yuzhe Ma, Fan Yang, Bei Yu, and Martin Wong  
(**TCAD 2023**) *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*
- [J3] A GPU-Enabled Level-Set Method for Mask Optimization  
Ziyang Yu, **Guojin Chen**, Yuzhe Ma, and Bei Yu  
(**TCAD 2023**) *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*
- [J2] DevelSet: Deep Neural Level Set for Instant Mask optimization  
**Guojin Chen**, Ziyang Yu, Hongduo Liu, Yuzhe Ma, and Bei Yu  
(**TCAD 2023**) *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*
- [J1] DAMO: Deep Agile Mask Optimization for Full-Chip Scale  
**Guojin Chen**, Wanli Chen, Qi Sun, Yuzhe Ma, Haoyu Yang, and Bei Yu  
(**TCAD 2022**) *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*

## Open Source Repositories

- |   |      |
|---|------|
| 1. TorchOPC/TorchLitho — ★50 — Differentiable computational lithography with PyTorch  | 2024 |
| 2. OpenOPC/OpenILT — ★81 — Open-source inverse lithography technology (ILT) framework | 2023 |
| 3. ai4eda/awesome-AI4EDA — ★87 — A curated paper list of existing AI for EDA studies. | 2023 |

## Experiences

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|---|-------------|
| Research Assistant, The Chinese University of Hong Kong | 2020 – 2021 |
| Research Intern, Tencent                                | 2018 – 2019 |

Awards

Ph.D. Studentship	2021 – 2025
By Chinese University of Hong Kong, 2021-2025	
Outstanding Graduate	2019
By Huazhong University of Science and Technology	

Ongoing Projects

Differentiable Computational Lithography. Revamping lithography with a GPU-accelerated, differentiable workflow based on Abbe imaging, using automatic differentiation to target diverse resolution enhancement objectives.

Professional Activities

Paper Review / External Review.....	
Design Automation Conference (DAC)	2021-2023
AAAI Conference on Artificial Intelligence (AAAI)	2022-2023
IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD)	2022-2023