

# Guojin Chen

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## Current Position

**Research Scientist Intern**, *NVIDIA Research*, Austin, Texas 2024.04 – Present  
**Ph.D. Candidate**, *The Chinese University of Hong Kong* (Supervisor : Prof. Bei Yu) 2021.08 – Present

## Education

**Ph.D. in Computer Science**, *The Chinese University of Hong Kong* 2021 – Present  
Supervisor : Prof. Bei Yu  
**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.

## Experiences

**Research Scientist Intern**, *NVIDIA*, Austin, TX (Mentor & Manager. Haoyu Yang & Mark Ren) 2024.04 – Present  
**Visiting Scholar**, *The University of Texas at Austin*, Austin, TX (Supervisor : Prof. David Z. Pan) 2023.08 – 2024.4  
**Research Intern**, *Tencent*, Shenzhen, China 2018 – 2019

## Publications [Google Scholar; 174+ citations, h-index: 7+]

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.....

- [J6] DeepOTF: Learning Equations-constrained Prediction for Electromagnetic Behavior  
Peng Xu, Siyuan Xu, Tinghuan Chen, **Guojin Chen**, Tsung-Yi Ho, and Bei Yu  
(**TODAES 2024**) *ACM Trans. Des. Autom. Electron. Syst.*
- [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*

#### Preprints.....

- [P1] LLM-Enhanced Bayesian Optimization for Efficient Analog Layout Constraint Generation  
**Guojin Chen**, Keren Zhu, Seunggeun Kim, Hanqing Zhu, Yao Lai, Bei Yu, and David Z Pan  
(**arXiv 2024**) *arXiv preprint arXiv:2406.05250*

## Open Source Repositories

1. TorchOPC/TorchLitho — ★88 — *Differentiable computational lithography with PyTorch* 2024
2. OpenOPC/OpenILT — ★92 — *Open-source inverse lithography technology (ILT) framework* 2023
3. ai4eda/awesome-AI4EDA — ★98 — *A curated paper list of existing AI for EDA studies.* 2023

## Awards

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

## Professional Activities

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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