# Guojin Chen

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## Current Position

**Ph.D. Student Researcher**, *Google DeepMind*, Mountain View, California  2024.07 – Present
**Ph.D. Candidate**, *Chinese University of Hong Kong* (Supervisor : Prof. Bei Yu)  2021.08 – Present

## Education

**Ph.D. in Computer Science**, *Chinese University of Hong Kong*  2021 – Present
Supervisor : Prof. Bei Yu
**M.S. in Computer Science**, *Chinese University of Hong Kong*  2019 – 2020
**B.S. in Computer Science**, *Huazhong University of Science and Technology*  2015 – 2019

## Experiences

**Google DeepMind**, *Ph.D. Student Researcher*  2024.07 – Present
Mountain view, CA

**NVIDIA**, *Research Scientist Intern*  2024.04 – 2024.07
(Mentor & Manager. Haoyu Yang & Mark Ren)  Austin, TX

**University of Texas at Austin**, *Visiting Scholar*  2023.08 – 2024.4
(Supervisor : Prof. David Z. Pan)  Austin, TX

**Tencent**, *Research Intern*  2018 – 2019
Shenzhen, China

## Research Interests

○ Scaling deep learning: large language models, LLM on EDA, large-scale layout representaion 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; 220+ citations, h-index: 8+]

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

### Conference papers

[C16] Differentiable Edge-based OPC
**Guojin Chen**, Haoyu Yang, Haoxing Ren, Bei Yu, and David Z. Pan
(**ICCAD 2024**) *Proceedings of the 43rd International Conference on Computer-Aided Design*

[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] LayouTransformer: 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 ★140 *Differentiable computational lithography with PyTorch*  2024
2. dekura/LLANA ★9 *LLM-Enhanced Bayesian Optimization for Efficient Analog Constraint Generation*  2024
3. OpenOPC/OpenILT ★106 *Open-source inverse lithography technology (ILT) framework*  2023
4. ai4eda/awesome-AI4EDA ★112 *A curated paper list of existing AI for EDA studies.*  2023

# Awards

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

## Paper Review / External Review

Neural Information Processing Systems (NeurIPS)  2023-2024
Design Automation Conference (DAC)  2021-2024
AAAI Conference on Artificial Intelligence (AAAI)  2022-2025
IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD)  2022-2024