

# Guojin Chen




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## Education

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

## Experiences

 <b>DeepMind</b> , <i>Ph.D. Student Researcher</i>	2024.07 – 2024.10 Mountain view, CA
 <b>NVIDIA</b> , <i>Research Scientist Intern</i> (Mentor & Manager. Haoyu Yang & Mark Ren)	2024.04 – 2024.07 Austin, TX
 <b>University of Texas at Austin</b> , <i>Visiting Scholar</i> (Supervisor : Prof. David Z. Pan)	2023.08 – 2024.4 Austin, TX
<b>Tencent</b> , <i>Intern</i>	2018 Shenzhen, China

## Research Interests

### Research Overview

To learn more about my research, click [this link](#) for a detailed document with rich text and images.

- 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; 268+ citations, h-index: 9+]

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

### Conference papers

- [C19] Intelligent OPC Engineer Assistant for Semiconductor Manufacturing  
**Guojin Chen**, Haoyu Yang, Bei Yu, and Haoxing Ren  
(**AAAI 2025**) *The 39th Annual AAAI Conference on Artificial Intelligence*
- [C18] AnalogCoder: Analog Circuit Design via Training-Free Code Generation  
Yao Lai, Sungyoung Lee, **Guojin Chen**, Souradip Poddar, Mengkang Hu, David Z Pan, and Ping Luo  
(**AAAI 2025**) *The 39th Annual AAAI Conference on Artificial Intelligence*
- [C17] PACE: Pacing Operator Learning to Accurate Optical Field Simulation for Complicated Photonic Devices  
Hanqing Zhu, Wenyan Cong, **Guojin Chen**, Shupeng Ning, Ray Chen, Jiaqi Gu, and David Z. Pan  
(**NeurIPS 2024**) *The Thirty-eighth Annual Conference on Neural Information Processing Systems*
- [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] 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.....

- [J7] RuleLearner: OPC Rule Extraction from Inverse Lithography Technique Engine  
Ziyang Yu, Su Zheng, Wenqian Zhao, Shuo Yin, Xiaoxiao Liang, **Guojin Chen**, Yuzhe Ma, Bei Yu, and Martin D.F. Wong  
(**TCAD 2024**) *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*
- [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 ★169   | <i>Differentiable computational lithography with PyTorch</i>                         | 2024 |
| 2. dekura/LLANA ★13           | <i>LLM-Enhanced Bayesian Optimization for Efficient Analog Constraint Generation</i> | 2024 |
| 3. OpenOPC/OpenILT ★127       | <i>Open-source inverse lithography technology (ILT) framework</i>                    | 2023 |
| 4. ai4eda/awesome-AI4EDA ★136 | <i>A curated paper list of existing AI for EDA studies.</i>                          | 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

### Paper Review / External Review

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|--|-----------|
| 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 |