

Guojin Chen




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Education

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

Experiences

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|  DeepMind Google DeepMind , <i>Ph.D. Student Researcher</i> | 2024.07 – Present Mountain view, CA |
|  NVIDIA , <i>Research Scientist Intern</i> (Mentor & Manager. Haoyu Yang & Mark Ren) | 2024.04 – 2024.07 Austin, TX |
|  University of Texas at Austin , <i>Visiting Scholar</i> (Supervisor : Prof. David Z. Pan) | 2023.08 – 2024.4 Austin, TX |
| Tencent , <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; 229+ citations, h-index: 8+]

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

Conference papers

- [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.....

- [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

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|-------------------------------|--|------|
| 1. TorchOPC/TorchLitho ★161 | <i>Differentiable computational lithography with PyTorch</i> | 2024 |
| 2. dekura/LLANA ★10 | <i>LLM-Enhanced Bayesian Optimization for Efficient Analog Constraint Generation</i> | 2024 |
| 3. OpenOPC/OpenILT ★113 | <i>Open-source inverse lithography technology (ILT) framework</i> | 2023 |
| 4. ai4eda/awesome-AI4EDA ★118 | <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 |