Guojin Chen

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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 – 2024.10
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, *Intern* 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 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; 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] 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

[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 *Differentiable computational lithography with PyTorch* 2024
2. dekura/LLANA ★13 *LLM-Enhanced Bayesian Optimization for Efficient Analog Constraint Generation* 2024
3. OpenOPC/OpenILT ★127 *Open-source inverse lithography technology (ILT) framework* 2023
4. ai4eda/awesome-AI4EDA ★136 *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