

JING MAI

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Ph.D. Candidate ◊ School of Computer Science ◊ Peking University

RESEARCH INTERESTS

- Optimization methods for ASIC designs. [ICCAD'24, ASP-DAC'23]
- Modeling and Optimization for FPGA CAD. [ISEDA'24, TCAS-I'24, ASICON'23, ASP-DAC'23, TCAD'23, JEIT'23, DAC'22]
- GPU-assisted methods for physical design. [DAC'21]

EDUCATION

Peking University

Ph.D. student at School of Computer Science

Supervisor: [Prof. Yibo Lin](#)

Sept. 2021 – Present

Beijing, China

Chinese University of Hong Kong (CUHK)

Visiting Student at Department of Computer Science and Engineering

Topics: Electrostatics-based global placement for FPGAs

Supervisor: [Prof. Bei Yu](#)

Sept. 2020 – June 2021

Hong Kong, China

Peking University

B.Sc. in Computer Science, Outstanding Undergraduate Graduates in Beijing (top %1)

Experience: Student Cluster Competition team of Peking University (2019 – 2021)

Sept. 2017 – June 2021

Beijing, China

PUBLICATIONS

Refereed Conference Papers

- [C1] **MORPH: More Robust ASIC Placement for Hybrid Region Constraint Management.**

Jing Mai, Zuodong Zhang, Yibo Lin, Runsheng Wang, and Ru Huang.

International Conference on Computer-Aided Design (ICCAD 2024).

- [C2] **OpenPARF 3.0: Robust Multi-Electrostatics Based FPGA Macro Placement Considering Cascaded Macros Groups and Fence Regions.**

Jing Mai, Jiarui Wang, Yifan Chen, Zizheng Guo, Xun Jiang, Yun Liang, and Yibo Lin.

International Symposium of Electronics Design Automation (ISEDA 2024). [\[paper\]](#) [\[slides\]](#)

- [C3] **OpenPARF: An Open-Source Placement and Routing Framework for Large-Scale Heterogeneous FPGAs with Deep Learning Toolkit. (Invited Paper)**

Jing Mai*, Jiarui Wang*, Zhixiong Di, Guojie Luo, Yun Liang and Yibo Lin.

International Conference on ASIC (ASICON 2023). [\[paper\]](#) [\[slides\]](#) [\[code\]](#)

- [C4] **A Robust FPGA Router with Concurrent Intra-CLB Rerouting.**

Jiarui Wang, Jing Mai, Zhixiong Di, Yibo Lin.

Asia and South Pacific Design Automation Conference (ASP-DAC 2023). [\[paper\]](#) [\[slides\]](#)

- [C5] **MacroRank: Ranking Macro Placement Solutions Leveraging Translation Equivariancy.**

Yifan Chen, Jing Mai, Xiaohan Gao, Muhan Zhang, Yibo Lin.

Asia and South Pacific Design Automation Conference (ASP-DAC 2023). [\[paper\]](#) [\[slides\]](#)

- [C6] **Multi-Electrostatic FPGA Placement Considering SLICEL-SLICEM Heterogeneity and Clock Feasibility.**

Jing Mai, Yibai Meng, Zhixiong Di, Yibo Lin.

Design Automation Conference (DAC 2023) [\[paper\]](#) [\[slides\]](#)

- [C7] **Ultrafast CPU/GPU Kernels for Density Accumulation in Placement.**

Zizheng Guo*, Jing Mai*, Yibo Lin.

Design Automation Conference (DAC 2021) [\[paper\]](#)

Journal Papers

- [J1] **LEAPS: Topological-Layout-Adaptable Multi-Die FPGA Placement for Super Long Line Minimization.**

Zhixiong Di, Runzhe Tao, Jing Mai, Lin Chen, Yibo Lin.

IEEE Transactions on Circuits and Systems I: Regular Papers (TCAS-I 2024). [\[paper\]](#)

[J2] **Multi-Electrostatic FPGA Placement Considering SLICEL-SLICEM Heterogeneity, Clock Feasibility, and Timing Optimization.**
Jing Mai, Jiarui Wang, Zhixiong Di, Yibo Lin.
IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD 2023). [\[paper\]](#)

[J3] **OpenPARF: An Open-Source Placement and Routing Framework for Large-Scale Heterogeneous FPGAs with Deep Learning Toolkit.**
Jing Mai*, Jiarui Wang*, Zhixiong Di, Yibo Lin.
Journal of Electronics and Information Technology (JEIT 2023).

[J4] **Critique of “Planetary Normal Mode Computation: Parallel Algorithms, Performance, and Reproducibility” by SCC Team From Peking University.**
Yihua Cheng, Zejia Fan, **Jing Mai**, Yifan Wu, Pengcheng Xu, Yuxuan Yan, Zhenxin Fu, Yun Liang.
IEEE Transactions on Parallel and Distributed Systems (TPDS 2021).

Book Chapters

[B1] **Deep Learning Framework for Placement, Machine Learning Applications in Electronic Design Automation. (Invited Book Chapter)**
Yibo Lin, Zizheng Guo and **Jing Mai**
Springer, 2023, edited by Haoxing Ren and Jiang Hu.

(* denotes alphabetical ordering or equal contribution)

PROFESSIONAL EXPERIENCE

Research Intern at ByteDance AML

June 2024 – Present

Topics: Code generation and autogpt applications with large language models

Beijing, China

Mentor: Liang Xiang & Rui Long

INVITED TALKS

• A Complete FPGA Placement and Routing Tutorial: Starting from OpenPARF Series [\[slides\]](#)

HUAWEI Inc. Jun. 2024

OPEN-SOURCE CONTRIBUTION

OpenPARF [\[code\]](#)

Sept. 2021 – Present

PKU-IDEA Group, advised by [Prof. Yibo Lin](#)

Beijing, China

• An SOTA open-source placement and routing framework for large-scale heterogeneous FPGAs with deep learning toolkit PyTorch.

HONORS

• Honors for Merit Student 三好学生, *Peking University*

Sept 2023

• Ubiquant Scholarship 九坤奖学金 (top 15%), *Peking University*

Sept 2023

• Industry Contribution Award 产业贡献奖, *Department of Design Automation and Computer System*

April 2023

• Honors for Outstanding Undergraduate Graduates in Beijing 北京市优秀毕业生 (top 1%)

May 2021

• Honors for Outstanding Undergraduate Graduates in Peking University 北京大学优秀毕业生

May 2021

• Xiaomi Scholarship 小米奖学金, *Peking University*

Dec 2020

• Honors for Merit Student 三好学生, *Peking University* (top 5%)

Dec 2020

• Huawei Scholarship 华为奖学金, *Peking University*

Dec 2019

• Honors for Merit Student 三好学生, *Peking University* (top 5%)

Dec 2019

• Honors for Outstanding Academic Performance 优秀科研奖, *Peking University*

Dec 2018

AWARDS

• IEEE/ACM MLCAD 2023 FPGA Macro-Placement Contest, Second Place

Sept 2023

• EDA Elite Challenge EDA 设计精英挑战赛, Second Prize

Dec 2021

• Beijing Challenge Cup Competition 北京市挑战杯, Second Prize

May 2021

• The 43rd ACM-ICPC Asia Regional Competition, Gold Award

Oct 2018

SOCIAL ACTIVITIES

• Associate captain of the ice hockey team *Fire kirin* 火麒麟 in Peking University

2023 – 2024

• Staff of the ACM-ICPC World Final

2018

SKILLS

Programming Languages and Softwares

C/C++, Python, Java, Pytorch, Tensorflow, L^AT_EX, Git, CUDA, Docker, Data Analysis/Visualization(Pandas)

Languages

Mandarin, Cantonese, English, Japanese

hobbies

Ice hockey, Badminton

Last Updated in July, 2024