

# JING MAI

[jingmai@pku.edu.cn](mailto:jingmai@pku.edu.cn)

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 %)   
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  
Mentor: Liang Xiang & Rui Long  
Beijing, China

## 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<sup>A</sup>T<sub>E</sub>X, Git, CUDA, Docker, Data Analysis/Visualization(Pandas)

### Languages

Mandarin, Cantonese, English, Japanese

### hobbies

Ice hockey, Badminton

Last Updated in July, 2024