JORDAN, CHAK-WA PUI

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INTERESTS AND EXPERTISE

- Physical design for both ASICs and FPGAs

EDUCATION

- **The Chinese University of Hong Kong, Hong Kong, China** *Aug. 2015 – Aug. 2019*
  Doctor of Philosophy, Computer Science and Engineering
  Advisor: Evangeline F. Y. Young
  Thesis: Resource Constrained Place and Route for FPGA
- **Shanghai Jiao Tong University, Shanghai, China** *Sep. 2011 – Jul. 2015*
  Bachelor of Science, Computer Science and Technology

WORK EXPERIENCE

- **R&D Engineer, Staff — UniVista**
  - Emulator Back-End Team
  - Jun. 2022 – present, Shanghai, China
- **Principal Engineer — Huawei**
  - AI4EDA Team of Noah's Ark Lab
  - Mar. 2021 – Jun. 2022, Shenzhen, China
- **Lead Software Engineer — Cadence Design Systems**
  - Detailed Placement Team of Innovus
  - May. 2020 – Mar. 2021, Shanghai, China
- **Research Assistant — The Chinese University of Hong Kong**
  - Aug. 2019 – Nov. 2019, Hong Kong, China
- **Technical-Engineering Intern — Synopsys**
  - Zebu Back-End Team
  - May. 2018 – Aug. 2018, Hillsboro, OR, U.S.
- **Software Engineering Intern — Cadence Design Systems**
  - Detailed Routing Team of Innovus
  - May. 2017 – Sep. 2017, San Jose, CA, U.S.

PUBLICATIONS

Conference Papers

[C13] Shixiong Kai, **Chak-Wa Pui**, Fangzhou Wang, Jiang Shougao, Bin Wang, Yu Huang and Jianye Hao, "TOFU: A Two-Step Floorplan Refinement Framework for Whitespace Reduction", Design, Automation, and Test in Europe (DATE), Antwerp, Belgium, Apr. 17-19, 2023.

[C12] Xinyi Zhou, Junjie Ye, **Chak-Wa Pui**, Kun Shao, Guangliang Zhang, Bin Wang, Jianye Hao, Guangyong Chen, Pheng Ann Heng, "Heterogeneous Graph Neural Network-based Imitation Learning for Gate Sizing Acceleration", International Conference on Computer-Aided Design (ICCAD), San Diego, CA, USA, Oct. 30-Nov. 3, 2022.

[C11] Dan Zheng, Xiaopeng Zhang, **Chak-Wa Pui**, Evangeline F.Y. Young, "Multi-FPGA Co-optimization: Hybrid Routing and Competitive-based Time Division Multiplexing Assignment", Asia and South Pacific Design Automation Conference (ASPDAC), Virtual Conference, Jan. 18-21, 2021.

[C10] Jinwei Liu, **Chak-Wa Pui**, Fangzhou Wang, Evangeline F.Y. Young, "CUGR: Detailed-Routability-Driven 3D Global Routing with Probabilistic Resource Model", Design Automation Conference (DAC), Virtual Conference, July 19-23, 2020.

[C9] **Chak-Wa Pui**, Evangeline F.Y. Young, "Lagrangian Relaxation-Based Time-Division Multiplexing Optimization for Multi-FPGA Systems", International Conference on Computer-Aided Design (ICCAD), Westminster, CO, USA, Nov. 4-7, 2019.

[C8] **Chak-Wa Pui**, Gang Wu, Freddy Y. C. Mang, Evangeline F Y. Young, "An Analytical Approach for Time-Division Multiplexing Optimization in Multi-FPGA based Systems", International Workshop on System-Level Interconnect Prediction (SLIP), Las Vegas, NV, USA, June 2, 2019.

[C7] Biying Xu, Shaolan Li, **Chak-Wa Pui**, Derong Liu, Linxiao Shen, Yibo Lin, Nan Sun, David Z. Pan, "Device Layer-Aware Analytical Placement for Analog Circuits", International Symposium on Physical Design (ISPD), San Francisco, CA, USA, Apr. 14-17, 2019.

[C6] Gengjie Chen, **Chak-Wa Pui**, Haocheng Li, Jingsong Chen, Bentian Jiang, Evangeline F.Y. Young, "Detailed Routing by Sparse Grid Graph and Minimum-Area-Captured Path Search", Asia and South Pacific Design Automation Conference (ASPDAC), Tokyo, Japan, Jan. 21-24, 2019.

[C5] Peishan Tu, **Chak-Wa Pui**, Evangeline F.Y. Young, "Simultaneous Timing Driven Tree Surgery in Routing with Machine Learning-based Acceleration", Great Lakes Symposium on VLSI (GLSVLSI), Chicago, IL, USA, May 23-25, 2018

[C4] **Chak-Wa Pui**, Peishan Tu, Haocheng Li, Gengjie Chen, Evangeline F.Y. Young, "A Two-Step Search Engine For Large Scale Boolean Matching Under NP3 Equivalence", Asia and South Pacific Design Automation Conference (ASPDAC), Jeju Island, Korea, Jan. 22-25, 2018.

[C3] **Chak-Wa Pui**, Gengjie Chen, Yuzhe Ma, Evangeline F.Y. Young, Bei Yu, "Clock-Aware UltraScale FPGA Placement with Machine Learning Routability Prediction", International Conference on Computer-Aided Design (ICCAD), Irvine, CA, USA, Nov. 13-16, 2017.

[C2] **Chak-Wa Pui**, Gengjie Chen, Wing-Kai Chow, Jian Kuang, Ka-Chun Lam, Peishan Tu, Hang Zhang, Evangeline F.Y. Young, Bei Yu, "RippleFPGA: A Routability-Driven Placement for Large-Scale Heterogeneous FPGAs", International Conference on Computer-Aided Design (ICCAD), Austin, TX, USA, Nov. 7-10, 2016.

[C1] Wing-Kai Chow, **Chak-Wa Pui**, Evangeline F.Y. Young, "Legalization Algorithm for Multiple-Row Height Standard Cell Design", Design Automation Conference (DAC), Austin, TX, USA, June 5-9, 2016.

Journal Papers

[J4] **Chak-Wa Pui**, Evangeline F.Y. Young, "Lagrangian Relaxation-Based Time-Division Multiplexing Optimization for Multi-FPGA Systems", Transactions on Design Automation of Electronic Systems (TODAES), 2020.

[J3] Gengjie Chen, **Chak-Wa Pui**, Haocheng Li, Evangeline F.Y. Young, "Dr. CU: Detailed Routing by Sparse Grid Graph and Minimum-Area-Captured Path Search", Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), 2020.

[J2] Peishan Tu, **Chak-Wa Pui**, Evangeline F.Y. Young, "Simultaneous Reconnection Surgery Technique of Routing with Machine Learning-based Acceleration", Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), 2020.

[J1] Gengjie Chen, **Chak-Wa Pui**, Wing-Kai Chow, Ka-Chun Lam, Jian Kuang, Evangeline F.Y. Young, Bei Yu, "RippleFPGA: Routability-Driven Simultaneous Packing and Placement for Modern FPGAs", Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), 2018.

Patents

[P3] **Chak-Wa Pui**, Jinglei Yang, Jiequn Tang, "Optimization method and system for critical timing path", CN116663464A

[P2] Shixiong Kai, **Chak-Wa Pui**, Bin Wang, Shougao Jiang, Yu Huang, "Module arrangement method for chip and related device", WO2023185917A1

[P1] Shixiong Kai, **Chak-Wa Pui**, Bin Wang, Shougao Jiang, Yu Huang, "Feed-through method of integrated circuit and related equipment", CN114662444A

RESEARCH AND PROJECT EXPERIENCE

- FPGA
  - Congestion-driven die-level partitioning — *Dec. 2022 – present*
  - Timing-driven localization in multi-FPGA system — *Jul. 2022 – present*
  - Multi-FPGA routing with time-division multiplexing technique — *May. 2019 – Nov. 2019*
  - Time-division multiplexing optimization for multi-FPGA systems — *May. 2018 – Apr. 2019*
  - FPGA placement (Routability-driven & Clock-aware) — *Feb. 2016 – Aug. 2017*

- Routing
  - Top-level routing *Apr. 2021 – Dec. 2021*
  - Detailed routability-driven global routing *May. 2019 – Nov. 2019*
  - Initial detailed routing *Jan. 2018 – Mar. 2018*
  - Tree surgery with machine learning *Sep. 2017 – Nov. 2017*
  - DRC removal on transition layers *May. 2017 – Aug. 2017*
- Placement
  - Datapath extraction in macro placement *Dec. 2021 – Jun. 2022*
  - Top-level floorplanning with advance constraints *Apr. 2021 – Dec.2021*
  - Improving legalization in N3 hybrid row design *Nov. 2020 – Feb. 2021*
  - Improving stability and scalability of data structure in rule checking *Jun. 2020 – Oct. 2020*
  - Analytical analog placement *Jul. 2018 – Aug. 2018*
  - Multi-row height standard cell placement *Aug. 2015 – Dec. 2015*
- Logic Synthesis
  - Gate sizing with machine learning *Aug. 2021 – Dec. 2022*
  - Lagrangian-relaxation-based postmapping optimization *Apr. 2021 – Dec. 2021*
  - Non-exact projective NPNP Boolean matching *Jun. 2016 – Dec. 2016*

SELECTED AWARDS AND HONORS

• Shanghai Pudong District Mingzhu Elite Talent	SH Pudong	*2023*
• 3rd Place Award in Contest on "System-level FPGA Routing with TDM Technique"	ICCAD	*2019*
• 1st Place Award in Contest on "LEF/DEF Based Open-Source Global Router"	ICCAD	*2019*
• Best Paper Award Nomination	ISPD	*2019*
• 2nd Place Award in Contest on "Initial Detailed Routing"	ISPD	*2018*
• 3rd Place Award in Contest on "Clock-Aware FPGA Placement"	ISPD	*2017*
• 1st Place Award in Contest on "NP3: Non-exact Projective NPNP Boolean Matching"	ICCAD	*2016*
• Best Paper Award Nomination	DAC	*2016*
• 2nd Place Award in Contest on "Routability-Driven FPGA Placement"	ISPD	*2016*
• Full Postgraduate Studentship	CUHK	*2015-2019*

PROFESSIONAL SERVICES

Technical Program Committee Member

- ACM/IEEE Design Automation Conference (DAC), 2022-2023
- IEEE/ACM International Conference on Computer-Aided Design (ICCAD), 2022-2023

Conference Reviewer

- ACM/IEEE Design Automation Conference (DAC)
- IEEE/ACM International Conference on Computer-Aided Design (ICCAD)
- ACM International Symposium on Physical Design (ISPD)
- IEEE International Conference on Computer Design (ICCD)
- ACM Great Lakes Symposium on VLSI (GLSVLSI)
- Workshop on Synthesis And System Integration of Mixed Information Technologies (SASIMI)

Journal Reviewer

- IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD)
- ACM Transactions on Design Automation of Electronic Systems (TODAES)

TECHNICAL SKILLS

Languages	C/C++, LaTeX, Python, Shell Programming
Operating Systems	Linux/UNIX