

TINGHUAN CHEN

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Assistant Professor ◊ School of Science and Engineering
TC413B ◊ Chinese University of Hong Kong, Shenzhen

RESEARCH INTERESTS

- VLSI CAD and deep learning accelerators.

EXPERIENCES

Chinese University of Hong Kong, Shenzhen School of Science and Engineering Assistant Professor	<i>Dec. 2022 – Now</i>
Chinese University of Hong Kong, Hong Kong Post-doctoral Fellow Advisor: Prof. Bei Yu	<i>Sep. 2022 – Dec. 2022</i>
Technical University of Munich, Germany Post-doctoral Fellow Advisor: Prof. Ulf Schlichtmann	<i>Mar. 2022 – Sep. 2022</i>
Chinese University of Hong Kong, Hong Kong Post-doctoral Fellow Advisor: Prof. Bei Yu	<i>Sep. 2021 – Mar. 2022</i>
HiSilicon Technologies Co., Shenzhen Research Intern COT Department	<i>Nov. 2019 – June 2020</i>
Chinese University of Hong Kong, Hong Kong Research Assistant Department of Computer Science and Engineering Advisor: Prof. Bei Yu	<i>Mar. 2017 – May. 2017</i>

EDUCATION

Chinese University of Hong Kong, Hong Kong Ph.D., Computer Science & Engineering Department of Computer Science and Engineering Advisor: Prof. Bei Yu	<i>Oct. 2017 – Sep. 2021</i>
Southeast University, Nanjing, China M.Eng., Circuits & Systems National ASIC Engineering Technology Research Center School of Electronics Science & Engineering	<i>Sep. 2014 – Sep. 2017</i>
Southeast University, Nanjing, China B.Eng., Electronics Science & Technology School of Electronics Science & Engineering	<i>Sep. 2010 – June 2014</i>
School of Computer Science & Engineering	<i>Sep. 2011 – June 2014</i> <i>Sep. 2010 – Aug. 2011</i>

PUBLICATIONS

Journal Papers

- [J20] Peng Xu, Siyuan Xu, Tinghuan Chen, Guojin Chen, Tsung-Yi Ho, Bei Yu, “DeepOTF: Learning Equations-constrained Prediction for Electromagnetic Behavior”, accepted by ACM Transactions on Design Automation of Electronic Systems (**TODAES**).
- [J19] Tinghuan Chen, Hao Geng, Qi Sun, Sanping Wan, Yongsheng Sun, Huatao Yu, Bei Yu, “Wages: The Worst Transistor Aging Analysis for Large-scale Analog Integrated Circuits via Domain Generalization”, accepted by ACM Transactions on Design Automation of Electronic Systems (**TODAES**).

- [J18] Yuyang Ye, Tinghuan Chen, Yifei Gao, Hao Yan, Bei Yu, Longxing Shi, “Timing-driven Technology Mapping Approximation Based on Reinforcement Learning”, accepted by IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (**TCAD**).
- [J17] Meng Zhang, Zheng Zhang, Yifan Niu, Jiayi Li, Zewei Chen, Guoqing Li, Yajun Ha, Tinghuan Chen, “Fast Constraints Tuning via Transfer Learning and Multi-objective Optimization”, accepted by IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (**TCAD**).
- [J16] Guoqing Li, Jingwei Zhang, Meng Zhang, Tuo Li, Tinghuan Chen, Jun Yang, “An Analysis of TinyML@ICCAD for Implementing AI on Low-power Microprocessor”, Science China Information Sciences (SCIS), vol. 67, no. 4, 149402, 2024.
- [J15] Yuyang Ye, Tinghuan Chen, Zicheng Wang, Hao Yan, Bei Yu, Longxing Shi, “Fast and Accurate Aging-aware Cell Timing Model via Graph Learning”, IEEE Transactions on Circuits and Systems II (**TCASII**), vol. 71, no. 01, pp. 156–160, 2024.
- [J14] Yuyang Ye, Tinghuan Chen, Yifei Gao, Hao Yan, Bei Yu, Longxing Shi, “Aging-aware Critical Path Selection via Graph Attention Networks”, IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (**TCAD**), vol. 42, no. 12, pp. 5006-5019, 2023.
- [J13] Tinghuan Chen, Silu Xiong, Huan He, Bei Yu, “TRouter: Thermal-driven PCB Routing via Non-Local Crisscross Attention Networks”, IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (**TCAD**), vol. 42, no. 10, pp. 3388-3401, 2023.
- [J12] Tinghuan Chen, Grace Li Zhang, Bei Yu, Bing Li, Ulf Schlichtmann, “Machine Learning in Advanced IC Design: A Methodological Survey”, IEEE Design & Test, vol. 40, no. 01, pp. 17–33, 2023. (**Invited Paper**)
- [J11] Hao Geng, Tinghuan Chen, Yuzhe Ma, Binwu Zhu, Bei Yu, “PTPT: Physical Design Tool Parameter Tuning via Multi-Objective Bayesian Optimization”, IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (**TCAD**), vol. 42, no. 1, pp. 178-189, 2023.
- [J10] Tinghuan Chen, Bin Duan, Qi Sun, Meng Zhang, Guoqing Li, Hao Geng, Qianru Zhang, Bei Yu, “An Efficient Sharing Grouped Convolution via Bayesian Learning”, IEEE Transactions on Neural Networks and Learning Systems (**TNNLS**), vol. 33, no. 12, pp. 7367-7379, 2022.
- [J9] Tinghuan Chen, Qi Sun, Canhui Zhan, Changze Liu, Huatao Yu, Bei Yu, “Deep H-GCN: Fast Analog IC Aging-induced Degradation Estimation”, IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (**TCAD**), vol. 41, no. 7, pp. 1990-2003, 2022.
- [J8] Qi Sun, Tinghuan Chen, Siting Liu, Jin Miao, Jianli Chen, Hao Yu, Bei Yu, “Correlated Multi-objective Multi-fidelity Optimization for HLS Directives Design”, ACM Transactions on Design Automation of Electronic Systems (**TODAES**), vol. 27, no. 4, pp. 1-27, 2022.
- [J7] Tinghuan Chen, Bingqing Lin, Hao Geng, Shiyang Hu, Bei Yu, “Leveraging Spatial Correlation for Sensor Drift Calibration in Smart Building”, IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (**TCAD**), vol. 40, no. 7, pp. 1273-1286, 2021.
- [J6] Yibo Lin, Xiaohan Gao, Tinghuan Chen, Bei Yu, “Machine learning for digital circuit backend design”, Micro/nano Electronics and Intelligent Manufacturing, vol. 2, no. 3, 2022. (in Chinese)
- [J5] Qianru Zhang, Meng Zhang, Tinghuan Chen, Zhifei Sun, Yuzhe Ma, Bei Yu, “Recent advances in convolutional neural network acceleration”, Neurocomputing, vol. 323, pp. 37-51, 2019.
- [J4] Zhifei Sun, Tinghuan Chen, You Tong, Meng Zhang, “Blind Equalization of Constant Modulus Signals Based on Gaussian Process for Classification”, Wireless Personal Communications, vol. 97, no. 4, pp. 6005-6018, 2017.
- [J3] Chen Zhu, Huatao Zhao, Tinghuan Chen, Tianbo Zhu, “A low latency and high efficient three-dimension Network-on-Chip based on hierarchical structure”, Modern Physics Letters B, vol. 31, no. 19-21, 1740061, 2017.
- [J2] Tinghuan Chen, Meng Zhang, Jianhui Wu, Chau Yuen, You Tong, “Image Encryption and Compression based on Kronecker Compressed Sensing and Elementary Automata Scrambling”, Optics & Laser Technology, vol. 84, pp. 118-133, 2016.

- [J1] Meng Zhang, Tinghuan Chen, Xuchao Shi, Peng Cao, “Image Arbitrary Ratio Down- and Up-Sampling Scheme Exploiting DCT Low Frequency Components and Sparsity in High Frequency Components”, *IEICE Transactions on Information and Systems*, vol. E99-D, no. 2, pp. 475- 487, 2016.

Conference Papers

- [C23] Mingjun Li, Pengjia Li, Shuo Yin, Shixin Chen, Beichen Li, Chong Tong, Jianlei Yang, Tinghuan Chen, Bei Yu, “WinoGen: A Highly Configurable Winograd Convolution IP Generator for Efficient CNN Acceleration on FPGA”, *ACM/IEEE Design Automation Conference (DAC)*, San Francisco, Jun. 23–27, 2024.
- [C22] Peng Xu, Guojin Chen, Keren Zhu, Tinghuan Chen, Tsung-Yi Ho, Bei Yu, “Performance-driven Analog Routing via Heterogeneous 3DGNN and Potential Relaxation”, *ACM/IEEE Design Automation Conference (DAC)*, San Francisco, Jun. 23–27, 2024.
- [C21] Jiayi Jiang, Lancheng Zou, Wenqian Zhao, Zhuolun He, Tinghuan Chen, Bei Yu, “PDRC: Package Design Rule Checking via GPU-Accelerated Geometric Intersection Algorithms for Non-Manhattan Geometry”, *ACM/IEEE Design Automation Conference (DAC)*, San Francisco, Jun. 23–27, 2024.
- [C20] Zun Xue, Yuchen Liu, Yuyang Ye, Tinghuan Chen, Hao Yan, Longxing Shi, “Aging-aware Logic Restructure Acceleration based on Heterogeneous Graph Learning”, *International Symposium of EDA (ISED)*, May 10–13, 2024.
- [C19] Fangzhou Liu, Zehua Pei, Ziyang Yu, Haisheng Zheng, Zhuolun He, Tinghuan Chen, Bei Yu, “CBTune: Contextual Bandit Tuning for Logic Synthesis”, *IEEE/ACM Proceedings Design, Automation and Test in Europe (DATE)*, Valencia, March 25-27, 2024.
- [C18] Yunfan Zuo, Yuyang Ye, Hongchao Zhang, Tinghuan Chen, Hao Yan, Longxing Shi, “A Graph-learning-driven Prediction Method for Combined Electromigration and Thermomigration Stress on Multi-Segment Interconnects”, *IEEE/ACM Proceedings Design, Automation and Test in Europe (DATE)*, Valencia, March 25-27, 2024.
- [C17] Donger Luo, Qi Sun, Qi Xu, Tinghuan Chen and Hao Geng, “Attention-Based EDA Tool Parameter Explorer: From Hybrid Parameters to Multi-QoR metrics”, *IEEE/ACM Proceedings Design, Automation and Test in Europe (DATE)*, Valencia, March 25-27, 2024.
- [C16] Yuan Pu, Tinghuan Chen, Zhuolun He, Chen Bai, Haisheng Zheng, Yibo Lin, Bei Yu, “IncreMacro: Incremental Macro Placement Refinement”, *ACM International Symposium on Physical Design (ISPD)*, Taipei, March 12-15, 2024. (**Best Paper Award Nomination**)
- [C15] Yuyang Ye, Tinghuan Chen, Yifei Gao, Hao Yan, Bei Yu, Longxing Shi, “Fast and Accurate Wire Timing Estimation Based on Graph Learning”, *IEEE/ACM Proceedings Design, Automation and Test in Europe (DATE)*, Antwerp, Belgium, April 7-19, 2023.
- [C14] Hao Geng, Qi Sun, Tinghuan Chen, Qi Xu, Tsung-Yi Ho, Bei Yu, “Mixed-Type Wafer Failure Pattern Recognition”, *IEEE/ACM Asia and South Pacific Design Automation Conference (ASPDAC)*, Tokyo Odaiba Miraikan, Jan. 16–19, 2023. (**Invited Paper**)
- [C13] Yuyang Ye, Tinghuan Chen, Yifei Gao, Hao Yan, Bei Yu, Longxing Shi, “Graph-Learning-Driven Path-Based Timing Analysis Results Predictor from Graph-Based Timing Analysis”, *IEEE/ACM Asia and South Pacific Design Automation Conference (ASPDAC)*, Tokyo Odaiba Miraikan, Jan. 16–19, 2023.
- [C12] Zheng Zhang, Tinghuan Chen, Jiabin Huang, Meng Zhang, “A Fast Parameter Tuning Framework via Transfer Learning and Multi-objective Bayesian Optimization”, *ACM/IEEE Design Automation Conference (DAC)*, San Francisco, CA, Jul. 10–14, 2022.
- [C11] Hao Geng, Tinghuan Chen, Qi Sun, Bei Yu, “Techniques for CAD Tool Parameter Auto-tuning in Physical Synthesis: A Survey”, *IEEE/ACM Asia and South Pacific Design Automation Conference (ASPDAC)*, Taipei, Jan. 17–20, 2022. (**Invited Paper**)
- [C10] Xuening Zhang, Tinghuan Chen, Liang Wu, “An Injection Locked Frequency Divider-by-Two with Harmonic Enhancement”, *IEEE MTT-S International Microwave Workshop Series on Advanced Materials and Processes for RF and THz Applications (IMWS-AMP)*, Guangzhou, Nov. 27-29, 2022.
- [C9] Yihui Wang, Tinghuan Chen, Liang Wu, “A 60-GHz Two-Way Transformer-Coupled Power Amplifier in 65-nm CMOS”, *IEEE MTT-S International Microwave Workshop Series on Advanced Materials and Processes for RF and THz Applications (IMWS-AMP)*, Guangzhou, Nov. 27-29, 2022.

- [C8] Tinghuan Chen, Qi Sun, Canhui Zhan, Changze Liu, Huatao Yu, Bei Yu, “Analog IC Aging-induced Degradation Estimation via Heterogeneous Graph Convolutional Networks”, IEEE/ACM Asia and South Pacific Design Automation Conference (**ASPDAC**), Tokyo, Jan. 18–21, 2021.
- [C7] Tinghuan Chen, Qi Sun, Bei Yu, “Machine Learning in Nanometer AMS Design for Reliability”, IEEE International Conference on ASIC (ASICON), Kunming, Oct. 26–29, 2021. (**Invited Paper**)
- [C6] Qi Sun, Chen Bai, Tinghuan Chen, Hao Geng, Xinyun Zhang, Yang Bai, Bei Yu, “Fast and Efficient DNN Deployment via Deep Gaussian Transfer Learning”, IEEE International Conference on Computer Vision (**ICCV**), Oct. 11–17, 2021.
- [C5] Qi Sun, Tinghuan Chen, Siting Liu, Jin Miao, Jianli Chen, Hao Yu, Bei Yu, “Correlated Multi-objective Multi-fidelity Optimization for HLS Directives Design”, IEEE/ACM Proceedings Design, Automation and Test in Europe (**DATE**), Grenoble, Feb. 1–5, 2021. (**Best Paper Award Nomination**)
- [C4] Tinghuan Chen, Bingqing Lin, Hao Geng, Bei Yu, “Sensor Drift Calibration via Spatial Correlation Model in Smart Building”, ACM/IEEE Design Automation Conference (**DAC**), Las Vegas, NV, June 2-6, 2019.
- [C3] Qi Sun, Tinghuan Chen, Jin Miao, Bei Yu, “Power-Driven DNN Dataflow Optimization on FPGA”, IEEE/ACM International Conference on Computer-Aided Design (**ICCAD**), Westminster, CO, Nov. 4–7, 2019. (**Invited Paper**)
- [C2] Qianru Zhang, Meng Zhang, Tinghuan Chen, Jinan Fan, Zhou Yang, Guoqing Li, “Electricity Theft Detection Using Generative Models”, IEEE International Conference on Tools with Artificial Intelligence (ICTAI), Volos, Nov. 5-7, 2018.
- [C1] Tinghuan Chen, Zhifang Dong, “A New Method for the 3-D Discrete Hartley Transform”, IEEE International Conference on Instrumentation & Measurement, Computer, Communication and Control, Harbin, Dec. 8-10, 2012.

Book Chapters

- [B1] Tinghuan Chen, Bingqing Lin, Hao Geng, Bei Yu, “Smart Building Sensor Drift Calibration”, Big Data Analytics for Cyber-Physical Systems, Springer, 2020: 187-202.

Newsletters

- [N2] Tinghuan Chen, “Bayesian Sharing Grouped Convolution”, IEEE TCCPS Newsletter, Volume 07, Issue 02, Nov. 2021.
- [N1] Qi Sun, Tinghuan Chen, Jin Miao, Bei Yu, “Power-Driven DNN Dataflow Optimization on FPGA”, IEEE TCCPS Newsletter, Volume 05, Issue 01, Mar. 2020.

SELECTED AWARDS

ACM ISPD Best Paper Award Nomination	2024
National High-level Young Scholar of China	2023
2nd Place Award in EDATHON	2023
2nd Prize Award in Integrated Circuit EDA Elite Challenge	2023
IEEE/ACM DATE Best Paper Award Nomination	2021

SUPERVISORSHIP

Baohui Xie	Ph.D.	Spring 2024 –
Pengjia Li	Ph.D.	Fall 2023 –
Weizhe Zhang	Ph.D.	Fall 2023 –
Jindong Tu	Ph.D.	Fall 2023 –
Xinrui Zhu	M.Phil.	Fall 2023 –
Yapeng Li	M.Phil.	Fall 2023 –

PROFESSIONAL SERVICE

Editorial Board

- Associate Editor, Neurocomputing, 2024–present
- Associate Editor, IET Cyber-Physical Systems: Theory & Applications, 2023–present.

Program Committee Member

- IEEE/ACM International Conference on Computer-Aided Design (ICCAD): 2024, 2023
- AAAI Conference on Artificial Intelligence (AAAI): 2024, 2023
- ACM/IEEE International Symposium on Machine Learning for CAD (MLCAD): 2024
- ACM/IEEE Workshop on Machine Learning for CAD (MLCAD): 2023
- International Joint Conference on Artificial Intelligence (IJCAI): 2024, 2023, 2022, 2021

Conference Reviewer

- ACM/IEEE Design Automation Conference (DAC): 2023, 2020, 2019
- ACM/IEEE International Conference on Computer-Aided Design (ICCAD): 2022
- IEEE International Conference on Computer Design (ICCD): 2022
- ACM/IEEE Workshop on Machine Learning for CAD (MLCAD): 2020
- ACM International Symposium on Physical Design (ISPD): 2023, 2019
- ACM Great Lakes Symposium on VLSI (GLSVLSI): 2018

Selected Journal Reviewer

- IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD)
- IEEE Transactions on Neural Networks and Learning Systems (TNNLS)
- ACM Transactions on Design Automation of Electronic Systems (TODAES)
- IEEE Transactions on Very Large Scale Integration Systems (TVLSI)
- IEEE Design & Test
- Integration, the VLSI Journal
- Journal of Systems Architecture

TEACHING

Spring 2024	ECE2050 Digital Logic and Systems
Fall 2023	EIE3201 Introduction to Microelectronic Circuits
Spring 2023	EIE2050 Digital Logic and Systems