# 林亦波

# 助理教授 < 高能效计算与应用中心 < 信息科学技术学院 理科 5 号楼, 100871 < 北京大学

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#### 研究方向

针对于超大规模集成电路设计自动化的建模和优化、深度学习及其应用、硬件加速、硬件安全

#### 教育经历

#### 德克萨斯大学奥斯汀分校

2013年8月-2018年5月

博士学位, 电子与计算机工程系

指导老师: David Z. Pan

博士毕业论文: "Bridging Design and Manufacturing Gap through Machine Learning and Machine-Generated Layout"

(学积分 3.96/4.0)

上海交通大学

2009年9月-2013年6月

学士学位,微电子学院 (学积分 91.17/100) (排名 1/60)

#### 工作经历

#### 北京大学 (Peking University)

2019年7月-现在

助理教授

信息科学技术学院高能效计算与应用中心

德克萨斯大学奥斯汀分校 (UT Austin)

2018年6月-2019年6月

博后

日本东芝存储 (Toshiba Memory)

2017年5月-2017年8月

实习

Memory lithography group

比利时微电子研究中心(IMEC)

2016年9月-2016年11月

实习

Design technology co-optimization for emerging lithography options

香港中文大学 (CUHK)

2016年6月-2016年8月

实习

Quantum computing

铿腾半导体 (Cadence) 2015 年 5 月 - 2015 年 8 月

实习

Routability driven detailed placement

# 甲骨文股份有限公司 (Oracle)

2014年5月-2014年8月

实习

Incremental timing driven detailed placement

# 授课经历

主讲	计算概论	2020 年秋
客座讲座	EE382M: VLSI CAD & Optimizations	2018 年秋
客座讲座	EE382M: VLSI Physical Design Automation	2017 年秋
研究生课程助教	EE382M: VLSI I	2014 年秋

# 奖项及荣誉

最佳论文	ISPD	2020 年
最佳论文提名	ASPDAC	2020 年
最佳论文 (×1) & 提名 (×1)	DAC	2019 年
最佳论文提名	ISPD	2019 年
首届最佳论文	Integration, the VLSI Journal	2018年
Graduate Continuing Fellowship	德克萨斯大学奥斯汀分校	2017年
Franco Cerrina Memorial 最佳学生论文	SPIE	2016 年
A. Richard Newton Young Student Fellow	DAC	2014年
国家奖学金	上海交通大学	2012 年
三星奖学金	上海交通大学	2011 年
二等奖学金	上海交通大学	2010年

# 服务

国际会议技术程序委员会委员: ICCAD 2018, ICCAD 2019, ICCD 2019, ISPD 2020, DAC 2020, ICCAD 2020

# 技能

# 编程语言

C/C++, Python, Verilog

# 网页制作

HTML5, JavaScript/jQuery

# 设计自动化工具

Cadence Virtuoso, Synopsys Design Compiler, Synopsys IC Compiler

# 相关课程

• EE382M: VLSI I	Prof. Michael Orshansky
• EE382N: Computer Architecture	Prof. Aater Suleman
• EE382V: Optimization Issues in VLSI CAD	Prof. David Pan
• EE382M: VLSI II	Prof. Jacob Abraham
• EE380L: Engineer Programming Languages	Prof. Craig Chase

• EE382V: Nanometer Scale IC Design

• EE382V: VLSI Physical Design Automation

• EE381V: Advanced Algorithms

• EE382V: Advanced Programming Tools

• EE380N: Optimization in Engineering Systems

• CS383C: Numerical Analysis: Linear Algebra

Prof. Michael Orshansky

Prof. David Pan

Prof. Evdokia Nikolova

Prof. Aziz Adnan

Prof. Ross Baldick

Prof. Robert van de Geijn

#### 出版物

#### 书籍章节

[B1] Yibo Lin and David Z. Pan, "Machine Learning in Physical Verification, Mask Synthesis, and Physical Design", Machine Learning in VLSI Computer-Aided Design, Springer, 2018, edited by Abe Elfedel, Duane Boning and Xin Li. (Invited Book Chapter)

#### 期刊论文

- [J23] Yibo Lin, Wuxi Li, Jiaqi Gu, Haoxing Ren, Brucek Khailany and David Z. Pan, "ABCDPlace: Accelerated Batch-based Concurrent Detailed Placement on Multi-threaded CPUs and GPUs", IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), 2020. (accepted)
- [J22] Jing Chen, Mohamed Baker Alawieh, Yibo Lin, Maolin Zhang, Jun Zhang, Yufeng Guo and David Z. Pan, "Powernet: SOI Lateral Power Device Breakdown Prediction With Deep Neural Networks", IEEE Access, Dec, 2020.
- [J21] Mohamed Baker Alawieh, Yibo Lin, Zaiwei Zhang, Meng Li, Qixing Huang and David Z. Pan, "GAN-SRAF: Sub-Resolution Assist Feature Generation using Generative Adversarial Networks", IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), 2020. (accepted)
- [J20] Ying Chen, Yibo Lin, Rui Chen, Lisong Dong, Ruixuan Wu, Tianyang Gai, Le Ma, Yajuan Su and Yayi Wei, "EUV Multilayer Defect Characterization via Cycle-Consistent Learning", Optics Express, 2020.
- [J19] Yibo Lin, Zixuan Jiang, Jiaqi Gu, Wuxi Li, Shounak Dhar, Haoxing Ren, Brucek Khailany and David Z. Pan, "DREAMPlace: Deep Learning Toolkit-Enabled GPU Acceleration for Modern VLSI Placement", IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), 2020. (accepted)
- [J18] Junzhe Cai, Changhao Yan, Yudong Tao, Yibo Lin, Sheng-Guo Wang, David Z. Pan and Xuan Zeng, "A Novel and Unified Full-chip CMP Model Aware Dummy Fill Insertion Framework with SQP-Based Optimization Method", IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), 2020. (accepted)
- [J17] Jing Chen, Mohamed Baker Alawieh, Yibo Lin, Maolin Zhang, Jun Zhang, Yufeng Guo and David Z. Pan, "Automatic Selection of Structure Parameters of Silicon on Insulator Lateral Power Device Using Bayesian Optimization", IEEE Electron Device Letters (EDL), 2020. (accepted)

- [J16] Jing Chen, Yibo Lin, Yufeng Guo, Maolin Zhang, Mohamed Baker Alawieh and David Z. Pan, "Lithography Hotspot Detection Using a Double Inception Module Architecture", Journal of Micro/Nanolithography, MEMS, and MOEMS (JM3), 2019.
- [J15] Ying Chen, Yibo Lin, Tianyang Gai, Yajuan Su, Yayi Wei and David Z. Pan, "Semi-Supervised Hotspot Detection with Self-Paced Multi-Task Learning", IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), 2019.
- [J14] Ying Chen, Yibo Lin, Lisong Dong, Tianyang Gai, Rui Chen, Yajuan Su, Yayi Wei and David Z. Pan, "SoulNet: Ultrafast Optical Source Optimization Utilizing Generative Neural Networks for Advanced Lithography", Journal of Micro/Nanolithography, MEMS, and MOEMS (JM3), Nov, 2019.
- [J13] Yibo Lin, Meng Li, Yuki Watanabe, Taiki Kimura, Tetsuaki Matsunawa, Shigeki Nojima and David Z. Pan, "Data Efficient Lithography Modeling with Transfer Learning and Active Data Selection", IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), Oct, 2019.
- [J12] Yibo Lin, Bei Yu, Meng Li and David Z. Pan, "Layout Synthesis for Topological Quantum Circuits with 1D and 2D Architectures", IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), Aug, 2018.
- [J11] Meng Li, Bei Yu, Yibo Lin, Xiaoqing Xu, Wuxi Li and David Z Pan, "A practical split manufacturing framework for trojan prevention via simultaneous wire lifting and cell insertion", IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), Jul, 2018.
- [J10] Xiaoqing Xu, Yibo Lin, Meng Li, Tetsuaki Matsunawa, Shigeki Nojima, Chikaaki Kodama, Toshiya Kotani and David Z. Pan, "Subresolution Assist Feature Generation With Supervised Data Learning", IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), Jun, 2018.
- [J9] Yibo Lin, Bei Yu, Xiaoqing Xu, Jhih-Rong Gao, Natarajan Viswanathan, Wen-Hao Liu, Zhuo Li, Charles J Alpert and David Z. Pan, "MrDP: Multiple-row detailed placement of heterogeneous-sized cells for advanced nodes", IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), Jun, 2018.
- [J8] Wuxi Li, Yibo Lin, Meng Li, Shounak Dhar and David Z. Pan, "UTPlaceF 2.0: A High-Performance Clock-Aware FPGA Placement Engine", ACM Transactions on Design Automation of Electronic Systems (TODAES), Jun, 2018.
- [J7] Yibo Lin, Bei Yu and David Z. Pan, "High performance dummy fill insertion with coupling and uniformity constraints", IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), Sep, 2017.
- [J6] Yibo Lin, Bei Yu, Biying Xu and David Z. Pan, "Triple patterning aware detailed placement toward zero cross-row middle-of-line conflict", IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), Jul, 2017.
- [J5] Xiaoqing Xu, Yibo Lin, Meng Li, Jiaojiao Ou, B. Cline and D. Z. Pan, "Redundant local-Loop insertion for unidirectional routing", IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), Jul, 2017.

- [J4] Yibo Lin, Bei Yu, Yi Zou, Zhuo Li, Charles J Alpert and David Z. Pan, "Stitch aware detailed placement for multiple e-beam lithography", Integration, the VLSI Journal, Jun, 2017. (Best Paper Award)
- [J3] Yibo Lin, Xiaoqing Xu, Bei Yu, Ross Baldick and David Z. Pan, "Triple/quadruple patterning layout decomposition via linear programming and iterative rounding", Journal of Micro/Nanolithography, MEMS, and MOEMS (JM3), Jun, 2017.
- [J2] Bei Yu, Xiaoqing Xu, Subhendu Roy, Yibo Lin, Jiaojiao Ou and David Z. Pan, "Design for manufacturability and reliability in extreme-scaling VLSI", Science China Information Sciences, 2016. (Invited paper)
- [J1] Bei Yu, Xiaoqing Xu, Jhih-Rong Gao, Yibo Lin, Zhuo Li, Charles Alpert and David Z. Pan, "Methodology for standard cell compliance and detailed placement for triple patterning lithography", IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), May, 2015.

#### 会议论文

- [C40] Jiaqi Gu, Zixuan Jiang, **Yibo Lin** and David Z. Pan, "Multi-Electrostatics Based Robust VLSI Placement with Region Constraints", IEEE/ACM International Conference on Computer-Aided Design (ICCAD), Nov 2-5, 2020. (accepted)
- [C39] Zizheng Guo, Tsung-Wei Huang and Yibo Lin, "GPU-Accelerated Static Timing Analysis", IEEE/ACM International Conference on Computer-Aided Design (ICCAD), Nov 2-5, 2020. (accepted)
- [C38] Wei Ye, Mohamed Baker Alawieh, Yuki Watanabe, Shigeki Nojima, Yibo Lin and David Z. Pan, "TEMPO: Fast Mask Topography Effect Modeling with Deep Learning", ACM International Symposium on Physical Design (ISPD), Taipei, Taiwan, Sep 20-23, 2020. (Best Paper Award)
- [C37] Wei Li, Jialu Xia, Yuzhe Ma, Jialu Li, Yibo Lin and Bei Yu, "Adaptive Layout Decomposition with Graph Embedding Neural Networks", ACM/IEEE Design Automation Conference (DAC), San Francisco, Jul 19-23, 2020. (accepted)
- [C36] Rachel Selina Rajarathnam, Yibo Lin, Yier Jin and David Z. Pan, "ReGDS: A Reverse Engineering Framework from GDSII to Gate-level Netlist", IEEE International Workshop on Hardware-Oriented Security and Trust (HOST), San Jose, CA, May 4, 2020. (accepted)
- [C35] Mingjie Liu, Wuxi Li, Keren Zhu, Biying Xu, Yibo Lin, Linxiao Shen, Xiyuan Tang, Nan Sun and David Z. Pan, "S3DET: Detecting System Symmetry Constraints for Analog Circuits with Graph Similarity", IEEE/ACM Asia and South Pacific Design Automation Conference (ASPDAC), Jan 13-16, 2020. (Best Paper Nomination)
- [C34] Mohamed Baker Alawieh, Wuxi Li, Yibo Lin, Love Singhal, Mahesh Iyer and David Z. Pan, "High-Definition Routing Congestion Prediction for Large-Scale FPGAs", IEEE/ACM Asia and South Pacific Design Automation Conference (ASPDAC), Jan 13-16, 2020.
- [C33] Wuxi Li, Yibo Lin and David Z. Pan, "elfPlace: Electrostatics-based Placement for Large-Scale Heterogeneous FPGAs", IEEE/ACM International Conference on Computer-Aided Design (ICCAD), Westminster, CO, Nov 4-7, 2019.
- [C32] Keren Zhu, Mingjie Liu, Yibo Lin, Biying Xu, Shaolan Li, Xiyuan Tang, Nan Sun and David Z.

- Pan, "GeniusRoute: A New Analog Routing Paradigm Using Generative Neural Network Guidance", IEEE/ACM International Conference on Computer-Aided Design (ICCAD), Westminster, CO, Nov 4-7, 2019.
- [C31] Chengyue Gong, Zixuan Jiang, Dilin Wang, Yibo Lin, Qiang Liu and David Z. Pan, "Mixed Precision Neural Architecture Search for Energy Efficient Deep Learning", IEEE/ACM International Conference on Computer-Aided Design (ICCAD), Westminster, CO, Nov 4-7, 2019.
- [C30] Biying Xu, Keren Zhu, Mingjie Liu, Yibo Lin, Shaolan Li, Xiyuan Tang, Nan Sun and David Z. Pan, "MAGICAL: Toward Fully Automated Analog IC Layout Leveraging Human and Machine Intelligence", IEEE/ACM International Conference on Computer-Aided Design (ICCAD), Westminster, CO, Nov 4-7, 2019. (Invited paper)
- [C29] Wei Li, Yuzhe Ma, Qi Sun, **Yibo Lin**, Iris Hui-Ru Jiang, Bei Yu and David Z Pan, "OpenMPL: An Open Source Layout Decomposer", International Conference on ASIC (ASICON), Chongqing, China, Oct, 2019. (**Invited paper**)
- [C28] Yibo Lin, Shounak Dhar, Wuxi Li, Haoxing Ren, Brucek Khailany and David Z. Pan, "DREAM-Place: Deep Learning Toolkit-Enabled GPU Acceleration for Modern VLSI Placement", ACM/IEEE Design Automation Conference (DAC), Las Vegas, NV, Jun 2-6, 2019. (Best Paper Award)
- [C27] Wei Ye, Mohamed Baker Alawieh, Yibo Lin and David Z. Pan, "LithoGAN: End-to-End Lithography Modeling with Generative Adversarial Networks", ACM/IEEE Design Automation Conference (DAC), Las Vegas, NV, Jun 2-6, 2019. (Best Paper Nomination)
- [C26] Biying Xu, Yibo Lin, Xiyuan Tang, Shaolan Li, Linxiao Shen, Nan Sun and David Z. Pan, "Well-GAN: Generative-Adversarial-Network-Guided Well Generation for Analog/Mixed-Signal Circuit Layout", ACM/IEEE Design Automation Conference (DAC), Las Vegas, NV, Jun 2-6, 2019.
- [C25] Mohamed Baker Alawieh, Yibo Lin, Zaiwei Zhang, Meng Li, Qixing Huang and David Z. Pan, "GAN-SRAF: Sub-Resolution Assist Feature Generation Using Conditional Generative Adversarial Networks", ACM/IEEE Design Automation Conference (DAC), Las Vegas, NV, Jun 2-6, 2019.
- [C24] Yibo Lin, Zhao Song and Lin F. Yang, "Towards a Theoretical Understanding of Hashing-Based Neural Nets", International Conference on Artificial Intelligence and Statistics (AISTATS), Okinawa, Japan, Apr 16-18, 2019.
- [C23] Biying Xu, Shaolan Li, Chak-Wa Pui, Derong Liu, Linxiao Shen, Yibo Lin, Nan Sun and David Z. Pan, "Device Layer-Aware Analytical Placement for Analog Circuits", ACM International Symposium on Physical Design (ISPD), San Francisco, CA, Apr 14-17, 2019. (Best Paper Nomination)
- [C22] Wei Ye, Mohamed Baker Alawieh, Meng Li, Yibo Lin and David Z. Pan, "Litho-GPA: Gaussian Process Assurance for Lithography Hotspot Detection", IEEE/ACM Proceedings Design, Automation and Test in Eurpoe (DATE), Florence, Italy, Mar 25-29, 2019.
- [C21] Ying Chen, Yibo Lin, Tianyang Gai, Yajuan Su, Yayi Wei and David Z. Pan, "Semi-Supervised Hotspot Detection with Self-Paced Multi-Task Learning", IEEE/ACM Asia and South Pacific Design Automation Conference (ASPDAC), Tokyo, Japan, Jan 21-24, 2019.
- [C20] Wei Ye, Mohamed Baker Alawieh, Yibo Lin and David Z. Pan, "Tackling Signal Electromigration with Learning-Based Detection and Multistage Mitigation", IEEE/ACM Asia and South Pacific Design

- Automation Conference (ASPDAC), Tokyo, Japan, Jan 21-24, 2019.
- [C19] Wei Ye, Yibo Lin, Meng Li, Qiang Liu and David Z. Pan, "LithoROC: Lithography Hotspot Detection with Explicit ROC Optimization", IEEE/ACM Asia and South Pacific Design Automation Conference (ASPDAC), Tokyo, Japan, Jan 21-24, 2019. (Invited paper)
- [C18] Yibo Lin, Mohamed Baker Alawieh, Wei Ye and David Z. Pan, "Machine Learning for Yield Learning and Optimization", IEEE International Test Conference (ITC), Phoenix, Arizona, Oct, 2018. (Invited paper)
- [C17] Jiong Zhang, Yibo Lin, Zhao Song and Inderjit S Dhillon, "Learning Long Term Dependencies via Fourier Recurrent Units", International Conference on Machine Learning (ICML), Stockholm, Sweden, Jun 10-15, 2018.
- [C16] Yibo Lin, Yuki Watanabe, Taiki Kimura, Tetsuaki Matsunawa, Shigeki Nojima, Meng Li and David Z. Pan, "Data Efficient Lithography Modeling with Residual Neural Networks and Transfer Learning", ACM International Symposium on Physical Design (ISPD), Monterey, CA, Mar 25-28, 2018.
- [C15] Meng Li, Bei Yu, **Yibo Lin**, Xiaoqing Xu, Wuxi Li and David Z. Pan, "A Practical Split Manufacturing Framework for Trojan Prevention via Simultaneous Wire Lifting and Cell Insertion", IEEE/ACM Asia and South Pacific Design Automation Conference (ASPDAC), Jeju, Korea, Jan 22-25, 2018.
- [C14] Che-Lun Hsu, Shaofeng Guo, **Yibo Lin**, Xiaoqing Xu, Meng Li, Runsheng Wang, Ru Huang and David Z Pan, "Layout-dependent aging mitigation for critical path timing", IEEE/ACM Asia and South Pacific Design Automation Conference (ASPDAC), Jeju, Korea, Jan 22-25, 2018.
- [C13] Yibo Lin, Peter Debacker, Darko Trivkovic, Ryoung-han Kim, Praveen Raghavan and David Z. Pan, "Patterning Aware Design Optimization of Selective Etching in N5 and Beyond", IEEE International Conference on Computer Design (ICCD), Boston, MA, Nov 5-8, 2017.
- [C12] Yibo Lin, Xiaoqing Xu, Jiaojiao Ou and David Z Pan, "Machine learning for mask/wafer hotspot detection and mask synthesis", Photomask Technology, Oct 16, 2017. (Invited paper)
- [C11] Wei Ye, Yibo Lin, Xiaoqing Xu, Wuxi Li, Yiwei Fu, Yongsheng Sun, Canhui Zhan and David Z. Pan, "Placement Mitigation Techniques for Power Grid Electromigration", IEEE International Symposium on Low Power Electronics and Design (ISLPED), Taipei, Jul 24-26, 2017.
- [C10] Xiaoqing Xu, Yibo Lin, Vinicius Livramento and David Z. Pan, "Concurrent Pin Access Optimization for Unidirectional Routing", ACM/IEEE Design Automation Conference (DAC), Austin, TX, Jun 18-22, 2017.
- [C9] Jiaojiao Ou, Bei Yu, Xiaoqing Xu, Joydeep Mitra, Yibo Lin and David Z. Pan, "DSAR: DSA aware routing with simultaneous DSA guiding pattern and double patterning assignment", ACM International Symposium on Physical Design (ISPD), Portland, OR, Mar 19-22, 2017.
- [C8] Yibo Lin, Bei Yu, Xiaoqing Xu, Jhih-Rong Gao, Natarajan Viswanathan, Wen-Hao Liu, Zhuo Li, Charles J Alpert and David Z. Pan, "MrDP: Multiple-row detailed placement of heterogeneous-sized cells for advanced nodes", IEEE/ACM International Conference on Computer-Aided Design (ICCAD), Austin, TX, Nov 7-10, 2016.
- [C7] Yudong Tao, Changhao Yan, Yibo Lin, Sheng-Guo Wang, David Z. Pan and Xuan Zeng, "A novel

- unified dummy fill insertion framework with SQP-based optimization method", IEEE/ACM International Conference on Computer-Aided Design (ICCAD), Austin, TX, Nov 7-10, 2016.
- [C6] Yibo Lin, Bei Yu and David Z. Pan, "Detailed placement in advanced technology nodes: a survey", IEEE International Conference on Solid-State and Integrated Circuit Technology (ICSICT), Hangzhou, China, Oct 25-28, 2016. (Invited paper)
- [C5] Yibo Lin, Xiaoqing Xu, Bei Yu, Ross Baldick and David Z. Pan, "Triple/quadruple patterning layout decomposition via novel linear programming and iterative rounding", Proceedings of SPIE, San Jose, CA, Feb 21-25, 2016. (Best Student Paper Award)
- [C4] Yibo Lin, Bei Yu, Yi Zou, Zhuo Li, Charles J Alpert and David Z. Pan, "Stitch aware detailed placement for multiple e-beam lithography", IEEE/ACM Asia and South Pacific Design Automation Conference (ASPDAC), Macau, China, Jan 25-28, 2016.
- [C3] Yibo Lin, Bei Yu, Biying Xu and David Z. Pan, "Triple patterning aware detailed placement toward zero cross-row middle-of-line conflict", IEEE/ACM International Conference on Computer-Aided Design (ICCAD), Austin, TX, Nov 2-6, 2015.
- [C2] Yibo Lin, Bei Yu and David Z. Pan, "High performance dummy fill insertion with coupling and uniformity constraints", ACM/IEEE Design Automation Conference (DAC), San Francisco, CA, Jun 7-11, 2015.
- [C1] David Z. Pan, Lars Liebmann, Bei Yu, Xiaoqing Xu and Yibo Lin, "Pushing multiple patterning in sub-10nm: are we ready?", ACM/IEEE Design Automation Conference (DAC), San Francisco, CA, Jun 7-11, 2015. (Invited Paper)