

# 林亦波

助理教授 ◇ 高效计算与应用中心 ◇ 信息科学技术学院

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## 研究方向

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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

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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

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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

## 授课经历

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|         |   |         |
|---------|---|---------|
| 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 |

## 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

- [J15] **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), 2019. (accepted)
- [J14] 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. (accepted)
- [J13] 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. (accepted)
- [J12] Qi Sun, **Yibo Lin**, Iris Hui-Ru Jiang, Bei Yu and David Z. Pan, “[OpenMPL: An Open Source Layout Decomposer](#)”, arXiv preprint arXiv:1809.07554, 2018.
- [J11] **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.
- [J10] Xiaoqing Xu, **Yibo Lin**, Meng Li, Tetsuaki Matsunawa, Shigeki Nojima, Chikaaki Kodama, Toshiya Kotani and David Z. Pan, “[Sub-Resolution 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, Jih-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, Jih-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

- [C31] 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. (accepted)
- [C30] 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. (accepted)
- [C29] 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. (accepted)
- [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 Europe (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, Jih-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**)

## 相关课程

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|   |                                  |
|---|----------------------------------|
| • EE382M: VLSI I                              | <i>Prof. Michael Orshansky</i>   |
| • EE382N: Computer Architecture               | <i>Prof. Aater Suleman</i>       |
| • EE382V: Optimization Issues in VLSI CAD     | <i>Prof. David Pan</i>           |
| • EE382M: VLSI II                             | <i>Prof. Jacob Abraham</i>       |
| • EE380L: Engineer Programming Languages      | <i>Prof. Craig Chase</i>         |
| • EE382V: Nanometer Scale IC Design           | <i>Prof. Michael Orshansky</i>   |
| • EE382V: VLSI Physical Design Automation     | <i>Prof. David Pan</i>           |
| • EE381V: Advanced Algorithms                 | <i>Prof. Evdokia Nikolova</i>    |
| • EE382V: Advanced Programming Tools          | <i>Prof. Aziz Adnan</i>          |
| • EE380N: Optimization in Engineering Systems | <i>Prof. Ross Baldick</i>        |
| • CS383C: Numerical Analysis: Linear Algebra  | <i>Prof. Robert van de Geijn</i> |

## 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

## 奖项及荣誉

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|  |                               |        |
|--|-------------------------------|--------|
| 最佳论文                                   | DAC                           | 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 |