

# Jieming Yin

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**RESEARCH INTEREST** Computer Architecture, Heterogeneous Multi-core Architectures, Interconnection Networks, Chiplet Systems, 2.5D/3D Integration, High-performance Computing, Machine Learning

**EDUCATION** **University of Minnesota, Twin Cities**, Minneapolis, MN  
Ph.D. in Computer Science, 2015  
Thesis: Time-Division-Multiplexing Based Hybrid-Switched NoC for Heterogeneous Multicore Systems  
Committee: Antonia Zhai (Advisor), Sachin S. Sapatnekar, Anand Tripathi, Pen-Chung Yew

**Harbin Institute of Technology**, Harbin, China  
B.Eng. in Electrical Engineering, 2008  
Thesis: Point-to-point Scalar Operand Networks for Clustered Superscalar Processors

**EMPLOYMENT** **Nanjing University of Posts and Telecommunications**, China Sep. 2022 - current  
*Professor*  
School of Computer Science

**Lehigh University**, Bethlehem, PA, USA Aug. 2020 - Aug. 2022  
*Assistant Professor*  
Department of Electrical and Computer Engineering

**AMD Research**, Bellevue, WA, USA Dec. 2016 - Aug. 2020  
*Member of Technical Staff Silicon Design Engineer*

**AMD Research**, Bellevue, WA, USA Mar. 2015 - Dec. 2016  
*Postdoc Researcher*

## PUBLICATIONS Peer-reviewed Conference and Workshop Publications

- C23. Anlan Yu, Ning Lyu, **Jieming Yin**, Zhiyuan Yan, Wujie Wen. *COLA: Orchestrating Error Coding and Learning for Robust Neural Network Inference Against Hardware Defects*. 40th International Conference on Machine Learning (**ICML**), Honolulu, Hawai'i, July 2023.
- C22. Zizhang Luo, Liqiang Lu, Size Zheng, **Jieming Yin**, Jason Cong, Jianwei Yin, Yun Liang. *Rubick: A Synthesis Framework For Spatial Architectures via Dataflow Decomposition*. 60th Annual Design Automation Conference (**DAC**), San Francisco, CA, July 2023.
- C21. Xiaobai Chen, Qiurun Hu, Fu Xiao, **Jieming Yin**. *CompoundEye: A 0.24-4.17 TOPS Scalable Multi-Node DNN Processor for Image Recognition*. 56th IEEE International Symposium on Circuits and Systems (**ISCAS**), Monterey, CA, May 2023.

- C20. Bingyao Li, **Jieming Yin**, Anup Holey, Youtao Zhang, Jun Yang, Xulong Tang. *Trans-FW: Short Circuiting Page Table Walk in Multi-GPU Systems via Remote Forwarding*. 29th IEEE International Symposium on High-Performance Computer Architecture (**HPCA**), Montreal, Canada, February 2023.
- C19. Qi Liu, **Jieming Yin**, Wujie Wen, Chengmo Yang, Shi Sha. *NeuroPots: Realtime Proactive Defense against Bit-Flip Attacks in Neural Networks*. 32nd USENIX Security Symposium (**USENIX-Security**), Anaheim, CA, August 2023.
- C18. Ran Ran, Nuo Xu, Wei Wang, Quan Gang, **Jieming Yin**, Wujie Wen. *CryptoGCN: Fast and Scalable Homomorphically Encrypted Graph Convolutional Network Inference*. 36th Conference on Neural Information Processing Systems (**NeurIPS**), New Orleans, LA, November 2022.
- C17. Bingyao Li, **Jieming Yin**, Youtao Zhang, Xulong Tang. *Improving Address Translation in Multi-GPUs via Sharing and Spilling aware TLB Design*. 54th IEEE/ACM International Symposium on Microarchitecture (**MICRO**), Virtual Conference, October 2021.
- C16. Liqiang Lu, Naiqing Guan, Yuyue Wang, Liancheng Jia, Zizhang Luo, **Jieming Yin**, Jason Cong, Yun Liang. *TENET: A Framework for Modeling Tensor Dataflow Based on Relation-centric Notation*. 48th International Symposium on Computer Architecture (**ISCA**), Virtual Conference, June 2021.
- C15. Yuan Zhou, Hanyu Wang, **Jieming Yin**, Zhiru Zhang. *Distilling Arbitration Logic from Traces using Machine Learning: A Case Study on NoC*. 58th Annual Design Automation Conference (**DAC**), Virtual Conference, July 2021. (**Best Paper Nominee**)
- C14. Subhash Sethumurugan, **Jieming Yin**, John Sartori. *Designing a Cost-Effective Cache Replacement Policy using Machine Learning*. 27th IEEE International Symposium on High-Performance Computer Architecture (**HPCA**), Virtual Conference, February 2021.
- C13. **Jieming Yin**, Antonia Zhai. *In-Network Memory Access Ordering for Heterogeneous Multicore Systems*. 14th IEEE/ACM International Symposium on Networks-on-Chip (**NOCS**), Virtual Conference, September 2020. (**Best Paper Award**)
- C12. Srikant Bharadwaj, **Jieming Yin**, Bradford M. Beckmann, Tushar Krishna. *Kite: A Family of Heterogeneous Interposer Topologies Enabled via Accurate Interconnect Modeling*. 57th Annual Design Automation Conference (**DAC**), Virtual Conference, July 2020.
- C11. **Jieming Yin**, Subhash Sethumurugan, Yasuko Eckert, Alan Smith, Chintan Patel, Eric Morton, Mark Oskin, Natalie Enright Jerger, Gabriel H. Loh. *Experiences with ML-Driven Design: A NoC Case Study*. 26th IEEE International Symposium on High-Performance Computer Architecture (**HPCA**), San Diego, CA, February 2020.
- C10. Shuai Che, **Jieming Yin**. *Northup: Divide-and-Conquer Programming in Systems with Heterogeneous Memories and Processors*. 33rd IEEE International Parallel & Distributed Processing Symposium (**IPDPS**), Rio de Janeiro, Brazil, May 2019.
- C9. **Jieming Yin**, Zhifeng Lin, Onur Kayiran, Matthew Poremba, Muhammad Shoaib Bin Altaf, Natalie Enright Jerger, Gabriel H. Loh. *Modular Routing Design for Chiplet-based Systems*. 45th International Symposium on Computer Architecture (**ISCA**), Los Angeles, CA, June 2018. (**Featured in IEEE Spectrum**)
- C8. **Jieming Yin**, Yasuko Eckert, Shuai Che, Mark Oskin, Gabriel H. Loh. *Toward More Efficient NoC Arbitration: A Deep Reinforcement Learning Approach*. The 1st International Workshop on AI-assisted Design for Architecture (**AIDArc**), Los Angeles, CA, June 2018.

- C7. Anthony Gutierrez, Bradford Beckmann, Alexandru Dutu, Joseph Gross, John Kalamatianos, Onur Kayiran, Michael LeBeane, Matthew Poremba, Brandon Potter, Sooraj Puthoor, Mark Wyse, **Jieming Yin**, Akshay Jain, Tim Rogers, Xianwei Zhang, Matt Sinclair. *Lost in Abstraction: Pitfalls of Analyzing GPUs at the Intermediate Language Level*. 24th IEEE International Symposium on High-Performance Computer Architecture (**HPCA**), Vienna, Austria, February 2018.
- C6. Matthew Poremba, Itir Akgun, **Jieming Yin**, Onur Kayiran, Yuan Xie, Gabriel H. Loh. *There and Back Again: Optimizing the Interconnect in Networks of Memory Cubes*. 44th International Symposium on Computer Architecture (**ISCA**), Toronto, CA, June 2017.
- C5. **Jieming Yin**, Onur Kayiran, Matthew Poremba, Natalie Enright Jerger, Gabriel H. Loh. *Efficient Synthetic Traffic Models for Large, Complex SoCs*. 22nd International Symposium on High Performance Computer Architecture (**HPCA**), Barcelona, Spain, March 2016.
- C4. **Jieming Yin**, Pingqiang Zhou, Sachin S. Sapatnekar, Antonia Zhai. *Energy-Efficient Time-Division Multiplexed Hybrid-Switched NoC for Heterogeneous Multicore Systems*. 28th IEEE International Parallel & Distributed Processing Symposium (**IPDPS**), Phoenix, Arizona, USA, May 2014.
- C3. **Jieming Yin**, Pingqiang Zhou, Anup P. Holey, Sachin S. Sapatnekar, Antonia Zhai. *Energy Efficient Non-Minimal Path On-chip Interconnection Network for Heterogeneous Multicore Systems*. International Symposium on Low Power Electronics and Design (**ISLPED**), Redondo Beach, USA, August 2012.
- C2. Pingqiang Zhou, **Jieming Yin**, Antonia Zhai, Sachin S. Sapatnekar. *NoC Frequency Scaling with Flexible-Pipeline Routers*. International Symposium on Low Power Electronics and Design (**ISLPED**), Fukuoka, Japan, August 2011.
- C1. Bing Yang, Zhigang Mao, **Jieming Yin**, Xiao Chen. *A Point to Point Inter-cluster Communication Network in Clustered Superscalar Processor*. International Conference on Solid-State and Integrated-Circuit Technology (**ICSICT**), Beijing, China, October 2008.

### Peer-reviewed Journal Publications

- J2. Chixiao Chen, **Jieming Yin**, Yarui Peng, Maurizio Palesi, Wenxu Cao, Letian Huang, Amit Kumar Singh, Haocong Zhi, Xiaohang Wang. *Design Challenges of Intra- and Inter-Chiplet Interconnection*. **IEEE Design & Test**, October 2022.
- J1. Xiangwei Cai, **Jieming Yin**, Pingqiang Zhou. *An orchestrated NoC prioritization mechanism for heterogeneous CPU-GPU systems*. **Integration**, Volume 65, March 2019.

### Patents and Patent Applications

- P12. US Patent 11,150,899. Tony Gutierrez, Sergey Blagodurov, Scott Moe, Xianwei Zhang, **Jieming Yin**, Matt Sinclair. *Selecting a precision level for executing a workload in an electronic device*. Granted Oct. 19, 2021.
- P11. US Patent 10,938,709. Mohamed Ibrahim, Onur Kayiran, Yasuko Eckert, **Jieming Yin**. *Mechanism for Dynamic Latency-Bandwidth Trade-off for Efficient Broadcasts/Multicasts*. Granted Mar. 2, 2021.
- P10. US Patent 10,719,441. **Jieming Yin**, Yasuko Eckert, Matthew Poremba, Steven Raasch, Doug Hunt. *Using Predictions of Outcomes of Cache Memory Access Requests for Con-*

- trolling Whether A Request Generator Sends Memory Access Requests To A Memory In Parallel With Cache Memory Access Requests.* Granted Jul. 21, 2020.
- P9. US Patent 10,389,251. Wei Huang, Yasuko Eckert, Xudong An, Muhammad Shoaib Bin Altaf, **Jieming Yin**. *Setting operating points for circuits in an integrated circuit chip.* Granted Aug. 20, 2019.
- P8. US Patent 10,097,091. Wei Huang, Yasuko Eckert, Xudong An, Muhammad Shoaib Bin Altaf, **Jieming Yin**. *Setting operating points for circuits in an integrated circuit chip.* Granted Oct. 9, 2018.
- P7. US Patent 10,042,774. Shuai Che, **Jieming Yin**. *Method and apparatus for masking and transmitting data.* Granted Aug. 7, 2018.
- P6. US Patent App 16/794,124. Onur Kayiran, **Jieming Yin**, Yasuko Eckert. *Look-ahead teleportation for reliable computation in multi-SIMD quantum processor.* Filed Feb. 18, 2020
- P5. US Patent App 16/716,194. **Jieming Yin**, Subhash Sethumurugan, Yasuko Eckert. *Cache management based on access type priority.* Filed Dec. 16, 2019
- P4. US Patent App 16/716,165. **Jieming Yin**, Subhash Sethumurugan, Yasuko Eckert. *Cache line re-reference interval prediction using physical page address.* Filed Dec. 16, 2019
- P3. US Patent App 16/600,897. **Jieming Yin**, Subhash Sethumurugan, Yasuko Eckert. *Cache replacement based on reuse distance.* Filed Oct. 14, 2019
- P2. US Patent App 16/176,903. Shuai Che, **Jieming Yin**. *Architecture for deep Q-learning.* Filed Oct. 31, 2018.
- P1. US Patent App 15/922,875. Shuai Che, **Jieming Yin**. *Reconfigurable prediction engine for general processor counting.* Filed Mar. 15, 2018.

## AWARDS AND HONORS

- Jiangsu Distinguished Professor, 2022
- Best Paper Nominee, 58th Annual Design Automation Conference (DAC), 2021
- Best Paper Award, 14th IEEE/ACM International Symposium on Networks-on-Chip (NOCS), 2020

## SCHOLARLY PRESENTATIONS

- (Invited talk) *In-Package Network Design: An Architecture's Perspective.* International Symposium on Networks-on-Chip (NOCS), Shanghai, China, Oct. 2022.
- (Invited talk) *Architecture Design Automation using Machine Learning.* International Workshop on AI-assisted Design for Architecture (AIDArc), Jun. 2021.
- (Conference talk) *In-Network Memory Access Ordering for Heterogeneous Multicore Systems.* International Symposium on Networks-on-Chip (NOCS), Virtual Conference, Sep. 2020.
- (Invited talk) *In-Package Interconnection Networks in the Era of Exascale and Beyond.* Seminar talk at College of William and Mary, Williamsburg, VA, Mar. 2020.
- (Invited talk) *In-Package Interconnection Networks in the Era of Exascale and Beyond.* Seminar talk at Illinois Institute of Technology, Chicago, IL, Jan. 2020.
- (Invited talk) *In-Package Interconnection Networks in the Era of Exascale and Beyond.* Seminar talk at Lehigh University, Bethlehem, PA, Jan. 2020.

- (Invited talk) *In-Package Interconnection Networks in the Era of Exascale and Beyond*. Seminar talk at Virginia Tech, Blacksburg, VA, Jan. 2020.
- (Conference talk) *Experiences with ML-Driven Design: A NoC Case Study*. International Symposium on High-Performance Computer Architecture (HPCA), San Diego, CA, Feb. 2020.
- (Invited talk) *Exploiting Machine Learning Insights for NoC Design*. Presented to the Department of Energy (DOE), Bellevue, WA, Apr. 2019.
- (Invited talk) *Better NoCs through Machine Learning*. Presented to the Department of Energy (DOE), Austin, TX, Sep. 2018.
- (Conference talk) *Modular Routing Design for Chiplet-based Systems*. International Symposium on Computer Architecture (ISCA), Los Angeles, CA, Jun. 2018.
- (Conference talk) *Toward More Efficient NoC Arbitration: A Deep Reinforcement Learning Approach*. International Workshop on AI-assisted Design for Architecture (AIDArc), Los Angeles, CA, Jun. 2018.
- (Invited talk) *Designing Energy-Efficient NoCs for Heterogeneous Multicore Systems*. Invited talk at Nvidia, Santa Clara, CA, Feb. 2015.
- (Conference talk) *Energy-Efficient Time-Division Multiplexed Hybrid-Switched NoC for Heterogeneous Multicore Systems*. 28th IEEE International Parallel & Distributed Processing Symposium (IPDPS), Phoenix, AZ, May. 2014.
- (Conference talk) *Energy Efficient Non-Minimal Path On-chip Interconnection Network for Heterogeneous Multicore Systems*. International Symposium on Low Power Electronics and Design (ISLPED), Redondo Beach, CA, Jul. 2012.
- (Conference talk) *NoC Frequency Scaling with Flexible-Pipeline Routers*. International Symposium on Low Power Electronics and Design (ISLPED), Fukuoka, Japan, Aug. 2011.

## TEACHING AND RESEARCH ADVISING Courses Taught

### TEACHING AND RESEARCH ADVISING

- **Operating Systems (Undergraduate-level)**  
Spring 2023, Nanjing University of Posts and Telecommunications
- **Parallel Computer Architecture (Graduate-level)**  
Spring 2022, Lehigh University
- **Advanced Computer Architecture (Graduate-level)**  
Fall 2021, Lehigh University
- **Computer Architecture (Undergraduate-level)**  
Spring 2021, Lehigh University
- **Interconnection Networks for Many-core Architectures**  
Fall 2020, Lehigh University

## Research Advising

### Current Students

- Hao Wu, Master student, Nanjing University of Posts and Telecommunications, 2022-present.
- Linhua Tao, Master student, Nanjing University of Posts and Telecommunications, 2022-present.

- Pengyang Li, Master student, Nanjing University of Posts and Telecommunications, 2022-present.
- Bingkun Zha, Master student, Nanjing University of Posts and Telecommunications, 2022-present.
- Zirui Miao, Undergraduate student, Nanjing University of Posts and Telecommunications, 2022-present.

#### **Former Students/Mentees**

- Qiurun Hu, Master student, NJUPT, 2022-2023.
- Jieke Sun, Master student, NJUPT, 2022-2023.
- Ruoyu Wang, PhD student, Lehigh University, 2020-2022.
- Berry Pan Situ, Undergraduate student, Lehigh University, 2021-2022.
- Subhash Sethumurugan, PhD student, University of Minnesota, Twin Cities, 2018-2021.  
*Project: Exploiting Machine Learning Insights for Cache Replacement Policy*
- Zhifeng Lin, Master student, University of Southern California, 2016-2017.  
*Project: Exploring QoS in Interposer-based Systems*

## **SERVICE**

### **Conference Organizing Committee**

- Session Chair, IEEE International Conference on Parallel and Distributed Systems (ICPADS), 2022.
- Publicity Chair, IEEE/ACM International Symposium on Networks-on-Chip (NOCS), 2021, 2022.
- Student Travel Awards Chair, IEEE/ACM International Symposium on Computer Architecture (ISCA), 2022.
- Session Chair, IEEE International Conference on Application-specific Systems (ASAP), Architectures and Processors, 2019.
- Finance Chair, IEEE International Conference on Application-specific Systems (ASAP), Architectures and Processors, 2019.
- Session Chair, IEEE International Symposium on Workload Characterization (IISWC), 2017.
- Submissions Chair, IEEE International Symposium on Workload Characterization (IISWC), 2017.

### **Conference Technical Program Committee**

- International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2023, 2024.
- (External Review Committee) IEEE/ACM International Symposium on Computer Architecture (ISCA), 2023.
- (External Review Committee) International Symposium on High-Performance Computer Architecture (HPCA), 2023.
- Track Co-chair, IEEE International Conference on Parallel and Distributed Systems (ICPADS), 2022.

- Track Co-chair, IEEE/ACM Design Automation Conference (DAC), 2022.
- (External Review Committee) IEEE/ACM International Symposium on Computer Architecture (ISCA), 2022.
- (External Review Committee) IEEE International Symposium for Circuits and Systems (ISCAS), 2022.
- IEEE International Conference on Application-specific Systems, Architectures and Processors (ASAP), 2019, 2020, 2022.
- Workshop on General Purpose Processing Using GPU (GPGPU), 2020, 2022.
- International Conference on Parallel Architectures and Compilation Techniques (PACT) ACM Student Research Competition (SRC), 2021.
- ACM International Conference on Supercomputing (ICS), 2021.
- Design Automation Conference (DAC), 2019-2021.
- IEEE/ACM International Symposium on Networks-on-Chip (NOCS), 2019, 2020, 2021.
- (External Review Committee) International Conference on Parallel Architectures and Compilation Techniques (PACT), 2020.
- IEEE International Symposium on Workload Characterization (IISWC), 2017.
- IEEE International Conference on High Performance Computing, Data, and Analytics (HiPC), 2016.

### **Editorship**

- Guest Editor, Journal of Signal Processing Systems special issue on Application-specific Systems, Architectures and Processors, 2020.

### **Journal Reviewer**

- ACM Transactions on Architecture and Code Optimization (TACO)
- IEEE Transactions on Computers (TC)
- IEEE Transactions on Computers Special Issue on Communications for Many-Core Processors and Accelerators
- IEEE Transactions on Parallel and Distributed Systems (TPDS)
- IEEE Transactions on Circuits and Systems (TCAS)
- IEEE Computer Architecture Letters (CAL)
- IEEE Embedded Systems Letters (ESL)
- IEEE Transactions on Very Large Scale Integration Systems (TVLSI)
- Journal of Systems Architecture (JAS)
- EURASIP Journal on Embedded Systems