

# Jieming Yin

## Curriculum Vitae

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### EDUCATION

- 2009 - 2015 **University of Minnesota, Twin Cities.**  
Ph.D. in Computer Science  
Dissertation: *Time-Division-Multiplexing Based Hybrid-Switched NoC for Heterogeneous Multi-core Systems*  
Committee: Antonia Zhai, Sachin S. Sapatnekar, Pen-Chung Yew, Anand Tripathi
- 2004 - 2008 **Harbin Institute of Technology, China.**  
B.Eng. in Electrical Engineering  
Thesis: *Point-to-point Scalar Operand Networks for Clustered Superscalar Processor*

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### EMPLOYMENT

- 12/2016 - Present **AMD Research**, Bellevue, WA.  
Member of Technical Staff Design Engineer
- 03/2015 - 11/2016 **AMD Research**, Bellevue, WA.  
Postdoc Researcher
- 05/2013 - 08/2013 **Qualcomm Inc.**, San Diego, CA.  
Summer Intern
- 09/2009 - 02/2015 **University of Minnesota, Twin Cities**, Minneapolis, MN.  
Research Assistant

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### PUBLICATIONS

- Conference Papers
- [1] 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.
  - [2] **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 by IEEE Spectrum**)
  - [3] 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.
  - [4] 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.

- [5] **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.
- [6] **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.
- [7] **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, Aug. 2012.
- [8] 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, Aug. 2011.
- Journal Article [9] Xiangwei Cai, **Jieming Yin**, Pingqiang Zhou. *An orchestrated NoC prioritization mechanism for heterogeneous CPU-GPU systems*. Integration, Volume 65, March 2019.
- Workshop Paper [10] **Jieming Yin**, Yasuko Eckert, Shuai Che, Mark Oskin, and Gabriel H. Loh. *Toward More Efficient NoC Arbitration: A Deep Reinforcement Learning Approach*. The 1st International Workshop on AI-assisted Design for Architecture, Los Angeles, CA, 2018.
- Technical Report [11] Pingqiang Zhou, **Jieming Yin**, Antonia Zhai, Sachin S. Sapatnekar. *NoC Design and Performance Optimization*. SRC TECHCON, 2011.
- US Patents [12] **US Patent 10042774**. Shuai Che, **Jieming Yin**. *Method and apparatus for masking and transmitting data*. Granted Aug 7, 2018.
- [13] **US Patent 10097091**. 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.
- [14] 170358-US-NP. Shuai Che, **Jieming Yin**. *Reconfigurable prediction engine for general processor counting*. Filed Mar 15, 2018.
- [15] 170377-US-NP. Tony Gutierrez, Sergey Blagodurov, Scott Moe, Xianwei Zhang, **Jieming Yin**, Matt Sinclair. *Selecting a precision level for executing a workload in an electronic device*. Filed Apr 9, 2018.
- [16] 180169-US-NP. Shuai Che, **Jieming Yin**. *Architecture for deep Q-learning*. Filed Oct 30, 2018.
- [17] 180283-US-NP. Mohamed Ibrahim, Onur Kayiran, Yasuko Eckert, **Jieming Yin**. *A Mechanism for Dynamic Latency-Bandwidth Trade-off for Efficient Broadcasts/Multicasts*. Filed Dec 12, 2018.
- [18] 180465-US-NP. Steven Raasch, Matthew Poremba, Yasuko Eckert, **Jieming Yin**. *Reducing the impact of Speculative DRAM Reads through the use of confidence prediction*. Filed Feb 1, 2019.
- [19] 190256-US-NP. **Jieming Yin**, Subhash Sethumurugan, Yasuko Eckert. *Cache management based on reuse distance*. Filed Oct 14, 2019.

## PRESENTATIONS

04/09/2019 “Exploiting Machine Learning Insights for NoC Design.” Presented to the Department of Energy (DOE), Bellevue, WA.

- 09/18/2018 "Better NoCs through Machine Learning." Presented to the Department of Energy (DOE), Austin, TX.
- 06/06/2018 "Modular Routing Design for Chiplet-based Systems." Presented at International Symposium on Computer Architecture (ISCA), Los Angeles, CA.
- 06/03/2018 "Toward More Efficient NoC Arbitration: A Deep Reinforcement Learning Approach." Presented at International Workshop on AI-assisted Design for Architecture (AIDArc), Los Angeles, CA.
- 02/12/2015 "Designing Energy-Efficient NoCs for Heterogeneous Multicore Systems." Invited talk. Presented at Nvidia, Santa Clara, CA.
- 05/20/2014 "Energy-Efficient Time-Division Multiplexed Hybrid-Switched NoC for Heterogeneous Multicore Systems." Presented at 28th IEEE International Parallel & Distributed Processing Symposium (IPDPS), Phoenix, AZ.
- 07/30/2012 "Energy Efficient Non-Minimal Path On-chip Interconnection Network for Heterogeneous Multicore Systems." Presented at International Symposium on Low Power Electronics and Design (ISLPED), Redondo Beach, CA.
- 08/03/2011 "NoC Frequency Scaling with Flexible-Pipeline Routers." Presented at International Symposium on Low Power Electronics and Design (ISLPED), Fukuoka, Japan.

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## PROFESSIONAL ACTIVITIES

- Committee
  - Technical Program Committee, Workshop on General Purpose Processing Using GPU (GPGPU), 2020
  - Technical Program Committee, Design Automation Conference (DAC), 2020
  - Technical Program Committee, Design Automation Conference (DAC), 2019
  - Technical Program Committee, IEEE/ACM International Symposium on Networks-on-Chip (NOCS), 2019
  - Finance Chair, IEEE International Conference on Application-specific Systems, Architectures and Processors (ASAP), 2019
  - Technical Program Committee, IEEE International Conference on Application-specific Systems, Architectures and Processors (ASAP), 2019
  - Submissions Chair, IEEE International Symposium on Workload Characterization (IISWC), 2017
  - Technical Program Committee, IEEE International Symposium on Workload Characterization (IISWC), 2017
  - Technical Program Committee, IEEE International Conference on High Performance Computing, Data, and Analytics (HiPC), 2016
- Journal Reviewer
  - ACM Transactions on Architecture and Code Optimization (TACO)
  - IEEE Transactions on Computers (TC)
  - IEEE Transactions on Parallel and Distributed Systems (TPDS)
  - IEEE Computer Architecture Letters (CAL)
  - Journal of Systems Architecture (JAS)
  - EURASIP Journal on Embedded Systems

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## ADVISING AND TEACHING EXPERIENCE

- Student Mentoring
  - Subhash Sethumurugan, PhD student, University of Minnesota, Twin Cities Project: Exploiting Machine Learning Insights for Cache Replacement Policy
  - Zhifeng Lin, PhD student, University of Southern California

Project: Exploring QoS in Interposer-based Systems

- Xiangwei Cai, Master student, ShanghaiTech University

Project: NoC Prioritization Mechanism for Heterogeneous CPU-GPU Systems

Teaching Assistant  
and Lecturer

- Lab Lecturer, Teaching Assistant, Introduction to Operating Systems, University of Minnesota, Twin Cities
- Lecturer, Teaching Assistant, Introduction to Compilers, University of Minnesota, Twin Cities
- Teaching Assistant, Operating Systems, University of Minnesota, Twin Cities
- Teaching Assistant, Advanced Computer Architecture, University of Minnesota, Twin Cities
- Guest Lecturer, Advanced Topics in Computer Architecture, University of Minnesota, Twin Cities

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## FUNDING

01/2017 - 12/2019

**Pathforward Program**, *Department of Energy (DOE)*.

Contributed to proposal and deliverable report writing. Working on Component and Memory Integration work package, one of the largest work packages in Pathforward.

01/2015 - 12/2016

**Fastforward 2 Program**, *Department of Energy (DOE)*, Total amount \$32,000,000.

Contributed to deliverable report writing. Worked on Component Integration project.

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## RESEARCH EXPERIENCE

12/2016 - Present

**AMD Research**, Member of Technical Staff Design Engineer.

- Work on PathForward program – Department of Energy’s Exascale Computing Project (ECP) for the development of the nation’s first exascale supercomputers.
- SoC performance modeling and evaluation for in-package communication networks and memory networks, propose new system topologies and routing algorithms.
- Utilize machine learning techniques to improve hardware design.

03/2015 - 11/2016

**AMD Research**, Postdoc Researcher.

- Work on FastForward 2 program—A jointly-funded collaboration between DOE Office of Science and the National Nuclear Security Administration (NNSA) focused on accelerating the research and development of critical technologies needed to enable exascale computing.
- Design novel communication architecture that guarantees quality-of-service.
- Optimize coherence protocols for exascale heterogeneous processors containing CPUs and GPUs.

05/2013 - 08/2013

**Qualcomm Inc.**, Summer Intern.

- Bring up a heterogeneous simulation platform containing CPU and GPU with shared memory space (SVM).
- Enable ARM and OpenCL support for running GPU applications on the simulation platform.
- Evaluate SVM efficiency and on-chip communication traffic caused by data transfer and coherence messages.

08/2009 - 02/2015

**University of Minnesota, Twin Cities**, Research Assistant.

- NoC-Enhanced Memory Consistency for Heterogeneous Multicore Systems.
- Co-design of Computation and Communication for High-throughput Data-parallel Accelerators.
- Energy Efficient Time-Division Multiplexed (TDM) Hybrid-Switched NoC.
- Integrated Layout and Architectural Design for Multicore Platforms.

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## PRESS COVERAGE

06/2018

AMD Tackles Coming “Chiplet” Revolution With New Chip Network Scheme, **IEEE Spectrum**

06/2018

AMD’s New Chipset Network to Artificially Continue Moore’s Law, **Engineering.com**