

Xiaoyang Lu

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EDUCATION

Illinois Institute of Technology

Chicago, IL

Ph.D. in Computer Science

Advisor: Professor Xian-He Sun

Aug 2017 – May 2024

Thesis: Utilizing Concurrent Data Accesses for Data-Driven and AI Applications

New York University

New York, NY

M.S. in Computer Engineering

Aug 2015 – May 2017

Zhejiang University

Hangzhou, China

B.E. in Electronic Science and Technology

Aug 2011 – July 2015

RESEARCH EXPERIENCE

Research Assistant Professor

June 2024 – Present

Illinois Institute of Technology

Chicago, IL

- Conduct comprehensive research in memory-centric computer architectures and scalable memory systems, focusing on optimizing high-performance computing systems.
- Explore and develop hardware/software co-designed accelerators for machine learning workloads, achieving significant improvements in data access speeds and computational efficiency.
- Investigate and implement processing-in-memory (PIM) architectures to minimize data movement and maximize computational speed, enhancing system performance.
- Direct and supervise PhD research, mentoring students in advancing the field of computer architecture and high-performance computing.

Research Assistant

Jan 2020 – May 2024

Illinois Institute of Technology

Chicago, IL

- Focused on memory performance optimizations, developing sophisticated models and pioneering machine learning-assisted architectural innovations.
- Designed and implemented intelligent frameworks aimed at enhancing cache performance, focusing on efficiency and innovative design principles.
- Mentored multiple graduate students, guiding their research projects and fostering both their academic development and practical engineering skills.

Research Aide

May 2020 – Aug 2020

Argonne National Laboratory

Lemont, IL

- Conducted comprehensive performance testing on disaggregated memory systems, identifying key areas for improvement.
- Developed and refined performance models for disaggregated memory systems, enhancing predictive accuracy and system efficiency.
- Quantified and mitigated interference in disaggregated memory systems, ensuring optimal operation and reliability.

CONFERENCE PUBLICATIONS

- **[PACT 2026]** Improving Data Reuse across Blocks for Efficient Block-Sparse Transformers on GPUs
Lihan Hu, **Xiaoyang Lu**, Xian-He Sun, Peng Jiang
To appear in the Proceedings of the 35th International Conference on Parallel Architectures and Compilation Techniques (PACT), 2026
- **[CCMCC 2026]** HyPIM: Accelerating Hyperbolic Machine Learning via Processing-In-Memory
Jinlin Wu, Ferit Ozdaban, Selvanathan Sadhasivam, **Xiaoyang Lu**, Yunhui Guo, Minxuan Zhou
To appear in the Proceedings of the 2nd IEEE Cross-Disciplinary Conference on Memory-Centric Computing (CCMCC), 2026

- **[IPDPS 2026]** I/O-Aware PIM Acceleration for Long-Sequence LLM Inference with Hybrid Sparse Attention
Xiaoyang Lu, Lihan Hu, Hongrui Huang, Peng Jiang, Xian-He Sun
In the Proceedings of the 40th IEEE International Parallel & Distributed Processing Symposium (IPDPS), 2026
- **[ASPLOS 2026]** I/O Analysis is All You Need: An I/O Analysis for Long-Sequence Attention
Xiaoyang Lu, Boyu Long, Xiaoming Chen, Yinhe Han, Xian-He Sun
In the Proceedings of the 31st International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2026
- **[DATE 2026]** Zion: A Comprehensive, Adaptive, and Lightweight Hardware Prefetcher
Vadim Biryukov, **Xiaoyang Lu**, Zirui Liu, Kaixiong Zhou, Xian-He Sun
In the Proceedings of the Design, Automation, and Test in Europe (DATE), 2026
- **[MICRO 2025]** COSMOS: RL-Enhanced Locality-Aware Counter Cache Optimization for Secure Memory
Haoran Geng, **Xiaoyang Lu**, Yuezhi Che, Ziang Tian, Dazhao Cheng, Xian-He Sun, Michael Niemier, X. Sharon Hu
In the Proceedings of the 58th International Symposium on Microarchitecture (MICRO), 2025
- **[GLSVLSI 2025]** Concurrency-Aware Cache Miss Cost Prediction with Perceptron Learning
Yuping Wu, **Xiaoyang Lu**, Xiaoming Chen, Yinhe Han, Xian-He Sun
In the Proceedings of the 35th Great Lakes Symposium on VLSI (GLSVLSI), 2025
- **[ICCD 2024]** AceMiner: Accelerating Graph Pattern Matching using PIM with Optimized Cache System
Liang Yan, **Xiaoyang Lu**, Xiaoming Chen, Sheng Xu, Xingqi Zou, Yinhe Han, Xian-He Sun
In the Proceedings of the 42nd International Conference on Computer Design (ICCD), 2024
- **[ASPLOS 2024]** ACES: Accelerating Sparse Matrix Multiplication with Adaptive Execution Flow and Concurrency-Aware Cache Optimizations
Xiaoyang Lu, Boyu Long, Xiaoming Chen, Yinhe Han, Xian-He Sun
In the Proceedings of the 29th International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2024
- **[HPCA 2024]** CHROME: Concurrency-Aware Holistic Cache Management Framework with Online Reinforcement Learning
Xiaoyang Lu, Hamed Najafi, Jason Liu, Xian-He Sun
In the Proceedings of the 30th International Symposium on High-Performance Computer Architecture (HPCA), 2024
- **[HPCA 2023]** CARE: A Concurrency-Aware Enhanced Lightweight Cache Management Framework
Xiaoyang Lu, Rujia Wang, Xian-He Sun
In the Proceedings of the 29th International Symposium on High-Performance Computer Architecture (HPCA), 2023
- **[WSC 2022]** A Generalized Model For Modern Hierarchical Memory System
Hamed Najafi, **Xiaoyang Lu**, Jason Liu, Xian-He Sun
In the Proceedings of the Winter Simulation Conference (WSC), 2022
- **[ICCD 2021]** Premier: A Concurrency-Aware Pseudo-Partitioning Framework for Shared Last-Level Cache
Xiaoyang Lu, Rujia Wang, Xian-He Sun
In the Proceedings of the 39th International Conference on Computer Design (ICCD), 2021
- **[ISLPED 2021]** CoPIM: A Concurrency-Aware PIM Workload Offloading Architecture for Graph Applications
Liang Yan, Mingzhe Zhang, Rujia Wang, Xiaoming Chen, Xingqi Zou, **Xiaoyang Lu**, Yinhe Han, Xian-He Sun
In the Proceedings of the International Symposium on Low Power Electronics and Design (ISLPED), 2021
- **[ICCD 2020]** APAC: An Accurate and Adaptive Prefetch Framework with Concurrent Memory Access Analysis
Xiaoyang Lu, Rujia Wang, Xian-He Sun

JOURNAL PUBLICATIONS

- **[TCAD 2025]** ProMiner: Enhancing Locality, Parallelism, and Offloading for Graph Mining on Processing-in-Memory Systems
Liang Yan, **Xiaoyang Lu**, Sheng Xu, Xiaoming Chen, Xingqi Zou, Yinhe Han, Xian-He Sun
IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), 2025
- **[CAL 2025]** Pyramid: Accelerating LLM Inference with Cross-Level Processing-in-Memory
Liang Yan, **Xiaoyang Lu**, Xiaoming Chen, Yinhe Han, Xian-He Sun
IEEE Computer Architecture Letters (CAL), 2025, 24(1): 121-124
- **[JCST 2023]** The Memory-Bounded Speedup Model and its Impacts in Computing
Xian-He Sun, **Xiaoyang Lu**
Journal of Computer Science and Technology (JCST), 2023, 38(1): 64-79

TEACHING EXPERIENCE

Guest Lecture

Jan 2022 – Present

Illinois Institute of Technology

Chicago, IL

- Spring 2025 CS 550 Advanced Operating Systems, “Data-Centric Optimizations for LLM”.
- Fall 2024 CS 546 Parallel and Distributed Processing, “Introduction of Parallel Processing”.
- Spring 2022 CS 570 Advanced Computer Architecture, “GPU Architectures”.

Teaching Assistant

Aug 2017 – May 2022

Illinois Institute of Technology

Chicago, IL

- Assisted in teaching five graduate courses at Illinois Institute of Technology, each with 9-60 students, covering topics such as Java Programming (CS 401), Software Engineering (CS 487), Advanced Operating Systems (CS 550), Parallel and Distributed Processing (CS 546), and Advanced Computer Architecture (CS 570).
- Developed and prepared comprehensive course materials, including laboratory experiments, lectures, exams, homework, and practice problems.
- Led weekly lab sessions and problem-solving discussions for groups of up to 30 students, enhancing their understanding and application of course materials.
- Supervised and guided students in final projects, provided detailed feedback, and graded exams and weekly homework assignments.

INVITED TALKS

- Toward Data-Centric Computing: Data-Movement Analysis, Concurrency-Aware Optimization, and Memory-Centric Architecture, Workshop on Extreme-Scale Storage and Analysis (ESSA), 2026.

MENTORING EXPERIENCE

- 2026–Present, Xulu Chu, Ph.D. student at Oregon State University; co-advised with Prof. Wenqian Dong.
- 2026–Present, Jie Ye, Ph.D. candidate at Illinois Institute of Technology; co-advised with Prof. Xian-He Sun.
- 2023–Present, Vadim Biryukov, Ph.D. candidate at Illinois Institute of Technology; co-advised with Prof. Xian-He Sun.
- 2025–2026, Hongrui Huang, M.S. student at Columbia University.
- 2025–2026, Belthangady Akash Vi Narayana Pai, M.S. student at Illinois Institute of Technology.
- 2025–2026, Max Han, undergraduate student at the University of Illinois Urbana-Champaign.
- 2024–2026, Lihan Hu, Ph.D. candidate at the University of Iowa; mentored in collaboration with Prof. Peng Jiang.
- 2023–2026, Haoran Geng, Ph.D. candidate at the University of Notre Dame; mentored in collaboration with Prof. X. Sharon Hu.

ACADEMIC HONORS AND AWARDS

- 2024 DAC PhD Forum Travel Award
- 2024 Illinois Institute of Technology Computer Science Department Best Student Paper Award (2023-2024)
- 2024 Illinois Institute of Technology College of Computing Best Poster Award
- 2024 ASPLOS Student Travel Award
- 2023 Top 100 Chips Achievements (2022-2023)
- 2023 HPCA Student Travel Award
- 2015 New York University Scholarship
- 2015 Zhejiang University Excellent Bachelor Thesis Award

PROFESSIONAL SERVICE

Editor

- Guest Editor, IEEE Internet of Things Journal, Special Issue on Integrated Sensing, Memory, Communication, and Computation for Large-Scale AI Based IoT Systems, 2026.

Conference Committee Service

- IEEE International Symposium on High Performance Computer Architecture (HPCA), Program Committee Member, 2027
- Chips To Systems Conference (DAC), Program Committee Member, 2026
- Conference on Machine Learning and Systems (MLSys), External Review Committee Member, 2026
- European Conference on Computer Systems (EuroSys), Shadow Program Committee Member, 2026
- IEEE Cloud Summit, Technical Program Committee Member, 2026
- IEEE International Conference on Computer Design (ICCD), Program Committee Member, 2025

Invited Reviewer for Journals & Transactions

- ACM Transactions on Architecture and Code Optimization (TACO)
- Device
- Expert Systems With Applications (ESWA)
- Future Generation Computer Systems (FGCS)
- IEEE Transactions on Computers (TC)
- IEEE Transactions on Consumer Electronics (TCE)
- IEEE Transactions on Industrial Informatics (TII)
- IEEE Transactions on Network Science and Engineering (TNSE)
- IEEE Transactions on Parallel and Distributed Systems (TPDS)
- Journal of Systems Architecture (JSA)
- Memories - Materials, Devices, Circuits and Systems (MEMORI)
- Microprocessors and Microsystems (MICPRO)
- Neurocomputing
- Simulation: Transactions of the Society for Modeling and Simulation International