Jing Liu

Senior Researcher
Systems Research Group
Microsoft Research Asia

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Research Interests

I am a computer systems researcher specializing in operating systems, storage systems, and distributed systems. My work builds an *instance-customizable operating system* – an OS that adapts at runtime to hardware, workloads, and failure context without breaking compatibility. I aim to advance the foundation for cloud- and AI-era systems, where each application-hardware instance can achieve instance-optimal performance and reliability, enabled by a fundamentally customizable OS.

Education

Department of Computer Sciences, University of Wisconsin – Madison
Ph.D. in Computer Sciences — Aug. 2024
M.S. in Computer Sciences — May 2022
Advisors: Prof. Andrea Arpaci-Dusseau & Prof. Remzi Arpaci-Dusseau
Thesis: *Scale, Performance, and Fault Tolerance in a Filesystem Semi-Microkernel*

Software Institute, Nanjing University
B.E. in Software Engineering Rank: 1/238 — May 2016
Thesis: *Depth-aware layered edge for elastic RGB-D object proposal*

Professional Experience

Microsoft Research Asia — Oct. 2024 – Present
Senior Researcher.

Google, Madison, WI — Summer 2019
Software Engineering Intern. Mentor: Dr. Marc De Kruijf

Microsoft Research, Redmond, WA — Summer 2018
Research Intern. Mentor: Dr. Irene Zhang

Honors and Awards

Erik Riedel Best Paper Award (FAST '25)	2025
Meta PhD Research Fellowship, Meta Inc.	2022 – 2024
Student Travel Grant (SOSP '17, OSDI '18, and OSDI '22)	2017, 2018, & 2022
CS Department Golden Brick Award, CS@UW-Madison	2022
CS Summer Research Award, UW-Madison	2017
Graduate Research Fellowship, UW-Madison	2016 – 2017
Departmental Best Undergraduate Thesis, University Highest Honor, Provincial Award	2016
Outstanding National Undergraduate Innovation Project (Role: Lead)	2016
National Encouraging Scholarship, Ministry of Education of China	2014, 2015
National Scholarship, Ministry of Education of China	2013

Refereed Conference Publications

† Student mentored by me.

[1] Zhongjie Chen†, Wentao Zhang, Yulong Tang†, Ran Shu, Fengyuan Ren, Tianyin Xu, and **Jing Liu**. *Principled Performance Tunability in Operating System Kernels*. (arXiv:2512.12530)

[2] Yaoqi Chen, Jinkai Zhang, Baotong Lu, Qianxi Zhang, Chengruidong Zhang, **Jing Liu**, Jingjia Luo, Di Liu, Huiqiang Jiang, Qi Chen, Bailu Ding, Xiao Yan, Jiawei Jiang, Chen Chen, Mingxing Zhang, Yuqing Yang, Fan Yang, and Mao Yang. *RetroInfer: A Vector-Storage Approach for Scalable Long-Context LLM Inference*. In Proceedings of the 52nd International Conference on Very Large Data Bases (VLDB '26)

[3] Chuandong Li, Ran Yi, Zonghao Zhang, **Jing Liu**, Changwoo Min, Jie Zhang, Yingwei Luo, Xiaolin Wang, Zhenlin Wang, Diyu Zhou. *Aeolia: A Fast and Secure Userspace Interrupt-Based Storage Stack*. In Proceedings of the 31st Symposium on Operating Systems Principles (SOSP '25), Seoul, South Korea, 2025.

[4] Shawn Zhong†, **Jing Liu**, Andrea Arpaci-Dusseau, and Remzi Arpaci-Dusseau. *Revealing the Unstable Foundations of eBPF-Based Kernel Extensions.* In Proceedings of the 20th European Conference on Computer Systems (EuroSys '25), Rotterdam, Netherlands, 2025

[5] **Jing Liu**, Yifan Dai, Andrea C. Arpaci-Dusseau, and Remzi H. Arpaci-Dusseau. *Fast, Transparent Filesystem Microkernel Recovery with Ananke.* In Proceedings of the 23rd USENIX Conference on File and Storage Technologies (FAST '25), Santa Clara, CA, 2025. (**Erik Riedel Best Paper Award**)

[6] Yifan Dai, **Jing Liu**, Andrea C. Arpaci-Dusseau, and Remzi H. Arpaci-Dusseau. *Symbiosis: The Art of Application and Kernel Cache Cooperation.* In Proceedings of the 22nd USENIX Conference on File and Storage Technologies (FAST '24), Santa Clara, 2024.

[7] **Jing Liu**, Anthony Rebello, Yifan Dai, Chenhao Ye, Sudarsun Kannan, Andrea C. Arpaci-Dusseau, and Remzi H. Arpaci-Dusseau. *Scale and Performance in a Filesystem Semi-Microkernel.* In Proceedings of the 28th ACM Symposium on Operating Systems Principles (SOSP '21), Virtual Event, Germany, 2021.

[8] Irene Zhang, Amanda Raybuck, Pratyush Patel, Kirk Olynyk, Jacob Nelson, Omar S. Navarro Leija, Ashlie Martinez, **Jing Liu**, Anna Kornfeld Simpson, Sujay Jayakar, Pedro Henrique Penna, Max Demoulin, Piali Choudhury, and Anirudh Badam. *The Demikernel Library OS Architecture for Microsecond, Kernel-Bypass Datacenter Systems.* In Proceedings of the 28th ACM Symposium on Operating Systems Principles (SOSP '21), Virtual Event, Germany, 2021.

[9] Suli Yang, **Jing Liu**, Andrea C. Arpaci-Dusseau, and Remzi H. Arpaci-Dusseau. *Principled Schedulability Analysis for Distributed Storage Systems using Thread Architecture Models.* In Proceedings of the 13th Symposium on Operating System and Design Implementation (OSDI '18), CA, USA, 2018.

[10] Ramnatthan Alagappan, Aishwarya Ganesan, **Jing Liu**, Andrea Arpaci-Dusseau, and Remzi Arpaci-Dusseau. *Fault-Tolerance, Fast and Slow: Exploiting Failure Asynchrony in Distributed Systems.* In Proceedings of the 13th Symposium on Operating System and Design Implementation (OSDI '18), CA, USA, 2018.

[11] **Jing Liu**, Tongwei Ren, Bingkun Bao and Jia Bei. *Depth-aware Layered Edge for Object Proposal.* In Proceedings of IEEE International Conference on Multimedia and Expo (ICME '16), Seattle, USA, 2016.

[12] **Jing Liu**, Tongwei Ren and Jia Bei. *Elastic Edge Boxes for Object Proposal on RGB-D images.* In Proceedings of International Conference on Multimedia Modeling (MMM '16), Miami, USA, 2016.

Journals and Workshops

[1] Inho Choi, Anand Bonde, **Jing Liu**, Joshua Fried, Irene Zhang, and Jialin Li. *ML-native Dataplane Operating Systems.* In ACM SIGOPS Asia-Pacific Workshop on Systems (APSys '25), South Korea, 2025.

[2] **Jing Liu**, Xiangpeng Hao, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau, and Tej Cheped. *Shadow Filesystems: Recovering from Filesystem Runtime Errors via Robust Alternative Execution* In Proceedings of the 16th ACM Workshop on Hot Topics in Storage and File Systems (HotStorage '24), Santa Clara, CA, 2024.

[3] Suli Yang, **Jing Liu**, Andrea C. Arpaci-Dusseau, and Remzi H. Arpaci-Dusseau. *Principled Schedulability Analysis for Distributed Storage Systems using Thread Architecture Models.* In ACM Transactions on Storage (TOS), March, 2023.

[4] **Jing Liu**, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau, and Sudarsun Kannan. *File Systems as Processes.* In 11th USENIX Workshop on Hot Topics in Storage and File Systems (HotStorage '19), Renton, WA, 2019.

[5] Irene Zhang, **Jing Liu**, Amanda Austin, Michael Lowell Roberts, and Anirudh Badam. *I'm Not Dead Yet! The Role of the Operating System in a Kernel-Bypass Era.* In Workshop on Hot Topics in Operating Systems (HotOS '19), Bertinoro, Italy, 2019.

[6] **Jing Liu**, Tongwei Ren, Yuantian Wang, Sheng-Hua Zhong, Jia Bei, and Shengchao Chen. *Object proposal on RGB-D images via elastic edge boxes.* In Neurocomputing (NEUCOM), 236:134-146, May, 2017.

Teaching Experience

Computer Sciences Department of UW–Madison, WI — Summer 2023
Instructor
Class: Introduction to Operating Systems.

Computer Sciences Department of UW–Madison, WI — Spring 2022, Spring 2023
Teaching Assistant
Class: Distributed Systems. Instructor: Prof. Andrea Arpaci-Dusseau

Computer Sciences Department of UW–Madison, WI — Spring 2018
Teaching Assistant
Class: Advanced Operating System. Instructor: Prof. Andrea Arpaci-Dusseau

Software Institute of Nanjing University, Nanjing, China — Spring 2015, Spring 2016
Teaching Assistant, and Head Teaching Assistant
Class: Computer Operating System. Instructors: Prof. Bin Luo & Prof. Jidong Ge

Service

Shadow PC Co-chair, EuroSys '26
Program Committee: SOSP '25, APSys '25, NSDI '26, OSDI '26, SOSP '26, FAST '27
External Review Committee: ATC '24
Artifact Evaluation Committee: ATC/OSDI '22
Topic (OS & Emerging Hardware) Moderator, SOSP '21 Diversity Workshop
President, W-ACM, UW Madison Chapter of ACM's Women in Computing — Aug. 2021 – Aug. 2022
External Reviewer: FAST '18

Mentoring

A General Inference Engine for Sparse Attention
Zihan Zhao, University of Virginia, Ph.D. student — May 2025 – Present
Shengjie Lin, Georgia Tech University, Master student — Aug. 2025 – Present

Efficiency of Agentic AI Systems
Yi Chen, University of Michigan, Ph.D. student — Jun. 2025 – Present
Kaiming Wang, Shanghai Jiao Tong University, Undergraduate — Oct. 2025 – Present

Principled Performance Tunability in Operating System Kernels
Zhongjie Chen, Tsinghua University, Ph.D. student — Apr. 2025 – Present
Yulong Tang, Renmin University of China, Master student — Sep. 2025 – Present

Smart Caching in Vector Storage Systems
Sukjoon Oh, KAIST, Ph.D. student — Oct. 2024 – Present

Unstable Foundations of eBPF Programs (EuroSys '25)

Shawn Zhong, UW–Madison, Ph.D. student — Jun. 2024 – May 2025

DiskANN Case Study for Application Reaction to Filesystem Failure

Luozhong Zhou, UW–Madison, Undergraduate — May 2023 – Nov. 2023

Presentations and Invited Talks

Systems Research: What We Build, Why We Build, and How We Do It?
Invited talk at MSRA Interns Event, Beijing, China. — Aug. 2025
Invited talk at MSRA – PKU Open Day, Beijing, China. — Jul. 2025
Invited talk at MSRA Open Day to Students, Beijing, China. — Jun. 2025

Fast, Transparent Filesystem Microkernel Recovery with Ananke
Talk at FAST '25, Santa Clara, CA. — Feb. 2025

Scale and Performance in a Filesystem Semi-Microkernel.
Invited talk at UIUC, Champaign, IL. — Oct. 2022
Invited talk at ENS de Lyon – France, virtual. — Mar. 2022
Invited talk at Samsung MSL Tech Talk, virtual. — Jun. 2021
Talk at SOSP '21, virtual. — Oct. 2021

File Systems as Processes.
Talk at HotStorage '19, Renton, WA. — Jul. 2019

Elastic Edge Boxes for Object Proposal on RGB-D Images.
Talk at MMM '16, Miami, MI. — Jan. 2016