

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 Preprint, Submitted)
- [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*. (Under One-shot Revision for VLDB)
- [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] Ramnathan 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 Chaped. *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 <i>Instructor</i> Class: Introduction to Operating Systems.	Summer 2023
Computer Sciences Department of UW–Madison, WI <i>Teaching Assistant</i> Class: Distributed Systems. Instructor: Prof. Andrea Arpaci-Dusseau	Spring 2022, Spring 2023
Computer Sciences Department of UW–Madison, WI <i>Teaching Assistant</i> Class: Advanced Operating System. Instructor: Prof. Andrea Arpaci-Dusseau	Spring 2018
Software Institute of Nanjing University, Nanjing, China <i>Teaching Assistant, and Head Teaching Assistant</i> Class: Computer Operating System. Instructors: Prof. Bin Luo & Prof. Jidong Ge	Spring 2015, Spring 2016

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

<i>A General Inference Engine for Sparse Attention</i>	
Zihan Zhao , University of Virginia, Ph.D. student	May 2025 – Present
Shengjie Lin , Georgia Tech University, Master student	Aug. 2025 – Present
<i>Efficiency of Agentic AI Systems</i>	
Yi Chen , University of Michigan, Ph.D. student	Jun. 2025 – Present
Kaiming Wang , Shanghai Jiao Tong University, Undergraduate	Oct. 2025 – Present
<i>Safe, Fast, and In-Situ Tuning of Performance-Critical Constants in OS Kernels</i>	
Zhongjie Chen , Tsinghua University, Ph.D. student	Apr. 2025 – Present
Yulong Tang , Renmin University of China, Master student	Sep. 2025 – Present
<i>Smart Caching in Vector Storage Systems</i>	
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

0.5emTalk 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