Li (Lilly) Wu

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140 Governors Dr, Amherst, MA 01003

Research Interests

Distributed Systems, Edge and Cloud Computing, Sustainable Computing, Resilient AI and Microservices Systems.

Academic Experience

- **University of Massachusetts Amherst** — Since 06/2023
  Postdoctoral Associate, College of Information and Computer Sciences (CICS) — United States
  Advisor: Prashant Shenoy
  - Designing systems for failure-resilient model-serving in edge computing.
  - Developing resource management techniques for sustainable computing.

- **Technical University of Berlin** — 2018 – 2021
  Graduate Research Assistant, Faculty of Electrical Engineering and Computer Science (EECS) — Germany
  Advisor: Odej Kao **Co-Advisors:** Johan Tordsson, Erik Elmroth
  - Developed methods for automatic performance diagnosis and recovery in cloud microservices.

Education

- **Technical University of Berlin** — 2018 – 2021
  Ph.D. in Computer Science — Germany
- **Southeast University** — 2012 – 2015
  M.S. in Information and Communication Engineering — China
- **Hohai University** — 2008 – 2012
  B.S. in Telecommunication Engineering — China
  - Honors: *Top 1% of Class*, Best Thesis Award

Awards and Honors

- Interview on GREEN Internet for UN Climate Change Conference (COP29), One World Network — 2024
- **Marie Skodowska-Curie PhD Fellowship**, European Commission (Grant No. 765452) — 2018 – 2021
- ACSOS Travel Grant Recipient — 2021
- Best of IBMer: Best new SRE of Cloud Foundation Services, IBM — 2017
- SEU Alumnus Scholarship for Outstanding Students — 2014
- 3rd Prize, National Graduate Student Mathematical Contest in Modeling — 2013
- Best Bachelor Thesis Award (Top 1%) — 2012
- **National Scholarship (Top 0.2% nationwide)**, Chinese Ministry of Education — 2011
- 2nd Prize, Physical and Experimental Science Technology Innovation — 2011
- 1st Prize, TI Cup Electronic Design Competition — 2010
- 1st Prize, Physics Contest, HHU — 2010
- 1st Prize, Mathematics Contest, HHU — 2010
- Academic Excellence and Innovation Scholarships (4 years), HHU — 2008 – 2012

Publications

Selected Publications

[1] **Li Wu**, Walid A. Hanafy, Abel Souza, Khai Nguyen, Jan Harkes, David Irwin, Mahadev Satyanarayanan, and Prashant Shenoy. "CarbonEdge: Leveraging Mesoscale Spatial Carbon-Intensity Variations for Low Carbon Edge Computing." In Proceedings of the 34th ACM International Symposium on High-Performance Parallel and Distributed Computing (**HPDC 2025**), *To appear. Acceptance rate: 19%.*

[2] **Li Wu**, Walid A. Hanafy, Tarek Abdelzaher, David Irwin, Jesse Milzman, and Prashant Shenoy. "FailLite: Failure-Resilient Model Serving for Resource-Constrained Edge Environments." *arXiv:2504.15856*. 2025.

[3] **Li Wu**, Johan Tordsson, Erik Elmroth, and Odej Kao. "MicroRCA: Root cause localization of performance issues in microservices." The 32nd IEEE/IFIP Network Operations and Management Symposium (NOMS), pp. 1-9. 2020. **Impact: 260+ citations; led to invited talks and $600,000 industry funding.**

Full Publications List

[23] Hetvi Shastri, Walid A. Hanafy, **Li Wu**, David Irwin, Mani Srivastava, and Prashant Shenoy. "LLM-Driven Auto Configuration for Transient IoT Device Collaboration." arXiv:2507.03064 (2025).

[22] Walid A. Hanafy, **Li Wu**, David Irwin, and Prashant Shenoy. "CarbonFlex: Enabling Carbon-aware Provisioning and Scheduling for Cloud Clusters." arXiv:2505.18357 (2025).

[21] **Li Wu**, Walid A. Hanafy, Tarek Abdelzaher, David Irwin, Jesse Milzman, and Prashant Shenoy. "FailLite: Failure-Resilient Model Serving for Resource-Constrained Edge Environments." arXiv:2504.15856 (2025).

[20] Hetvi Shastri, Walid A. Hanafy, **Li Wu**, David Irwin, Mani Srivastava, and Prashant Shenoy. "Rethinking Collaboration Among Mobile Devices in IoT Environments." In Proceedings of the 23rd ACM Conference on Embedded Networked Sensor Systems (SenSys), pp. 676-677. 2025.

[19] **Li Wu**, Walid A. Hanafy, Abel Souza, Khai Nguyen, Jan Harkes, David Irwin, Mahadev Satyanarayanan, and Prashant Shenoy. "CarbonEdge: Leveraging Mesoscale Spatial Carbon-Intensity Variations for Low Carbon Edge Computing." In Proceedings of the 34th ACM International Symposium on High-Performance Parallel and Distributed Computing (HPDC), *To appear*. 2025.

[18] Maji, Diptyaroop, Walid A. Hanafy, **Li Wu**, David Irwin, Prashant Shenoy, and Ramesh K. Sitaraman. "Data Centers Carbon Emissions at Crossroads: An Empirical Study." ACM SIGENERGY Energy Informatics Review 5, no. 2 (2025): 48-55.

[17] **Li Wu**, Walid A. Hanafy, Abel Souza, Tarek Abdelzaher, Gunjan Verma, and Prashant Shenoy. "Enhancing Resilience in Distributed ML Inference Pipelines for Edge Computing." In IEEE Military Communications Conference (MILCOM), pp. 1-6. 2024.

[16] Jinyang Li, *et al.*, including **Li Wu**. "Acies-os: A content-centric platform for edge AI twinning and orchestration." In 33rd International Conference on Computer Communications and Networks (ICCCN), pp. 1-9. 2024. (Invited Paper)

[15] Mehmet Savasci, Abel Souza, **Li Wu**, David Irwin, Ahmed Ali-Eldin, and Prashant Shenoy. "SLO-Power: SLO and power-aware elastic scaling for web services." In IEEE 24th International Symposium on Cluster, Cloud and Internet Computing (CCGrid), pp. 136-147. 2024.

[14] Walid A. Hanafy, **Li Wu**, Tarek Abdelzaher, Suhas Diggavi, and Prashant Shenoy. "Failure-Resilient ML Inference at the Edge through Graceful Service Degradation." In IEEE Military Communications Conference (MILCOM), pp. 144-149. 2023.

[13] Jasmin Bogatinovski, Sasho Nedelkoski, **Li Wu**, Jorge Cardoso, and Odej Kao. "Failure identification from unstable log data using deep learning." In 22nd IEEE International Symposium on Cluster, Cloud and Internet Computing (CCGrid), pp. 346-355. 2022.

[12] **Li Wu**. "Automatic performance diagnosis and recovery in cloud microservices". Technical University of Berlin (Germany), 2022.

[11] Davaadorj Battulga, Mozhdeh Farhadi, Mulugeta Ayalew Tamiru, **Li Wu**, and Guillaume Pierre. "LivingFog: Leveraging fog computing and LoRaWAN technologies for smart marina management (experience paper)." In 25th Conference on Innovation in Clouds, Internet and Networks (ICIN), pp. 9-16. 2022. (Equal contribution)

[10] **Li Wu**, Johan Tordsson, Erik Elmroth, and Odej Kao. "Causal inference techniques for microservice performance diagnosis: Evaluation and guiding recommendations." In IEEE International Conference on Autonomic Computing and Self-Organizing Systems (ACSOS), pp. 21-30. 2021.

[9] **Li Wu**, Johan Tordsson, Jasmin Bogatinovski, Erik Elmroth, and Odej Kao. "MicroDiag: Fine-grained performance diagnosis for microservice systems." In IEEE/ACM International Workshop on Cloud Intelligence (AIOps at ICSE 2021), pp. 31-36. 2021.

[8] **Li Wu**, Jasmin Bogatinovski, Sasho Nedelkoski, Johan Tordsson, and Odej Kao. "Performance diagnosis in cloud microservices using deep learning." In International Conference on Service-Oriented Computing, pp. 85-96. 2020.

[7] **Li Wu**, Johan Tordsson, Alexander Acker, and Odej Kao. "MicroRAS: Automatic recovery in the absence of historical failure data for microservice systems." In IEEE/ACM 13th International Conference on Utility and Cloud Computing (UCC), pp. 227-236. 2020.

[6] **Li Wu**, Johan Tordsson, Erik Elmroth, and Odej Kao. "MicroRCA: Root cause localization of performance issues in microservices." The 32nd IEEE/IFIP Network Operations and Management Symposium (NOMS), pp. 1-9. 2020.

[5] Ahmed, Arif, HamidReza Arkian, *et al.*, including **Li Wu**. "Fog Computing Applications: Taxonomy and Requirements." arXiv:1907.11621 (2019). (Equal contribution)

[4] **Li Wu** and Lijun Chen. "Experimental Study on Time-of-Flight Measurement in Acoustic Pyrometry for Furnaces." Technical Acoustics 37, no. 3 (2018): 211-216.

[3] Chen Xu, **Li Wu**, and Lijun Chen. "Experimental Evaluation of Acoustic Waveguide Propagation Characteristics." Acoustics and Electronics Engineering (2015): 23-28.

[2] **Li Wu**. Research on Temperature Field Reconstruction in Furnaces Based on Acoustic Wave Theory. Southeast University, 2015.

[1] **Li Wu**, and Chenping Zhu. "Research on Matching Technology for Ultrasonic Fruit and Vegetable Cleaning Machines." Acoustics and Electronics Engineering (2013): 38-42.

Patents

G=Granted, P=Published

[G.1] Lin Cai, Yiming Yin, **Li Wu**, and Xuegang Ding. "Testing an Online System for Service-Oriented Architecture (SOA) Services." U.S. Patent 11,169,905, issued November 9, 2021.

[P.1] **Li Wu**, Yifan Du, Rui Zhang, and Xiangyu Wu. "System and Method for Offloading Autonomous Driving Tasks." US2025110788A1, also published as CN119729625A and DE102024208630A1. 2025

[P.2] **Li Wu**, Naresh Ganesh Nayak, Yifan Du, and Xiangyu Wu. "Method and Device for Scheduling Service in Edge Computing System." WO2025091368A1, 2025.

[P.3] Yifan Du and **Li Wu**. "Method and Device for Model Aggregation in Federated Learning." US2025217719A1, also published as CN120218272A and DE102024212013A1. 2025.

[P.4] Yifan Du, **Li Wu**, and Jianwei Shi. "Method and Apparatus for Deployment of Applications on Edge Cluster." DE102024210068A1, also published as CN120066757A. 2025.

[P.5] **Li Wu**, Jia Hu, and MICHAEL P. Zapf. "Distributed System and Roadside System Comprising Same." CN118555294A, 2024.

Industry Experience

- **Bosch Research Center** 2022 – 2023
  Senior Research Scientist, Reliable Distributed Systems (RDS) China
  ◦ Led R&D on reliable distributed systems for infrastructure-assisted autonomous driving.
  ◦ Designed and *deployed* fault-tolerant computing solutions at 11 smart intersections.
  ◦ Inventor on 5 patents related to reliable distributed systems in autonomous driving.

- **Elastisys (Spin-off from Umeå University)** 2018 – 2021
  System Scientist **Mentors**: Johan Tordson, Erik Elmroth Sweden
  ◦ Developed the Micro-X family of tools (e.g., MicroRCA and MicroDiag) for reliable cloud microservices.
  ◦ Contributed to open-source root cause localization solutions.

- **Las Naves – Centre for Social & Urban Innovation** 2020 – 2021
  Researcher **Mentors**: Guillaume Pierre Spain
  ◦ Designed, implemented, and *deployed* the LivingFog platform for smart marina management.
  ◦ Organized and presented at a hackathon centered around the LivingFog platform.

- **IBM Cloud (Bluemix)** 2015 – 2018
  Software Developer and Site Reliability Engineer (SRE) China
  ◦ Developed and *operated* the large-scale PaaS (Kubernetes) and IaaS (SoftLayer) services for IBM Cloud.
  ◦ Inventor on 1 patent related to cloud service reliability improvements.

Teaching Experience

- **Guest Lecturer** Fall 2025
  UMass Amherst, COMPSCI 230 Computer Systems Principles
  ◦ Expected to lecture on Cache Management.

- **Program Co-Director and Lecturer** 2024, 2025
  UMass Amherst, UMass Turing Summer Program
  ◦ Delivered lectures on Introduction to Python Programming and Cloud Computing.

- **Teaching Assistant** 2020 – 2021
  Technical University of Berlin, Operating Complex IT-Systems
  ◦ Assisted in delivering and evaluating the Distributed and Operating System Seminar.

- **Guest Lecturer** 03/2021
  Las Naves, Hack the Fog Hackathon (FogGuru LivingLab)

Mentoring Experience

- Hetvi Shastri (Ph.D., UMass Amherst) 07/2023 – Present
- Mehmet Savasci (Ph.D., UMass Amherst) 07/2023 – 05/2024
- Khai Nguyen (M.S., UMass Amherst) **Employer: Microsoft** 09/2023 – 07/2025
- Riley Kim Connell (B.S., REU, UMass Amherst) **Employer: Dell** 06/2024 – 06/2025
- Xiangyu Wu (M.S., Bosch Research) **Employer: Initial: Tencent** 08/2022 – 06/2023
- Rui Zhang (B.S., Bosch Research) **Ph.D. program at UC Santa Cruz (UCSC)** 07/2022 – 12/2022
- 4 B.S./M.S. students in research seminar, Technical University of Berlin 09/2020 – 11/2021
- 6 M.S. students in *Independent studies*, UMass Amherst 09/2023 – Present

Invited Talks and Panels

- **Sustainable and Resilient Distributed Computing** 08/2025
  Inria, France
- **Reliable Large-Scale Computing** 11/2024
  KU Leuven, Belgium
- **Automatic Performance Diagnosis and Recovery in Cloud Microservices** 08/2024
  Zscaler, US
- **MicroRCA: Root Cause Localization of Performance Issues in Microservices** 08/2021
  Ericsson, Sweden
- **Panel Discussion: Anomaly Detection in Edge/Fog Computing** 06/2019
  The 15th cloud control workshop, Sweden

Professional Service

- Technical Program Committee, ACM/IFIP/USENIX International Middleware Conference (Middleware) 2026
- Technical Program Committee, The Tenth ACM/IEEE Symposium on Edge Computing (SEC) 2025
- Artifact Evaluation Committee, The 31st Symposium on Operating Systems Principles (SOSP) 2025
- Session Chair, HotCarbon Workshop on Sustainable Computer Systems (HotCarbon) 2025
- Program Co-Director, UMass Turing Summer Program 2024, 2025
- Reviewer, ICT Express 2025
- Reviewer, IEEE Internet Computing 2024, 2025
- Reviewer, IEEE Transactions on Network and Service Management 2024, 2025
- Reviewer, Journal of Parallel and Distributed Computing 2024, 2025
- Reviewer, Performance Evaluation 2024, 2025
- Reviewer, IEEE Transactions on Services Computing 2024
- Reviewer, Sustainable computing 2024
- Organizing Committee, Hackathon: Hack The Fog 2021
- Organizing Committee, AIOPS Workshop at ICSOC 2021
- External Reviewer, International World Wide Web Conference 2020
- Panel Chair, 15th Cloud Control Workshop 2019