University Academic Curriculum Vitae

Personal information

Name: Xiaozhou Li

Education since leaving school

- 2007, Bachelor's degree in software engineering (Northeastern University, China)
- 2013, Master's degree in software development (University of Tampere, Finland)
- 2017, Master's Degree in Internet and Game Studies (University of Tampere, Finland)
- 2022, Ph.D. in Computer Science (Tampere University, Finland)

Present appointment

- Title of appointment: Post Doctoral Researcher (corresponding to Research with a fix contract term – RTDa)
- start of appointment: 01/01/2023
- Level of appointment (in national / international context): Post Doctoral Researcher
- Employer: University of Oulu, Oulu, Finland
- Responsibility:
    - Research on microservice architecture degradation, software project organizational structure, developer profile and personality, computational game study.
    - Work-package leader for the project 6GSoft on software architectures for extremely distributed edge-to-cloud systems.
    - Teaching both master and bachelor level courses.

Professional experience

From / to	Job title	Name of academic Institution	Academic level	responsibilities
01/05/2022 – 30/06/2023	Post Doctoral Researcher	Tampere University	Post Doctoral Researcher	The research topic focuses on microservice architecture degradation, software project organizational structure optimization, developer profile personality analysis, computational game studies. From 2020 to 2023 I was project manager on open-source software assessment and adoption model, which funded by Huawei.

Experience in academic teaching

- Main responsible teacher:
    - Database, 2024-2025, University of Oulu (Collaborated with Nanjing institute of Technology), 135 hours.
    - Software Development Maintenance and Operations, 2024-2025, University of Oulu, 60 hours. 2023-2024,
    - Database, 2023-2024, University of Oulu (Collaborated with Nanjing institute of Technology), 135 hours.
    - Software Development Maintenance and Operations, 2023-2024, University of Oulu, 60 hours.
- Postgraduate supervision (PhD level): number of students supervised in the last five years with subject areas
    - Master Students: co-supervisions of 5 students in Tampere University and University of Oulu
    - Ph.D. Students: co-supervisions of 2 Ph.D. students in

Other academic responsibilities

- responsibilities for organizing conferences/seminars/exhibitions:
  - EASE 2023 – Web chair
  - PROFES 2023 – Proceeding chair
  - SANER 2024 – Tool Demo co-chair
  - ICSA 2024 1st Workshop on Edge Software Architecture – Organizers co-chair
  - 2024 Summer School on Advanced Summer School on Cloud, Edge, and IoT – University of Oulu (05/08-16/08)

Memberships

Membership of scientific committee:

- Microservices 2023: PC members
- ESOCC 2024: PC members
- Journal of system and Software – reviewer since 2023
- Information and Software Technology Journal– reviewer since 2023

Research and scholarships

Scholarships:
2020 - Ulla Tuominen Scholarship
2022 - CNESS research scholarship

Publications

- R. Su, X. Li, and D. Taibi, “From microservice to monolith: A multivocal literature review,” Electronics, 2024. DOI: https://doi.org/10.3390/electronics13081452
- X. Li, V. Lenarduzzi, and D. Taibi, “A data-driven analysis of player personalities for different game genres,” in 1st Foundations of Applied Software Engineering for Games Workshop (FaSE4Games’24), 2024 ISBN: 979-8-4007-0674-5/24/07.
- S. Zhao, X. Xia, B. Fitzgerald, et al., “Motivating open source collaborations through social network evaluation: A gamification practice from alibaba,” in the 46th International Conference on Software Engineering: Software Engineering in Practice (ICSE-SEIP), 2024. DOI: https://doi.org/10.1145/3639477.3639734
- A. Janes, X. Li, and V. Lenarduzzi, “Open tracing tools: Overview and critical comparison,” Journal of Systems and Software, vol. 204, p. 111 793, 2023, issn: 0164-1212. doi: https://doi.org/10.1016/j.jss.2023.111793.
- X. Li, S. Moreschini, Z. Zhang, F. Palomba, and D. Taibi, “The anatomy of a vulnerability database: A systematic mapping study,” Journal of Systems and Software, vol. 201, p. 111 679, 2023, issn: 0164- 1212. doi: https://doi.org/10.1016/j.jss.2023.111679.
- D. Amoroso d’Aragona, X. Li, T. Cerny, A. Janes, V. Lenarduzzi, and D. Taibi, “One microservice per developer: Is this the trend in oss?” In European Conference on Service-Oriented and Cloud Computing, Springer, 2023, pp. 19–34. DOI: https://doi.org/10.1007/978-3-031-46235-1_2
- X. Li, D. A. d’Aragona, and D. Taibi, “Evaluating microservice organizational coupling based on cross- service contribution,” in International Conference on Product-Focused Software Process Improvement, Springer, 2023, pp. 435–450. DOI: https://doi.org/10.1007/978-3-031-49266-2_30
- X. Li, A. Elsayed, R. Su, et al., “Metrics and models for developer collaboration analysis in microservice-based systems. a review,” in the 17th International Conference on Software Process and Product Measurement (MENSURA), 2023. ISSN: 1613-0073
- X. Li, A. Elsayed, J. Yero, D. A. d’Aragona, T. Cerny, and D. Taibi, “Analyzing organizational structure of microservice projects based on contributor collaboration,” in The 17th IEEE International Conference

on Service-Oriented System Engineering (IEEESOSE), IEEE, 2023. DOI: https://doi.org/10.1109/SOSE58276.2023.00007

- X. Li, S. Moreschini, F. Pecorelli, and D. Taibi, “Ossara: Abandonment risk assessment for embedded open source components,” IEEE Software, vol. 39, no. 04, pp. 48–53, 2022. DOI: https://doi.org/10.1109/MS.2022.3163011
- X. Li, S. Moreschini, Z. Zhang, and D. Taibi, “Exploring factors and metrics to select open source software components for integration: An empirical study,” Journal of Systems and Software, vol. 188, p. 111 255, 2022, issn: 0164-1212. doi: https://doi.org/10.1016/j.jss.2022.111255.
- S. Moreschini, F. Pecorelli, X. Li, S. Naz, D. Hästbacka, and D. Taibi, “Cloud continuum: The definition,” IEEE Access, 2022. DOI: https://doi.org/10.1109/ACCESS.2022.3229185
- X. Li, S. Moreschini, A. Filatova, and D. Taibi, “Knowledge management challenges for ai quality,” in 2022 IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER), IEEE, 2022, pp. 1295–1296. DOI: https://doi.org/10.1109/SANER53432.2022.00156
- F. Lomio, S. Moreschini, X. Li, and V. Lenarduzzi, “Anomaly detection in cloud-native systems,” in 48th Euromicro Conference on Software Engineering and Advanced Applications (SEAA 2022), 2022. DOI: https://doi.org/10.1109/SEAA56994.2022.00023
- S. Moreschini, F. Pecorelli, X. Li, et al., “Cognitive cloud: The definition,” in 19th International Conference on Distributed Computing and Artificial Intelligence, Springer, 2022. DOI: https://doi.org/10.1007/978-3-031-20859-1_22
- X. Li and S. Moreschini, “Oss pesto: An open source software project evaluation and selection tool,” in IFIP International Conference on Open Source Systems, Springer, 2021, pp. 42–50. DOI: https://doi.org/10.1007/978-3-030-75251-4_4
- X. Li, Z. Zhang, and K. Stefanidis, “A data-driven approach for video game playability analysis based on players’ reviews,” Information, vol. 12, no. 3, p. 129, 2021. DOI: https://doi.org/10.3390/info12030129
- X. Li, B. Zhang, Z. Zhang, and K. Stefanidis, “A sentiment-statistical approach for identifying problematic mobile app updates based on user reviews,” Information, vol. 11, no. 3, p. 152, 2020. DOI: https://doi.org/10.3390/info11030152
- X. Li, “Towards factor-oriented understanding of video game genres using exploratory factor analysis on steam game tags,” in 2020 IEEE International Conference on Progress in Informatics and Computing (PIC), IEEE, 2020, pp. 207–213. DOI: https://doi.org/10.1109/PIC50277.2020.9350753
- X. Li and B. Zhang, “A preliminary network analysis on steam game tags: Another way of understanding game genres,” in Proceedings of the 23rd International Conference on Academic Mindtrek, 2020, pp. 65–73. DOI: https://doi.org/10.1145/3377290.3377300
- Lu, X. Li, T. Nummenmaa, Z. Zhang, and J. Peltonen, “Patches and player community perceptions: Analysis of no man’s sky steam reviews,” in DiGRA’20-Proceedings of the 2020 DiGRA International Conference, DiGRA, 2020. https://dl.digra.org/index.php/dl/article/view/1303
- Lu, J. Peltonen, T. Nummenmaa, X. Li, and Z. Zhang, “What makes a trophy hunter? an empirical analysis of reddit discussions,” in 4th International GamiFIN Conference, GamiFIN 2020, 2020. ISSN: 1613-0073 urn:nbn:de:0074-2637-8
- B. Zhang and X. Li, “Bibliography-based social network analysis and geo-location map of gamification,” in European Conference on Games Based Learning, Academic Conferences International Limited, 2020, p. 684. DOI:10.34190/GBL.20.138
- X. Li, “Research on software project developer behaviors with k-

means clustering analysis," in SSSME 2019: Joint Proceedings of the Summer School on Software Maintenance and Evolution, CEUR-WS, 2019. ISSN: 1613-0073 urn:nbn:de:0074-2520-6

- X. Li, C. Lu, J. Peltonen, and Z. Zhang, "A statistical analysis of steam user profiles towards personalized gamification," in 3rd International GamiFIN Conference, GamiFIN 2019, CEUR-WS, 2019. ISSN: 1613-0073 urn:nbn:de:0074-2359-5
- M. Stratigi, X. Li, K. Stefanidis, and Z. Zhang, "Ratings vs. reviews in recommender systems: A case study on the amazon movies dataset," in European conference on advances in databases and information systems, Springer, 2019, pp. 68–76. DOI: https://doi.org/10.1007/978-3-030-30278-8_9
- X. Li, "A method to support gamification design practice with motivation analysis and goal modeling," in Proceedings of the 2nd International GamiFIN Conference, GamiFIN 2018, CEUR-WS, 2018. ISSN: 1613-0073 urn:nbn:de:0074-2186-5
- X. Li, Z. Zhang, and T. Poranen, "Scenario-driven continuous mobility requirements analysis in mobile app maintenance," in 4th Workshop on Continuous Requirements Engineering. CRE Workshop, CEUR-WS, 2018. ISSN: 1613-0073 urn:nbn:de:0074-2075-4
- X. Li, Z. Zhang, and K. Stefanidis, "Mobile app evolution analysis based on user reviews," in New Trends in Intelligent Software Methodologies, Tools and Techniques, IOS Press, 2018, pp. 773–786. DOI: 10.3233/978-1-61499-900-3-773
- X. Li, Z. Zhang, and K. Stefanidis, "Sentiment-aware analysis of mobile apps user reviews regarding particular updates," The 13th International Conference on Software Engineering Advances 2018, p. 109. ISBN: 978-1-61208-668-2
- X. Li, B. Upreti, and Z. Zhang, "Mobility requirements engineering tool (more)," in 2016 IEEE 24th International Requirements Engineering Conference (RE), IEEE, 2016, pp. 409–410. DOI: https://doi.org/10.1109/RE.2016.66
- X. Li and Z. Zhang, "A user-app interaction reference model for mobility requirements analysis," in ICSEA 2015: The Tenth International Conference on Software Engineering Advances, 2015, pp. 170– 177. ISBN: 978-1-61208-438-1
- X. Li, Z. Zhang, and J. Nummenmaa, "Models for mobile application maintenance based on update history," in 2014 9th International Conference on Evaluation of Novel Approaches to Software Engineering (ENASE), IEEE, 2014, pp. 1–6. ISBN:978-989-758-065-9
- Articles published by others in magazines, etc. about the applicant or his/her projects

Further data

Conference presentations:

- 2024 - International Conference on Software Engineering (ICSE2024): A Framework for Microservice Organizational Structure Optimization
- 2024 - ACM International Conference on the Foundations of Software Engineering (FSE): A Data-Driven Analysis of Player Personalities for Different Game Genres.
- 2024 - IEEE International Conference on Software Architecture (ICSA): Toward Collaboration Optimization in Microservice Projects based on Developer Personalities
- 2023 - European Conference on Service-Oriented and Cloud Computing (ESOCC): One microservice per developer: is this the trend in OSS?
- 2023 - International Conference on Product-Focused Software Process Improvement (PROFES): Evaluating Microservice Organizational Coupling Based on Cross-Service Contribution
- 2023 - International Conference on Software Process and Product Measurement (MENSURA): Metrics and Models for Developer

Collaboration Analysis in Microservice-Based Systems. A Systematic Mapping Study

- 2023 - IEEE International Conference on Service-Oriented System Engineering (SOSE): Analyzing organizational structure of microservice projects based on contributor collaboration
- 2022 - IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER): Knowledge Management Challenges for AI Quality
- 2022 - Euromicro Conference on Software Engineering and Advanced Applications (SEAA): Anomaly Detection in Cloud-Native Systems
- 2021 - IFIP International Conference on Open Source Systems (OSS): OSS PESTO: An Open Source Software Project Evaluation and Selection Tool
- 2020 - IEEE international conference on Progress in informatics and computing (PIC): Towards Factor-oriented understanding of video game genres using exploratory factor analysis on steam Game Tags
- 2020 & 2015 - International Conference on Software Engineering Advances (ICSEA): Sentiment-aware Analysis of Mobile Apps User Reviews Regarding Particular Updates; A User-App Interaction Reference Model for Mobility Requirements Analysis
- 2020 - International Conference on Academic Mindtrek (MindTrek): A preliminary network analysis on steam game tags: Another way of understanding game genres
- 2019 & 2018 - International GamiFIN Conference (GamiFIN): A statistical analysis of Steam user profiles towards personalized gamification; A method to support gamification design practice with motivation analysis and goal modeling
- 2018 - International Conference on Intelligent Software Methodologies, Tools, and Techniques (SOMET): Mobile App Evolution Analysis based on User Reviews
- 2018 - Requirements Engineering: Foundation for Software Quality Conference (REFSQ): Scenario-Driven Continuous Mobility Requirements Analysis in Mobile App Maintenance
- 2016 - International Requirements Engineering Conference (RE): Mobility Requirements Engineering Tool (MoRE)
- 2014 - International Conference on Evaluation of Novel Approaches to Software Engineering (ENASE): Models for mobile application maintenance based on update history

Awards:

- Best paper in GamiFin 2019.
- Best paper in ICSEA 2015.
- Faculty Scholarship 2017-2018.

Statement of interest

Competence in the Research Domain of Computing Systems Architectures

My main research focus is on the degradation and corresponding maintenance of microservice architecture. This research aims to contribute to the effective maintenance and quality of software architectures by managing the increasing complexity of microservice systems through continuous evolution. I investigate how data-driven approaches and AI techniques can be applied to detect, evaluate, visualize, and mitigate architecture degradation in microservice-based systems. Additionally, I have a particular interest in the human aspects of microservice architecture, exploring how organizational structures affect software architecture quality (as per Conway's Law). Specifically, I examine the organizational dynamics, such as automatic reconstruction of project organizational structures, key developers' roles, developer personalities, collaboration network analysis, and strategies for organizational coupling and decoupling. My work is also directly related to cloud computing and high-performance systems, where maintaining efficiency and performance while minimizing degradation is critical. I have practical experience with major cloud platforms such as AWS and Google Cloud, which are essential for the design, simulation, and energy-efficient operation of

digital systems. I have published extensively in this area, including papers in top-tier journals like the Journal of Systems and Software.

Competence in the Research Domain of Distributed and Parallel Systems

I also have significant expertise in distributed and parallel systems, specifically focusing on the architecture of microservices in relation to cloud-edge environments and distributed computing. My research includes studying how to enhance system quality and performance through organizational strategies, such as reconstructing project teams, managing developer roles, and understanding the impact of distributed teams on software development.
My work encompasses key aspects of distributed systems such as system operating environments, computer networks, and the performance evaluation of large-scale distributed systems, including cloud and IoT systems. I focus on mitigating the complexity in these environments by developing strategies for coupling and decoupling organizational and technical components. This research has led to multiple conference presentations and publications focused on improving the resilience and performance of distributed systems, which are vital for modern cloud-based architectures.

Competence in the Research Domain of Software Engineering

I have substantial experience in the field of software engineering, particularly in methodologies, programming languages, and software infrastructures. My research aims to improve software architecture by managing its continuous evolution and addressing its organizational aspects. I investigate the interaction between software architecture and team structures, with a focus on how best practices, like “one microservice per team,” are applied in real-world scenarios, where they are often overlooked despite their importance for system maintainability. In terms of publications, I have authored more than 40 papers in international conferences and peer-reviewed journals, covering a wide range of topics such as software engineering, data mining, and the organizational aspects of software architecture. My background in data science, including machine learning, deep learning, natural language processing, statistical analysis, and network analysis, further strengthens my ability to contribute to the software engineering domain. This interdisciplinary approach allows me to bring novel insights into software architecture quality and its maintenance.
In addition to research, I have considerable grant application experience, such as main participant in EU Horizon funding application (HORIZON-CL4-2024-DIGITAL-EMERGING- 01-22) 2024; Main participant in EU Horizon funding application (HORIZON-CL4-2023-DATA-01-04) 2023; Main participant in Business Finland funding application 2023; CNESS research funding 2022; Ulla Tuominen Funding 2020; Doctoral student funding from Faculty of Natural Sciences at University of Tampere 2017; Main Participant in funding application SKR Pirkanmaa Regional Funding 2018, 2020; Main participant in funding application to KoneenSäätiö 2017; Main participant in funding application to Academy of Finland 2014, 2015, 2017, 2019, 2023.

Language competence

IELTS certificate with score 7.5
(ELTS 7.5 = CERF C1)