JianxinZhao

contact

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in://jzstark
GitHub: @jzstark

programming

Python, OCaml, C,
Matlab, CUDA
Git, container, Vim

fields of skill

scientific computing,
machine learning,
deep learning,
decentralized compute,
system architecture,
enterprise architecture

languages

Chinese (native)
English (fluent)
Japanese (mid)
German (beginner)

additional info

EU Blue Card
DE Driver License (B)
Cisco CCNA (2015)

Education

2015-2020 **Ph.D.** in Computer Science , *University of Cambridge, UK*
Thesis: *Optimisation of a Modern Numerical Library: a Bottom-Up Approach*
Supervisor: Prof. Jon Crowcroft

2013–2015 **Master** in Software Engineering , *Beijing Institute of Technology, CN*
Thesis: *Design and Implementation of Event Detection System and Algorithms in Participatory Sensing*
Supervisor: Prof. Chi Harold Liu

2013.03–05 **Student Exchange Programme** , *Karsruhe Institute of Technology, DE*
Thesis: *Implementation of a Bi-directional Link Approach in Business Process Modeling*
Advisor: Dr. Timm Caporale

2009–2013 **Bachelor** in Software Engineering , *Beijing Institute of Technology, CN*

Work

2023.10 until now **Postdoctoral Researcher** , *Karlsruhe Institute of Technology, DE*
Research group: Cooperative Autonomous Systems. My research focuses on autonomous driving and applied machine learning in cooperative autonomous systems.

2021.01–2023.03 **Postdoctoral Researcher** , *Beijing Institute of Technology, CN*
My research theme during this postdoc is distributed machine learning in edge computing and IoT, focusing on model performance and energy efficiency in heterogeneous environments.

Projects

2016–Now **Owl - OCaml Scientific and Engineering Computing** , *https://ocaml.xyz*
Owl is a dedicated open-source system for scientific and engineering computing, a core numerical library in the OCaml Language community. I have worked as a core developer and now the leader of this project since its inception on 2016, gaining hands-on **software development and architecting** experience. The code base includes 133K LoC OCaml and 103K LoC C code.

2022-2025 **Key Technologies for Edge Intelligent Perception and Capability Enhancement** ,
This is a Joint Funds project of the National Natural Science Foundation of China (NSFC), with a total grant of €350K. I've participated in proposal writing and project implementation as a main member.

2016–2017 **Databox: Privacy-Aware Infrastructure for Managing Personal Data** ,
The EPSRC Databox project (EP/N028260/1) investigates a privacy-aware personal data platform in a digital world.

Funding

2024 **Connecting Young Scientists at KIT** ,
For me this program support a short-term journeys to a Germany vehicle manufactures such as BMW and Volkswagen for deeper understanding of real-world application of technologies in the industry and building networks. Total grant: €5K.

2024 **Funding to Support Maintainance of Owl** ,
The OCaml Software Foundation provides a grant to support the maintenance and development of the Owl project. Total grant: €10K.

2021 **Postdoctoral International Exchange Program Scholarship** ,
Awarded to excellent international young scientists holding a PhD degree pursuing postdoctoral research in a Chinese university.

2015 **China Scholarship Council (CSC) Scholarship** ,
Full Scholarship including tuition fee. Awarded to top students to pursue Ph.D. degree abroad.

Publications

Books

2026.03 **Autonomous Driving: Technical, Business, and Regulatory Landscape** , *Wiley*
Jianxin Zhao, Liang Wang, and Alexey Vinel. Writing in Progress.
This book aims to provide a comprehensive exploration of this groundbreaking field, examining the state-of-the-art blend of technology, business strategies, social implications, and legal frameworks that underpin the autonomous driving industry.

2024.04 **Strategic Blueprint for Enterprise Analytics:Integrating Advanced Analytics into Data-Driven Business** , *Springer Cham*
Liang Wang and Jianxin Zhao. Springer Cham, 1st ed., 245 pages. Included in Springer's "Studies in Big Data" series. (link).
This book is a comprehensive guide for professionals, leaders, and academics seeking to unlock the power of data and analytics in the modern business. It delves into the strategic, architectural, and managerial aspects of implementing enterprise analytics systems in large enterprises.

2022.12 **Architecture of Advanced Numerical-Analysis Systems** , *Apress*
Liang Wang and Jianxin Zhao. Apress Open Access. 1st ed., 472 pages.
Based on our hands-on experience in developing the Owl library, this book aims to present the architecture design and optimization of various core components in a modern numerical library.

2022.05 **OCaml Scientific Computing: Functional Programming in Data Science and Artificial Intelligence** , *Springer International Publishing*
Liang Wang, Jianxin Zhao, and Richard Mortier. Springer Nature, 1st ed. 2022 edition, 381 pages. Included in Springer's "Undergraduate Topics in Computer Science" series (link).
This book covers a wide range of topics in scientific computing:
- Part I introduces basic numerical techniques, including statistics, linear algebra, ordinary differential equations, and signal processing.
- Part II shows advanced numerical techniques: algorithmic differentiation, optimization and regression, and neural network.
- Part III includes a range of computer vision case studies.

2021.11 **Introduction to Internet of Thing Technologies** , *China Machine Press*
Chi Harold Liu (Editor-in-Chief), Rui Han, Jianxin Zhao, and Jian Ma (Associate Editor-in-Chief), 3rd edition (Chinese).

Patents

A Large-Scale Edge Machine Learning Training Method Based on Probabilistic Sampling
Jianxin Zhao, Rui Han, Chi Liu
CN Patent No. ZL202110285186.X; Nov.8, 2022, China National Intellectual Property Administration.

A client selection method for edge-side federated learning under heterogeneous data
Jianxin Zhao, Chi Liu, Yanhao Feng, Xinyu Chang
CN Patent No. ZL20211498897.1; May.31, 2024, China National Intellectual Property Administration.

Journals

A Systematic Literature Review on Vehicular Collaborative Perception - A Computer Vision Perspective (in submission)
Lei Wan, Jianxin Zhao, Andreas Wiedholz, Manuel Bied, Mateus Martinez de Lucena, Abhishek Dinkar Jagtap, Andreas Festag, Antônio Augusto Fröhlich, Hannan Ejaz Keen, Alexey Vinel
IEEE Intelligent Transportation Systems Transactions *00.00 (2025) p. 00. 2025*

Parallel and Memory-Efficient Distributed Edge Learning in B5G IoT Networks
Jianxin Zhao, Pierre Vandenhove, Peng Xu, Hao Tao, Liang Wang, Chi Harold Liu, Jon Crowcroft
IEEE Journal of Selected Topics in Signal Processing *17.1 (2023) pp. 222–233. 2023*

Participant Selection for Federated Learning With Heterogeneous Data in Intelligent Transport System
Jianxin Zhao, Xinyu Chang, Yanhao Feng, Chi Harold Liu, Ningbo Liu
IEEE Transactions on Intelligent Transportation Systems *(2022). IEEE, 2022*

Energy-Efficient and Fair IoT Data Distribution in Decentralized Federated Learning
Jianxin Zhao, Y. Feng, X. Chang, P. Xu, S. Li, Chi H. Liu, W. Yu, Tang Jian, Crowcroft Jon
IEEE Transactions on Network Science and Engineering *(2022). IEEE, 2022*

Energy-efficient Client Selection in Federated Learning with Heterogeneous Data on Edge
Jianxin Zhao, Yanhao Feng, Xinyu Chang, Chi Harold Liu
Peer-to-Peer Networking and Applications *15.2 (2022) pp. 1139–1151. Springer, 2022*

Federated Learning with Heterogeneity-Aware Probabilistic Synchronous Parallel on Edge
Jianxin Zhao, Rui Han, Yongkai Yang, Benjamin Catterall, Chi Harold Liu, Lydia Y Chen, Richard Mortier, Jon Crowcroft, Liang Wang
IEEE Transactions on Services Computing *15.2 (2022) pp. 614–626. IEEE, 2022*

Energy-efficient Event Detection by Participatory Sensing Under Budget Constraints
Chi Harold Liu, Jianxin Zhao, Honggang Zhang, Song Guo, Kin K Leung, Jon Crowcroft
IEEE Systems Journal *11.4 (2016) pp. 2490–2501. IEEE, 2016*

A Survey of Incentive Mechanisms for Participatory Sensing
Hui Gao, Chi H. Liu, Wendong Wang, Jianxin Zhao, Zheng Song, Xin Su, Jon Crowcroft, K. K. Leung
IEEE Communications Surveys & Tutorials *17.2 (2015) pp. 918–943. IEEE, 2015*

Conferences

Cross-Platform Deep Learning Compilation with Model-Specific Cost Model Pre-Training
Xinjun Wu, Jianxin Zhao, Peng Xu, Chi Harold Liu
17th International Conference on Machine Learning and Computing (ICMLC), 2024

V2X-Based Decentralized SVD in Dynamic Vehicular Environment
Jianxin Zhao, Min-Bin Lin, Alexey Vinel
1st Workshop on Cooperative Intelligence for Embodied AI, ECCV 2024, 2024

Air-Ground Collaborative Spatial Crowdsourcing with UAV Carriers by Geometric Graph Convolutional Multi-Agent Deep Reinforcement Learning
Yu Wang, Jingfei Wu, Xingyuan Hua, Chi Liu, Guozheng Li, Jianxin Zhao, Ye Yuan, Guoren Wang
39th IEEE International Conference on Data Engineering (ICDE 2023), 2023

Automatic Operator Performance Tumng in a Machine Learning System on Edge
Peng Xu, Xinyu Chang, Jianxin Zhao, Chi Harold Liu
2022 IEEE 28th International Conference on Parallel and Distributed Systems (ICPADS), 2023

Privacy-preserving Machine Learning Based Data Analytics on Edge Devices
Jianxin Zhao, Richard Mortier, Jon Crowcroft, Liang Wang
Proceedings of the 2018 AAAI/ACM Conference on AI, Ethics, and Society, 2018

Data Analytics Service Composition and Deployment on Edge Devices
Jianxin Zhao, Tudor Tiplea, Richard Mortier, Jon Crowcroft, Liang Wang
Workshop on Big Data Analytics and Machine Learning for Data Communication Networks, 2018

Energy-efficient Dynamic Event Detection by Participatory Sensing
Jianxin Zhao, Chi Harold Liu, Min Chen, Xue Liu, Kin K Leung
2015 IEEE International Conference on Communications (ICC), 2015

Activities

2024-2025 **Supervision of Master Thesis** , *Karlsruhe, DE*
Optimization of dynamic Byzantine Fault Tolerant for Vehicular Networks

2024-2025 **Artificial Intelligence for Autonomous Driving** , *Karlsruhe, DE*
Lecturer
Master level seminar.

2024.4-10 **Supervision of Student** , *Karlsruhe, DE*
Research on Pedestrian Intention Prediction; studentische Hilfskräfte

2024.4-8 **Collective Perception in Autonomous Driving** , *Karlsruhe, DE*
Lecturer
Master level course. Teaching basic fundamental ML knowledge for AD, including DL, object detection, Bayesian Inference, etc.

2021-2023 **Supervision of Master Students** , *Beijing, CN*
Supervision of three master dissertations. Research topics include Federated Learning and optimization of deep learning compiling.

2016-2017 **STIMULUS Programme** , *Cambridge, UK*
Teaching Assistant at the Milton Road Primary School
STIMULUS is a community service program which gives Cambridge University students the opportunity to work with pupils in local schools, helping with Maths, Science, Computing or Technology lessons.

2017 **UK University Kendo Taikai 2017** , *Cambridge, UK*
Participate in organizing a national sports event
University Taikai is a grand gathering of UK university students practicing Kendo, a Japanese martial art.

2016 **Undergraduate Supervision** , *Computer Lab, University of Cambridge*
Computer Networking, Michaelmas term 2016.

Communication Skills

2019 **Oral Presentation** , *ICFP OCaml 2019, Berlin*
"*Executing Owl Computation on GPU and TPU*".

2018 **Oral Presentation** , *ACM Open IoT Day, Munich*
"*Data Analytics Service Composition and Deployment on IoT Devices* ".

2017 **Poster** , *SOSP 2017, Shanghai*
"*User-centric Composable Services for Personal Data Analytics*".

Interests

Professional: distributed system, optimization, computer graphics, the study of uncertainty, reinforcement learning, real world application of technology, intersection of technology and business
Personal: reading, biking, Kendo (a Japanese martial art), guitar