




JianxinZhao

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 in://jzstark
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languages

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

programming

Python, OCaml, C,
Matlab
Git, Vim

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](#)
- 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
I finished my bachelor's thesis at the **Institute AIFB**, based on KIT-Horus, an open-source software toolset that facilitates the development of process-oriented information systems.
- 2009-2013 **Bachelor** in Software Engineering [Beijing Institute of Technology, CN](#)

Work

- 2023.10 **Postdoctoral Researcher** [Karlsruhe Institute of Technology, Germany](#)
until now My research focuses on autonomous driving and applied machine learning in cooperative autonomous systems.
- 2021.01-2023.03 **Postdoctoral Researcher** [Beijing Institute of Technology, China](#)
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. It is based on the OCaml programming language and is widely recognized and used in the OCaml community. I have worked as a core developer and maintainer on this project since its inception around 2016.
- 2022-2025 **Key Technologies for Edge Intelligent Perception and Capability Enhancement** [National Natural Science Foundation of China \(NSFC\)](#)
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** [EPSRC](#)
The EPSRC Databox project (EP/N028260/1) investigates a privacy-aware personal data platform in a digital world.

Awards

- 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

- 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 landscape. It delves deeply 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 optimization techniques: algorithmic differentiation, optimization and regression, and deep 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).

Journals

- 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 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
- Energy-Efficient and Fair IoT Data Distribution in Decentralized Federated Learning

Jianxin Zhao, Yanhao Feng, Xinyu Chang, Peng Xu, Shilin Li, Chi Harold Liu, Wenke Yu, Jian Tang, Jon Crowcroft

IEEE Transactions on Network Science and Engineering (2022). *IEEE*, 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 Harold Liu, Wendong Wang, Jianxin Zhao, Zheng Song, Xin Su, Jon Crowcroft, Kin K Leung

IEEE Communications Surveys & Tutorials 17.2 (2015) pp. 918–943. *IEEE*, 2015

Conferences

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

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

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.

Communication Skills

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

Present the research on functional programming and optimizing computation I have conducted during my PhD study.

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

2017 **Oral Presentation**, EuroSys'17 Doctoral Workshop, Belgrade
"Towards Security in Distributed Home System".

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

Activities

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

Interests

Professional: autonomous driving, scientific computing, distributed system, reinforcement learning, Bayesian network, intersection of technology and business

Personal: reading, biking, Kendo, guitar