Jiawei Zhang

✉ Jiawei.Zhang@uky.edu | ⌂ jiaweizhang.site

Research Interests

Machine Learning, privacy-aware decentralized learning, deep learning, statistical inference, and model selection and diagnostics.

Education

School of Statistics, University of Minnesota, Twin Cities

Ph.D. in Statistics   *2017 - 2023*

- Ph.D. candidate advised by Prof. Yuhong Yang and Prof. Jie Ding

School of Statistics, University of Minnesota, Twin Cities

M.S. in Statistics   *2015–2017*

School of Statistics and Management, Shanghai University of Finance and Economics, Shanghai

Bachelor of Economics (with honors)   *2011–2015*

Research Projects

Foundations of Machine Learning Evaluation [1, 9]

How to assess whether a trained model is sufficiently accurate?

- Developed a methodology from a nonparametric testing perspective to assess modern classification methods such as tree ensembles and neural networks

Foundations of Model Selection [2]

How to identify the most appropriate model for tasks in new data domains?

- Developed a cross-validation method for statistically reproducible comparison of multiple models or hyperparameters based on adaptive data-splitting

Decentralized Multi-Party Learning [8, 3]

How to facilitate learning entities (e.g., government agencies, research institutions, companies) with

various data modalities to assist each other?

- Developed an *Assisted Learning* methodology that does not require sharing datasets or model parameters to autonomously assist each other
- Developed a multi-party learning mechanism in which a learning entity that receives assistance is incentivized to assist others, thus promoting mutual benefits

AI-enabled Cyber-Physical-Biological System for Organoid Maturation [5]

How to provide a reliable quantification of the maturation stage of man-made cardiac tissues using

multimodal measurements at a single-cell level?

- Collaborated with bioengineering scientists to develop a multi-task learning system for nano-level sensing that substantially improved the state-of-the-art

In-Depth Review of Information Criteria [4]

When and how to use information criteria appropriately?

- Completed a review of information criteria that focuses on the fundamental challenges in model selection, insights into the theoretical properties of information criteria and their connections with other related methods, recent research advancements, and clarification of misleading folklore and practical guidelines

Teaching

Independent Instructor

Introduction to Probability and Statistics   *2020*

- Served as an independent instructor that redesigned the course lecture, created assignments, and developed exams
- Led a TA and a grader to successfully teach 139 undergraduate students from diverse disciplines
- Covered basic probability theory, random variables, sampling distributions, and statistical inference

Teaching Assistant

Applied Regression Analysis *2017-2018*

- Worked as the TA by holding labs and grading homework for two semesters
- The classes consisted of around 40 students, including undergraduate students from diverse disciplines and master or Ph.D. students from, e.g., computer science and business school
- Covered estimation, testing, and prediction of regression models

Software

BAGofT

- Author and maintainer of the R package *BAGofT* published in CRAN that implements the methods in [1] for assessing the goodness-of-fit of binary classifiers

Publications

Papers published

1. **J. Zhang**, J. Ding, Y. Yang, "Is a Classification Procedure Good Enough? A Goodness-of-Fit Assessment Tool for Classification Learning," Journal of the American Statistical Association, (2023)

2. **J. Zhang**, J. Ding, Y. Yang, "Target Cross-Validation," Bernoulli, (2023)

3. X. Wang, **J. Zhang**, M. Hong, Y. Yang, J. Ding, "Parallel Assisted Learning," IEEE Transactions on Signal Processing, (2022)

4. **J. Zhang**, Y. Yang, J. Ding, "Information Criteria for Model Selection," Wiley Interdisciplinary Reviews: Computational Statistics, (2023)

5. X. Tang, **J. Zhang** (co-first author), Y. He, X. Zhang, Z.Lin, S. Partarrieu, E. B. Hanna, Z. Ren, Y. Yang, X. Wang, N. Li, J. Ding, J. Liu, "Multi-task learning for single-cell multi-modality biology," Nature Communications, (2023)

6. E. Diao, G. Wang, **J. Zhang**, Y. Yang, J. Ding, V. Tarokh, "Pruning Deep Neural Networks from a Sparsity Perspective," ICLR 2023, (2023)

7. C. Chen, **J. Zhang** (co-first author), J. Ding, Y. Zhou, "Assisted Learning with Unsupervised Domain Adaptation," Abstracts of papers IEEE International Symposium on Information Theory 2, (2023)

Papers under review or revision

8. **J. Zhang**, J. Ding, Y. Yang, "Additive-Effect Assisted Learning."

Papers in preparation

9. **J. Zhang**, Y. Yang, J. Ding, "DeepDx for Assessing Classifiers Beyond Accuracy," 2022.

10. **J. Zhang**, B.Zhao, J. Ding, Y. Yang, "A Comparison Study of Published Experiments in Model Selection," 2022.

Invited Poster Presentation

Targeted Cross-Validation *2019*

- Cook's Distance and Beyond: A Conference Celebrating the Contributions of R. Dennis Cook

Honors

2018	**Martin-Buehler Fellowship in Statistics,**	School of Statistics, University of Minnesota
2020	**Martin-Buehler Fellowship in Statistics,**	School of Statistics, University of Minnesota
2022	**Martin Statistics Travel Award,**	School of Statistics, University of Minnesota

Services

Mentor of K-12 Outreach Program *2019*

- Served as the mentor of 2022 AEOP High School Apprenticeship K-12 Outreach Program to enhance diversity, equity, and inclusion (sponsored by Army Research Office)
- Guided four high school students with diverse backgrounds from Minnesota, Missouri, and Virginia on hands-on AI projects (Press Release)

Program Committee Member of IEEE BigData Workshop *2021*

- Co-organized the 2021 IEEE BigData Workshop on Scalable Reinforcement Learning with Big Data (Web Page)

Student Representative for School of Statistics Faculty Search *2021*

- Organized the meetings between faculty candidates and graduate students, facilitated the evaluation of candidates, and presented the results to the faculty

School of Statistics Advisory Committee Meeting *2017.2018*

- Volunteered in the advisory committee meeting, communicated with influential statistical leaders outside the university, and improved the recognition of the school