

Wenbo Zhang

PhD Candidate of Statistics

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🌐 Website

Research Interest

Uncertainty Quantification, Large Language Models, Reinforcement Learning

Education

2021–present **PhD of Statistics**, *University of California, Irvine*

Adviser: Prof. Hengrui Cai

2019–2021 **Master of Science, Biostatistics**, *University of Washington*

2015–2019 **Bachelor of Science, Applied Mathematics**, *Xi'an Jiaotong-Liverpool University*

Fellowships & Awards

2021 **School of Public Health's Outstanding MS Student Award**, awarded to one master student in Department of Biostatistics every year, *University of Washington*.

2020 **UW Summer Institutes Scholarship**, *University of Washington*.

2018 **University Academic Achievement Award**, awarded to 10% of all undergraduates, *XJTLU*.

Publications & Preprints

2023 **Towards Trustworthy Explanation: On Causal Rationalization**

Wenbo Zhang, Tong Wu, Yunlong Wang, Yong Cai, and Hengrui Cai

International Conference on Machine Learning (ICML), 2023

2022 **Nonparametric Estimation of the Causal Effect of a Stochastic Threshold-based Intervention**

Lars Van Der Laan, Wenbo Zhang, and Peter Gilbert

Biometrics

2021 **Interpretable Discriminant Analysis for Functional Data Supported on Random Non-linear Domains**

Eardi Lila, Wenbo Zhang, and Swati Rane

Under review in Journal of the Royal Statistical Society Series B

2021 **Finding Atrophy Patterns of Grey Matter Through Orthonormal Non-negative Factorization**

Wenbo Zhang, Kwun Chuen Gary Chan, Dean Shibata, and David Haynor

SPIE Medical Imaging

2021 **A New Convolutional Neural Network Architecture for Automatic Segmentation of Overlapping Human Chromosomes**

Sifan Song, Tianming Bai, Yanxin Zhao, Wenbo Zhang, Chunxiao Yang, Jia Meng, Fei Ma, and Jionglong Su

Neural Processing Letters

2018 **Chromosome Classification with Convolutional Neural Network Based Deep Learning**

Wenbo Zhang, Sifan Song, Tianming Bai, Yanxin Zhao, Fei Ma, Jionglong Su, and Limin Yu

International Congress on Image and Signal Processing, BioMedical Engineering and Informatics (CISP-BMEI)

Collaboration Papers

- 2023 **Antibody Correlates of Protection From Severe Respiratory Syncytial Virus Disease in a Vaccine Efficacy Trial**
Youyi Fong, Ying Huang, Bhavesh Borate, Lars Wim and Paul van der Laan, [Wenbo Zhang](#) , Lindsay N. Carpp, Iksung Cho, Greg Glenn, Louis Fries, Raphael Gottardo and Peter B. Gilbert
Open Forum Infectious Diseases
- 2021 **Immune Correlates Analysis of the mRNA-1273 Covid-19 Vaccine Efficacy Clinical Trial**
Peter Gilbert, David Montefiori, Adrian McDermott, Youyi Fong, David Benkeser et al.
Science

Industry Experience

- June, 2022 – **Machine Learning Research Intern**
Sep, 2022 IQVIA, *Plymouth Meeting, PA (Remote)*
 - Developed a novel selective rationalization approach based on large language models to explain the predictions by leveraging two causal desiderata, non-spuriousness, and efficiency for Natural Language Processing (NLP) and Electronic Health Records (EHR) datasets

Research Experience

- Sep, 2023 – **Uncertainty Quantification with Large Language Model Generations**
present *Department of Statistics, University of California Irvine, Irvine, CA*
 - Evaluate the trustworthiness of token-probability-based uncertainty estimation methods for large language models from different perspectives, like robustness and consistency.
- Jun, 2023 – **Conformal Inference for individualized Treatment Effect Estimation**
present *Department of Statistics, University of California Irvine, Irvine, CA*
 - Utilized conformal inference on pre-trained conditional average treatment effect (CATE) models to quantify individualized treatment effects with theoretic guarantee.
- Apr, 2023 – **Individualized Treatment Effect Estimation with Deep Generative Model**
present *Department of Statistics, University of California Irvine, Irvine, CA*
 - Developed a diffusion-based deep generative model for causal treatment effect estimation which can answer more individualized queries than conditional average treatment effect (CATE).
- Jan, 2023 – **Reinforcement Learning with High-Dimensional Action Space**
present *Department of Statistics, University of California Irvine, Irvine, CA*
 - Unitized variable selection method to find the sufficient and necessary action set from offline data and make online learning more efficient with less spurious features
- Sep, 2022 – **Causality Inspired Explainable Text Classification Model**
Jan 2023 *Department of Statistics, University of California Irvine, Irvine, CA*
 - Incorporate two causal desiderata, non-spuriousness, and efficiency for self-explaining text classification models and provide a consistent way of evaluating explanations
- Sep, 2020 – **Functional Data Analysis for Neuroimaging Diagnosis**
Mar, 2021 *Department of Biostatistics, University of Washington, Seattle, WA*
 - Developed a functional penalized regression method over two-dimensional manifolds with a smooth surface penalty; proposed an iterative optimization algorithm to solve this problem
- Jun, 2020 – **Correlation Study of Antibody Markers with Causal Inference**
Sep, 2020 *Fred Hutchinson Cancer Research Center, Seattle, WA*
 - Helped to develop a non-parametric model based on Causal Inference techniques to estimate immune response threshold of risk

Skills

Programming Languages Python, PyTorch, R, SQL, Linux, Matlab