

Yuyao Wang

PhD candidate

University of California San Diego

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Education

2019 - now	<i>PhD</i> , Mathematics with a specialization in statistics, University of California San Diego
2019 - 2022	<i>MA</i> , Mathematics, University of California San Diego
2015 - 2019	<i>BS</i> , Mathematics, Xi'an Jiaotong University

Research Interests

Causal inference, survival analysis, missing data problems, semiparametric theory, high dimensional statistics. Applications to medical data, health data, and aging studies.

Fellowships

2019 - 2023	Halicioglu Data Science Institute Graduate Prize Fellowship.
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Awards

2023	Student Paper Competition Award, 2023 Lifetime Data Science Conference.
2017	China National Scholarship.

Publications and Preprints

2022	Wang, Y. , Ying, A., Xu, R. (2022) Doubly robust estimation under covariate-induced dependent left truncation. <i>arXiv preprint arXiv:2208.06836</i> (Accepted in <i>Biometrika</i> ; won Student Paper Competition Award at 2023 Lifetime Data Science Conference)
2023	Peng, Y., Wang, Y. , Xu, R. (2023). Measures of explained variation under the mixture cure model for survival data. <i>Statistics in Medicine</i> , 42(3), 228-245.

Software

R packages: [truncAIPW](#), [aftR2](#)

Presentations

- 2023 Doubly Robust Estimation under Covariate-induced Dependent Left Truncation. *Presentation at 2023 Lifetime Data Science Conference.*
- 2023 Multiply Robust Estimation of Treatment Effect for Time-to-event Outcome under Dependent Left Truncation. *Poster at 2023 American Causal Inference Conference.*
- 2023 Doubly Robust Estimation under Covariate-induced Dependent Left Truncation. *Poster at 2023 Public Health Research Day at UCSD.*
- 2022 Semiparametric Estimation for Non-randomly Truncated Data. *Poster at 2022 American Causal Inference Conference.*
- 2022 Semiparametric Estimation for Non-randomly Truncated Data. *Poster at 2022 Public Health Research Day at UCSD.*

Research Experience

- 2023 - now **Data Analysis for Alzheimer Brain Pathology at Death**, University of California San Diego, La Jolla, CA, USA.
Research Assistant | Supervisors: Ronghui Xu, Lon White
 - Data visualization and data analysis for Alzheimer brain autopsy data from Honolulu Asia Aging Study.
 - Identified three risk factors (FEV₁, dietary selenium, dietary maltose) for Alzheimer brain pathology at death.
- 2023 **Assessing safety of COVID-19 vaccine exposure during pregnancy**, Rady Children's Hospital, San Diego, CA, USA.
Statistical consultant
 - Contributed to developing statistical analysis approaches for assessing safety of Pfizer-BioNTech COVID-19 vaccine exposure during pregnancy; particularly in addressing challenges in analyzing the effect of different timings of exposure in the presence of selection bias due to left truncation.
- 2020 - now **Doubly Robust Estimation under Covariates-induced Dependent Left Truncation**, University of California San Diego, La Jolla, CA, USA.
Student researcher for PhD thesis | Supervisor: Ronghui Xu
 - Derived the efficient influence curve (EIC) for the expectation of an arbitrarily transformed survival time.
 - Constructed EIC-based estimators that are shown to have favorable properties, including model double robustness, rate double robustness, and semiparametric efficiency.

- Provided technical conditions for the asymptotic properties that appear to not have been carefully examined in the literature for time-to-event data.
- Our work represents the first attempt to construct doubly robust estimators in the presence of left truncation.
- Applied our estimator to analyze data on central nervous system (CNS) lymphoma and data on cognitive impairment from Honolulu Asia Aging study.
- Extended the doubly robust estimating function for other estimands, including causal effects and causal hazard ratio under a marginal structural Cox model.

2020 - 2022

Measures of Explained Variation under the Mixture Cure Model, University of California San Diego, La Jolla, CA, USA.

Student researcher | Supervisor: Ronghui Xu

- Proposed two approaches to define explained variation under mixture cure models: based on the Kullback-Leibler information gain, and based on residual sum of squares.
- Studied properties of the proposed measures both analytically and with simulation studies
- Applied the proposed approaches to analyze data on bone marrow transplant and the SEER-medicare data.

2020 - 2021

Covariate balancing weights for estimating average treatment effect with censored time-to-event data, University of California San Diego, La Jolla, CA, USA.

Student researcher | Supervisor: Jelena Bradic

- Reviewed the literature on covariate balancing methods and investigated the possibility of developing covariate balancing weights to estimate average treatment effect for censored time-to-event data.
- Developed method that use balancing weights for confounding and use inverse probability of censoring weighting to handle informative right censoring.

2018 - 2019

Posterior Consistency for Bayesian Method of Inverse Problems with Non-Gaussian Noise Assumption, Xi'an Jiaotong University, Xi'an, Shaanxi, China.

Research assistant | Supervisor: Jianxiong Jia

- Studied existing methods and algorithms of Bayesian approach to inverse problems.
- Generalized the consistency result in *Posterior consistency for Bayesian inverse problems through stability and regression results* by Sebastian J Vollmer to Bayesian inverse problem with Gaussian mixture noise.

2018

Active Subspace and Sliced Inverse Regression, Georgia Institute of Technology, Atlanta, GA, USA.

Research assistant | Supervisor: Wenjing Liao

- Proved two theorems for the error bounds of the estimated covariance matrix and the estimated projection matrix when using active subspaces.
- Compared the performance of active subspace method with sliced inverse regression in simulation and analyzed convergence rates and find the optimal tuning parameter for active subspace method.

- 2017 - 2018 **Transfer Learning and Domain Adaptation**, Xi'an Jiaotong University, Xi'an, Shaanxi, China.
 Research assistant | Supervisor: Limin Li
- Reviewed the literature of transfer learning and domain adaptation.
 - Implemented CNN, DAN and JAN and assessed these methods using Office-31 and Caltech-10 datasets.

Teaching Experience

- University of California San Diego**, La Jolla, CA, USA.
- 2024 DSC 180B: Data Science Project II, TA, Winter 2024.
- 2023 DSC 180A: Data Science Project I, TA, Fall 2023.
 High School Math Program (Probability and Statistics, advanced track), mentor, Summer 2023.
 MATH 284: Lifetime Data Analysis, TA, Spring 2023.
 MATH 181B: Introduction to Mathematical Statistics, TA, Spring 2023.
 DSC 180B: Data Science Project II, TA, Winter 2023.
- 2022 DSC 180A: Data Science Project I, TA, Fall 2022.
 MATH 181A: Introduction to Mathematical Statistics I, TA, Winter and Spring 2022.
- 2021 MATH 10A: Calculus I, TA, Fall 2021.
 MATH 185: Introduction to Computational Statistics, TA, Spring 2021.
 MATH 189: Data Analysis and Inference, TA, Winter 2021.
- 2020 MATH 11: Calculus-Based Probability and Statistics, TA, Fall 2020.
 MATH 189: Data Analysis and Inference, TA, Winter and Spring 2020.
- 2019 MATH 10B: Calculus II, TA, Fall 2019.

Outreach

- 2023 Presentation at the UCSD Halicioglu Data Science Institute research review event for industry partners
- 2023 Poster presentation at the UCSD Halicioglu Data Science Institute Open House for prospective PhD students
- 2022 Moderator for the Prospective International Graduate Student Panel in math department at UC San Diego
- 2022 Mentor in AWM undergrad mentorship program at UC San Diego
- 2020 - 2021 Mentor in math graduate mentorship program at UC San Diego