# JITAO WANG

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## EDUCATION

**University of Michigan** — Ann Arbor, MI
Ph.D. candidate in Biostatistics — Sep 2020 - Apr 2025(expected)
Supervised by: Dr. Zhenke Wu and Dr. Chengchun Shi (LSE)

**University of Michigan** — Ann Arbor, MI
Master of Science in Biostatistics — Aug 2017 - May 2019

**Shanghai Jiao Tong University** — Shanghai, China
Bachelor of Science in Bioinformatics — Aug 2013 - Jun 2017

## RESEARCH INTERESTS

Theory and Methods: Reinforcement Learning, Causal Inference, Sequential Decision Making, Machine Learning, Deep Learning, Longitudinal Data Analysis, Hypothesis Testing, Fairness in Machine Learning.

Applications: Mobile Health, Personalized/Individualized Healthcare, Computerized Adaptive Test.

## RESEARCH EXPERIENCE

**Multivariate Dynamic Mediation Analysis under a RL Framework** — Apr 2023 - Sep 2023
*Graduate Research Assistant, advised by Dr. Zhenke Wu et al.* — University of Michigan

- Derived recursive formulas within the proposed Markov mediation process framework and introduced a novel algorithm to estimate dynamic mediation effects.
- Implemented the proposed algorithm and validated its effectiveness through a combination of simulation studies and a real-world mobile health application.

**Testing Stationarity Assumption in Sequential Decision Making** — Nov 2021 - Apr 2023
*Graduate Research Assistant, advised by Dr. Zhenke Wu and Dr. Chengchun Shi* — University of Michigan

- Proposed a novel model-based doubly robust procedure for testing the stationarity assumption and identifying change points in complex high-dimensional offline reinforcement learning scenarios.
- Proved the size and double robustness property of the developed test within a general bidirectional asymptotic framework, and demonstrate its effectiveness through numerical studies and real-world applications.

**A Reinforcement Learning Framework for Dynamic Mediation Analysis** — Oct 2022 - Apr 2023
*Graduate Research Assistant, advised by Dr. Zhenke Wu et al.* — University of Michigan

- Performed simulation studies to demonstrate the multiple robustness property and statistical efficiency of the proposed method for estimating the dynamic mediation effects.
- Applied the developed algorithm to a real-world mobile health application to analyze the mediation effect of physical exercise and sleeping on individuals' mood status, providing new insight for future study design.

**Statistical Inference in Hidden Markov Models Under k-Segment Constraints** — May 2018 - Jul 2018
*Graduate Research Assistant, advised by Dr. Zhenke Wu* — University of Michigan

- Derived Viterbi, forward-backward and expectation-maximization algorithms tailored to k-segment constraints within Hidden Markov Models (HMMs), and introduced a Gibbs sampler for posterior sampling.
- Implemented both expectation-maximization and Markov Chain Monte Carlo algorithms to estimate the parameters in HMMs subject to k-segment constraints, and conducted a comprehensive comparison of their robustness through numerical simulations.

## TEACHING EXPERIENCE

**Graduate Student Instructor, University of Michigan** Sep 2018 - Dec 2018
Course: Statistical Computing (Biostat 615), taught by Dr. Jian Kang.

**Graduate Student Instructor, University of Michigan** Jan 2019 - May 2019
Course: Statistical Inference (Biostat 602), taught by Dr. Min Zhang.

## PUBLICATIONS

PUBLISHED PEER-REVIEWED ARTICLES:

1. **Wang, J.**, Shi, C., & Wu, Z. (2023). A Robust Test for the Stationarity Assumption in Sequential Decision Making. Proceedings of the 40th International Conference on Machine Learning, 36355–36379.
2. Ge, L., **Wang, J.**, Shi, C., Wu, Z., & Song, R. (2023). A Reinforcement Learning Framework for Dynamic Mediation Analysis. Proceedings of the 40th International Conference on Machine Learning, 11050–11097.
3. **Wang, J.**, Wu, Z., Choi, S. W., Sen, S., Yan, X., Miner, J. A., Sander, A. M., Lyden, A. K., Troost, J. P., & Carlozzi, N. E. (2023). The Dosing of Mobile-Based Just-in-Time Adaptive Self-Management Prompts for Caregivers: Preliminary Findings From a Pilot Microrandomized Study. *JMIR Formative Research*.
4. **Wang, J.**, Fang, Y., Frank, E., Walton, M. A., Burmeister, M., Tewari, A., Dempsey, W., NeCamp, T., Sen, S., & Wu, Z. (2023). Effectiveness of gamified team competition as mHealth intervention for medical interns: A cluster micro-randomized trial. Npj Digital Medicine, 6(1), 1-8.
5. Carlozzi, N. E., Choi, S. W., Wu, Z., Troost, J. P., Lyden, A. K., Miner, J. A., Graves, C. M., **Wang, J.**, Yan, X., & Sen, S. (2022). An app-based just-in-time-adaptive self-management intervention for care partners: The CareQOL feasibility pilot study. Rehabilitation Psychology, 67(4), 497–512.
6. Chen, X.-P., Shi, T., Wang, X.-L., **Wang, J.**, Chen, Q., Bai, L., & Zhao, Y.-L. (2016). Theoretical studies on the mechanism of thioesterase-catalyzed macrocyclization in erythromycin biosynthesis. ACS Catalysis, 6(7), 4369–4378.
7. Ting, S., Ming, C., Xiongping, C., **Jitao, W.**, Ajun, W., & Yi-Lei, Z. (2015). Molecular Mechanism of Protein S-Nitrosylation and Its Correlation with Human Diseases. PROGRESS IN CHEMISTRY, 27(5), 594–600.

MANUSCRIPTS IN PROGRESS: (*co-first authors)

1. *Luo, L., *Shi, C., ***Wang, J.**, Wu, Z., Li, L. (2023). Multivariate Dynamic Mediation Analysis under a RL Framework. *Annals of Statistics. Submitted.*

## SKILLS

**Programing Languages** R, Python, C++, SQL, Julia, LaTeX.
**Frameworks and Tools** Git, PyTorch, Pandas, Linux.