Cong Jiang

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EDUCATION

University of Waterloo (UW), Canada Sep. 2017 - Aug. 2022

Ph.D. of Statistics, Supervisors: Dr. Mary E. Thompson and Dr. Michael P. Wallace.

City University of New York (CUNY), U.S.A. Aug. 2015 - Jul. 2017

Master of Mathematics, Supervisors: Dr. Asohan Amarasingham and Dr. Shirshendu Chatterjee.

Anhui University of Finance and Economics, China Sep. 2011 - Jul. 2015

Bachelor of Mathematical Finance

DISSERTATION

Dynamic Treatment Regimes with Interference (*Link*), defended on Aug. 2nd, 2022.
This dissertation investigates the estimation of the effects of Dynamic Treatment Regimes in personalized medicine when a patient's outcome may be influenced by not only their own treatment but also the treatments of others in their network.
Committee: Dr. Michael R. Kosorok (University of North Carolina at Chapel Hill), Dr. Yeying Zhu, Dr. Zahid Butt, Dr. Paul Marriott, Dr. Michael P. Wallace and Dr. Mary E. Thompson.

RESEARCH INTERESTS

Causal inference, Dynamic Treatment Regimes, Interference, Semiparametric/nonparametric theory, Machine learning, Health & Public policy

RESEARCH EXPERIENCE

Postdoctoral Researcher, Université de Montréal
Supervisors: Mireille Schnitzer and Denis Talbot *Oct. 2022 –*
Keywords: Causal inference, machine learning, vaccine effectiveness (VE), test-negative design (TND)

- Project 1: Efficient and doubly robust estimation of COVID-19 VE under TND, using nonparametric theory.
- Project 2: Estimation of heterogeneous COVID-19 VE under TND, and development of an optimal treatment allocation strategy with scarcity constraints, in the presence of interference (i.e., considering herd immunity).

Research Assistantships, UW
Supervisors: Mary E. Thompson and Michael P. Wallace *Sep. 2017 – Aug. 2022*
Keywords: Dynamic Treatment Regimes (DTR), interference, Tobacco usage, nicotine addiction and cessation

- Project 1: Proposing network propensity function for doubly robust DTR estimation with network interference.
- Project 2: Introducing weights for model balance, addressing misspecification in generalized linear models, and enhancing doubly-robust approach for binary outcomes in DTR estimation.
- Project 3: Examining heterogeneous causal effects of smoking alternatives (e.g., e-cigarettes) on nicotine addiction and cessation, considering household members' behaviors.
- Project 4: Applying probabilistic record linkage methods to derive efficient estimators using linked data from the International Tobacco Control Project.

New York University Langone Health (Buzsáki Lab) **Supported by the Research Foundation of CUNY**
Research Assistant, CUNY (Asohan Amarasingham's Group) *May 2016 – Jul. 2017*

Keywords: Neuroscience, Spike trains, Non-Stationary Point processes, Spike-Centered Jitter

- Utilizing a rate- and history-preserving resampling algorithm, we obtained a closed-form expression for synchrony distribution. We showcased dynamic programming's Markov Chain sampling and FFT's 'faster-jitter' computation of synchrony distribution.
- Collaborating with Professor Amarasingham contributed to a simulation study in Platkiewicz, Stark and Amarasingham (2017), *Spike-Centered Jitter Can Mistake Temporal Structure, Neural Computation.*

FELLOWSHIPS AND GRANTS

- 2022 **Canadian Institutes of Health Research (CIHR) Project Grant**
  Co-investigator, *the test-negative design for the estimation of COVID-19 vaccine effectiveness*
  [2nd place in the committee, $\$141,525$ *CAD*]
- 2022 **Centre de Recherches Mathématiques StatLab Postdoctoral Fellowship** [$\$10,000$ *CAD*]
- 2019-2020 **OICR (Bio)statistics Training Initiative Fellowship**
  [Top (Bio)statistics PhDs of Ontario *(Link)*, $\$15,000$ *CAD*/yr]

TEACHING EXPERIENCE

Teaching Assistant, Statistics and Actuarial Science, UW

- *STAT 341 Computational Statistics and Data Analysis* – Winter 2021
  Fundamental computationally oriented statistics course for math faculty students.
  Assessed and graded assignments and quizzes; Facilitated weekly Slack office hours, monitoring channels and promptly addressing inquiries; Led community-building within the Slack environment.
- *STAT 444/844/CM 764 Statistical Learning - Advanced Regression* - Spring 2021
- *STAT 441/841/CM763: Statistical Learning - Classification* - Winter 2019
  Machine learning (ML) courses tailored to senior undergraduates and graduate students, emphasizing modern applied regression techniques and classification, respectively.
  Graded assignments, quizzes, and tests to provide constructive feedback to students. Offered tutoring and guidance to students participating in Kaggle competitions and helped them develop their ML skills and strategies. Conducted thorough evaluations of final group projects, assessing the application of ML concepts and the quality of project work.
- *STAT 337 Introduction to Biostatistics* - Fall 2020
- *STAT 241 Statistics* (*Advanced Level*) and *STAT 231 Statistics* - 2018
- *STAT 240 Probability* (*Advanced Level*) and *STAT 220 Probability* (*Non-Specialist Level*) - 2017

Teaching Assistant, Mathematics, CUNY
Mathematical Statistics (*37600*) and *Elements of Probability Theory* (*37500*), two advanced mathematics courses for math majors. Conducted tutorial courses, graded assignments, and administered exams.

AWARDS AND HONORS

- 2018, 2022 **Chair Award**, Department of Statistics and Actuarial Science, UW, [$\$1,000$ *CAD*/yr]
- 2017 **Doctoral Entrance Award**, Faculty of Mathematics, UW, [$\$1,000$ *CAD*]
- 2016 **Rich Summer Internships Award,** Department of Mathematics, CUNY,
  [Awarded to top students for enhanced faculty-led research, $\$6,000$ *USD*]
- 2015, 2016 **Dr. Barnett and Jean Hollander Rich Mathematics Scholarship,** CUNY
  [Awarded to talented math students preparing for math-related careers, $\$6,000$ *USD*/yr]

RESEARCH PRESENTATION AWARDS

First CANSSI-NISS Health Data Science Workshop
Poster Presentation Competition Award *2021*
"Dynamic Treatment Regimes with Network Interference."

Statistics and Actuarial Science and WatRISQ Research Presentation, UW
Best Research Presentation Prize *2021*
"Dynamic Treatment Regimes with Interference."

SUPERVISORY AND MONITORING EXPERIENCE

Tutoring three undergraduate students on their statistics courses and working with a graduate student on her senior thesis.

ACADEMIC SERVICE

Peer-review service: *Statistics in Medicine* (2), *Journal of the American Statistical Association* (1), *Stat* (1)

Organized invited sessions at conferences: ''Advances And Applications In Optimal Dynamic Treatment Regimes'' *May 2023, Statistical Society of Canada Annual Meeting, Ottawa.*

PRESENTATIONS

Invited talks

Centre de Recherches Mathématique StatLab Annual Scientific Meeting **Montreal, Canada**
Invited by Aurelie Labbe (HEC Montréal) *2023*
- Efficient and doubly robust estimation of COVID-19 vaccine effectiveness under the test-negative design

Pacific Causal Inference Conference (PCIC) 2023 **Beijing, China**
Invited by Lu Wang (University of Michigan) *2023*
- Vaccine effectiveness estimation under the test-negative design: efficiency theory for causal inference under conditional exchangeability

Second CANSSI-NISS Health Data Science Workshop **Waterloo, Canada**
with M. Schnitzer, invited by Yeying Zhu (University of Waterloo) *2023*
- Vaccine effectiveness estimation under the test-negative design: identifiability and efficiency theory for causal inference under conditional exchangeability

Statistical Society of Canada (SSC) Annual Meeting **Ottawa, Canada**
Invited by Mireille Schnitzer (Université de Montréal) *2023*
- Estimating dynamic treatment regimes for ordinal outcomes with household interference.

Health Data Science Lab (HDSL), Univerisity of Waterloo **Waterloo, Canada**
Invited by Joel Dubin (University of Waterloo) *2022*
- Dynamic Treatment Regimes with Interference.

Contributed Oral Presentations

CANSSI Quebec Postdoc Day **Montreal, Canada**
2023
- Efficient and doubly robust estimation of COVID-19 vaccine effectiveness under the test-negative design

Joint Statistical Meetings (JSM) **Toronto, Canada**
2023
- Efficient estimation of COVID-19 vaccine effectiveness under the test-negative design

Statistical Society of Canada (SSC) Annual Meeting (virtual)
2022
- Doubly Robust Dynamic Treatment Regimen Estimation for Binary Outcomes.

Statistical Society of Canada (SSC) Annual Meeting (virtual)
2021

- Dynamic Treatment Regimes with Network Interference.

Waterloo Student Conference in Statistics, Actuarial Science and Finance **Waterloo, Canada**
2020

- Dynamic Treatment Regimes with Interference — Q-learning.

Statistical Society of Canada (SSC) Annual Meeting **Calgary, Canada**
2019

- Dynamic Treatment Regimes with Interference.

Statistical Society of Canada (SSC) Annual Meeting **Montreal, Canada**
2018

- Case Studies in Data Analysis Competition. Modelling and Predicting the Popularity of TED Talks with Cox (Time-Varying) Proportional Hazard Model.

SENSE TO SYNAPSE 2017, The Rockefeller University **New York City, USA**
*J. Platkiewicz, **C. Jiang**, A. Amarasingham.* *2017*

- Validation of Injected Synchrony Models for Detecting Monosynaptic Connectivity Using Large-Scale Labeled Datasets.

PUBLICATIONS

Google Scholar Profile (link)

- **C. Jiang**, M.P. Wallace, and M.E. Thompson (2023). **Dynamic Treatment Regimes with Interference**. *Canadian Journal of Statistics.* **51(2)**: 469 - 502. *https://doi.org/10.1002/cjs.11702.*
- C. Hong, L. Qin, **C. Jiang**, M. Qin, Y. Sun, and J.Luo (2023). **Characteristics, risk management and GMP standards of pharmaceutical companies in China**. *Frontiers in Public Health 11:1103555.doi: 10.3389/fpubh.2023.1103555.*

UNDER REVIEW

- **C. Jiang**, D.Talbot, S.Carazo and M.E. Schnitzer (2023). **Efficient and Doubly Robust Estimation of COVID-19 Vaccine Effectiveness under the Test-Negative Design**. Under review at *Journal of the American Statistical Association(arxiv link).*
- **C. Jiang**, M.E. Thompson, M.P. Wallace(2023). **Estimating dynamic treatment regimes for ordinal outcomes with household interference: Application in household smoking cessation**. *Revise & resubmit to Statistical Methods in Medical Research(arxiv link).*
- **C. Jiang**, M.P. Wallace, and M.E. Thompson (2023). **Doubly Robust Dynamic Treatment Regimen Estimation for Binary Outcomes: two-step weighted generalized linear models**. Under review at *Statistics in Medicine(arxiv link).*
- E.O.Brizuela, M.Carabali, **C. Jiang**, J.Merckx, D.Talbot, M.E. Schnitzer (2023). **Potential Biases in Test-Negative Design Studies of COVID-19 Vaccine Effectiveness Arising from the Inclusion of Asymptomatic Individuals.** *Revise & resubmit to American Journal of Epidemiology.*
- M.Mésidor, Y.Liu, D.Skowronski, G.D.Serres, J.Merckx, A.Koushik, M.Tadrous, S.Carazo, **C. Jiang**, M.E.Schnitzer, D.Talbot (2023). **Test negative design for vaccine effectiveness estimation in the context of the COVID-19 pandemic: a systematic methodology review.** Under review at *Vaccine.*

IN PREPARATION

- **C. Jiang**, D.Talbot, M.E. Schnitzer. **Vaccine Effect of Heterogeneity and Optimal Individualized COVID-19 Vaccination Strategies under the Test-Negative Design**.
- E.O.Brizuela, **C. Jiang**, M.Carabali, D.Talbot, M.E. Schnitzer (2023). **Machine Learning in Vaccine Effectiveness Estimation under the Test-Negative Design: Bridging the Gap for Epidemiologists.**

REFERENCES

Mary E. Thompson (PhD supervisor),
Professor of Statistics & Actuarial Science at UW.
Email: methompson@uwaterloo.ca

Mireille Schnitzer (Postdoc. supervisor),
Associate Professor of Biostatistics at Université de Montréal.
Email: mireille.schnitzer@umontreal.ca

Denis Talbot (Postdoc. co-supervisor),
Professor of Biostatistics at Université Laval.
Email: denis.talbot@fmed.ulaval.ca

Michael P. Wallace (PhD co-supervisor),
Associate Professor of Statistics & Actuarial Science at UW.
Email: michael.wallace@uwaterloo.ca

Yeying Zhu (Committee member),
Associate Professor of Statistics & Actuarial Science at UW.
Email: yeying.zhu@uwaterloo.ca