Archer Gong Zhang

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Contact Information

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Employment

2023 – Present Department of Statistical Sciences Postdoctoral Fellow
University of Toronto, Toronto, ON, Canada

2022 – 2023 Postdoctoral Fellow in Statistical Sciences
University of Toronto, Toronto, ON, Canada
Supervisors: Dr. Nancy Reid and Dr. Qiang Sun

Education

2016 – 2022 Ph.D. in Statistics (Degree conferred in May 2022)
University of British Columbia (UBC), Vancouver, BC, Canada
Thesis title: "Semiparametric Inferences under a Density Ratio Model"
Supervisor: Dr. Jiahua Chen

2013 – 2016 Honours Bachelor of Science (with high distinction)
University of Toronto, Toronto, ON, Canada
Specialist in Statistical Science and Minor in Mathematics
Cumulative GPA: 3.88/4.00

2012 – 2013 **Simon Fraser University (SFU)**, Burnaby, BC, Canada
(Transferred to University of Toronto)
Cumulative GPA: 3.99/4.33

Publications and Preprints

- **Archer Gong Zhang**, Guangyu Zhu, Jiahua Chen. "Empirical likelihood ratio test on quantiles under a density ratio model." Electronic Journal of Statistics, 15(2), 6191–6227, 2021. https://doi.org/10.1214/21-EJS1943.
- **Archer Gong Zhang** and Jiahua Chen. "Density ratio model with data-adaptive basis function." Journal of Multivariate Analysis (2022): 105043. https://doi.org/10.1016/j.jmva.2022.105043.
- Qiong Zhang, **Archer Gong Zhang**, and Jiahua Chen. "Gaussian Mixture Reduction with Composite Transportation Divergence." arXiv preprint arXiv:2002.08410 (2022).
  In revision for resubmission to IEEE Transactions on Information Theory. Available here.

Work in progress

- **Archer Gong Zhang** and Jiahua Chen. Estimation efficiency under a two-sample density ratio model. *Manuscript in preparation.*

- **Archer Gong Zhang** and Trevor Campbell. Finite-data guarantee on asymptotic normality of posterior distributions.

Scholarships and Awards

2021	General Student Research Presentation Award at Statistical Society of Canada Annual Meeting
2020/2021	Department of Statistics Graduate Teaching Assistant Award (Nominated for the UBC Killam Graduate Teaching Assistant Award)
2020 – 2021	President's Academic Excellence Initiative Ph.D. Award
2017 – 2021	Four Year Doctoral Fellowship
2016 – 2021	International Tuition Award
2016 – 2020	Faculty of Science Ph.D. Tuition Award
2016 – 2020	Faculty of Science Graduate Award
2016	Anona Thorne and Takao Tanabe Graduate Entrance Scholarship in Statistics
2015	University of Toronto Excellence Award in the Natural Sciences and Engineering
2015	University of Toronto Innis College Exceptional Achievement Award
2013	SFU Vice-President Research-Undergraduate Student Research Award
2013	SFU Undergraduate Open Scholarship
2012	SFU Alumni Scholarship Fund

Research Experience

2022 – Present — Ongoing research projects at **University of Toronto**
Advisor: Dr. Nancy Reid and Dr. Qiang Sun
Investigate some data integration methodologies to combine the experimental and observation datasets in causal inference. The advantages of data integration in terms of efficiency gain and interpretable estimation are particularly studied. Also look into some research problems in transfer learning, optimization, self-supervised learning, and graphical model.

2018 – Present — Ongoing research project at **University of British Columbia**
Collaborator: Dr. Trevor Campbell
Study the Bernstein-von Mises theorem on posterior normality when both the data generating process and the model are Bayesian. Look into the possibility of weakening the assumptions in the current Bernstein-von Mises theorem. Develop new approaches and techniques based on martingale theory and Stein's method to prove this theorem with a finite-data guarantee.

2016 – 2022 — Ph.D. thesis projects at **University of British Columbia**
Supervisor: Dr. Jiahua Chen
Focused on several inference problems related to a semiparametric density ratio model (DRM) to analyze data from multiple populations. Studied the nonparametric empirical likelihood (EL) based inferences under the DRM. Successfully showed that some EL-DRM estimators achieve parametric efficiency in some situations. Explored the use of the EL-based likelihood ratio test for hypotheses concerning population quantiles and proved a Wilks type theorem. Proposed an approach to solve an important open problem regarding a key component in the DRM.

2014 – 2015 — Undergraduate research assistant at **University of Toronto**
Supervisor: Dr. Nancy Reid
Conducted experiments with the application of the adjusted likelihood inference to some semiparametric models, such as logistic regression and log-linear Poisson regression models, and compared it with the classical likelihood method. Conducted a number of simulations using various datasets, and particularly investigated the performance of the adjusted likelihood method on a real-world time series data on air pollution and mortality.

Summer 2013 — Undergraduate research assistant at **Simon Fraser University**
Supervisor: Dr. Thomas Loughin
Conducted statistical simulation studies using the software `R` under a nested generalized linear mixed model for the development of a structural wood adhesive testing procedure.

Professional Experience

2014/08 – 2014/09 Summer Intern at **AIA China–Life Insurance–AIA Group Limited (Shanghai, China)**
Department: Marketing and Product Design Department
Used the programming language SQL to manage the company's database of profiles of policy holders and life assurance policies.

Teaching Experience

Course Instructor at University of Toronto

2023/09 – 2023/12	STA237H1	Probability, Statistics and Data Analysis I

Teaching Assistant at University of Toronto

2023/01 – 2023/04	STAD80H3	Analysis of Big Data

Sessional Lecturer at University of British Columbia

2020/01 – 2020/04	STAT 302	Introduction to Probability

Teaching Assistant at University of British Columbia

2021/09 – 2021/12	STAT 302	Introduction to Probability
2021/01 – 2021/04	STAT 302	Introduction to Probability
2020/09 – 2020/12	STAT 203	Statistical Methods
2019/01 – 2019/04	STAT 302	Introduction to Probability
2018/09 – 2018/12	STAT 306	Finding Relationships in Data
2018/01 – 2018/04	STAT 461/561	Statistical Theory II
2017/09 – 2017/12	STAT 460/560	Statistical Theory I
2017/01 – 2017/04	STAT 302	Introduction to Probability
2016/09 – 2016/12	STAT 302	Introduction to Probability

Professional Service

Refereeing For Academic Journal and Conference Papers

Artificial Intelligence and Statistics (AISTATS) 2023, Communications in Statistics - Simulation and Computation, Journal of Nonparametric Statistics, Mathematical Population Studies, The Canadian Journal of Statistics, Uncertainty in Artificial Intelligence (UAI) 2023.

Professional Activities

2023/08 Contributed talk at **2023 Joint Statistical Meetings (JSM)**
Title: "Estimation Efficiency under A Semiparametric Density Ratio Model".

2022/12 Presentation at **Department of Statistical Sciences Postdoctoral Day**
Title: "Density ratio model with data-adaptive basis function".

2022/11 Presentation at **Reading Group on Learning**
Title: "An Overview of Transfer Learning – with an emphasis on domain adaptation".

2022/06 Contributed talk at **Statistical Society of Canada 2022 Annual Meeting**
Title: "Estimation Efficiency under a Two-Sample Density Ratio Model".

2022/05 Invited seminar talk at **Department of Management Sciences, City University of Hong Kong** (remote via Zoom)
Title: "Semiparametric Inferences under a Density Ratio Model".

2021/11 Lightning talk at **2021 Canadian Statistical Sciences Institute (CANSSI) Showcase**
Title: "Density ratio model with data-adaptive basis function".

2021/06 Research presentation at **Statistical Society of Canada 2021 Annual Meeting**
Title: "Empirical Likelihood Ratio Test on Quantiles under a Density Ratio Model".
Winner of the General Student Research Presentation Award

2020/08 Contributed talk at **2020 Joint Statistical Meetings (JSM)**
Title: "Learning the Basis Function in a Semiparametric Density Ratio Model".

Summer 2020 Team leader in a project to support the statistics department's move to online teaching
Roles of the team: preparing teaching materials including lab materials and questions for the in-class activities and quizzes, and meeting with the course instructors and our supervisors.

2018 – 2019 Graduate student liaison to the search for assistant professor in biostatistics at **UBC Department of Statistics**
Roles: leading the discussion of graduate students with the candidates, collecting graduate students' opinions, and reporting back to the Search Committee.

2017 – 2019 Organizer of the graduate student seminars at **UBC Department of Statistics**

2018/12 Research presentation at **SFU-UBC Forest Products Stochastic Modeling Group 2018 Annual Meeting at FPInnovations**
Title: "Empirical Likelihood Ratio Test on Quantiles under a Density Ratio Model".

2018/08 Case study poster session at **2018 Joint Statistical Meeting**
Joint work with: Ho Yin Ho, Boyi Hu & Yu Wang
Title: "Uncertainty Quantification of Weather Forecasts".

2017/08 Volunteer at **International Chinese Statistical Association-Canada Chapter 2017 Symposium**

2016/05 Case study poster session at **Statistical Society of Canada 2016 Annual Meeting**
Joint work with: Tommy Guo, Mufan Li, Harris Quach & Yanbo Tang
Title: "On the Predictive Characteristics for Sustainability of Canadian Charities".

2014/05 Volunteer at **Statistical Society of Canada 2014 Annual Meeting**