Zhongyuan (Jasper) Zhang

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ACADEMIC CREDENTIALS

Ph.D. in Biostatistics — University of Toronto
- Advisor: Dr. Wei Xu — 2022 - 2026 (Expected)
- CGPA: 3.96/4.0

M.Sc. in Biostatistics — University of Toronto, 2019 - 2021
- Thesis: Tightly Integrated Multiomics-based Deep Tensor Survival Model for Time-to-Event Prediction
- Advisors: Dr. Wei Xu, Dr. Pingzhao Hu, Committee: Dr. Osvaldo Espin-Garcia
- CGPA: 3.96/4.0

B.Math. in Computer Science, Computational Mathematics, Statistics — University of Waterloo, 2015 – 2019

RESEARCH EXPERIENCE

Research Analyst — 2022 - Present
Child Health Evaluative Sciences, The Hospital of Sick Children (SickKids) — Toronto, ON
Supervisor: Dr. Petros Pechlivanoglou
- **COVID-19 Transmissions Simulation:** Developed a highly efficient agent-based model in R. Available transmission locations: home, school, university, workspace.
- **COVID-19 Hospital Resources Discrete Event Simulation:** Developed hospital resources (ICU, ventilator, Ward) simulation model adapting COVID-19 case prediction using wastewater signal data.
- **Survival Curve Digitizer SurvdigitizeR** R package**:** Developed R package to automate the digitization of published Kaplan-Meier curves.

Non-appointed ICES agent (NAIA) — 2022 - Present
The Institute for Clinical Evaluative Sciences (ICES) — Toronto, ON
- Conducted research projects and data analysis within the AHRQ portfolio at ICES Central.

PhD First-year Practicum Student — 2022 - 2023
Biostatistics Division and IHPME, University of Toronto — Toronto, ON
Supervisors: Dr. Rafal Kustra, Dr. Davide Chicco
- **CLSA Cognitive States Clustering:** Investigated temporal changes in clusters at two time points (baseline and follow-up) with robust validation and consistency evaluation to understand cognitive states' patterns and obtain interpretable clusters for patient health condition trajectories.

Research Assistant 2019 - 2021
Biostatistics Department, Princess Margaret Cancer Centre, UHN Toronto, ON
Department of Biochemistry and Medical Genetics, University of Manitoba (Remote)
Supervisors: Dr. Wei Xu, Dr. Pingzhao Hu

- **Master Thesis Project**: Developed a deep tensor algorithm for survival prediction on cancer data from The Cancer Genome Atlas Program (TCGA). Achieved better survival prediction performance using a tight data integration approach on multiple genomic data types than loose data integration.
- **Hodgkin Lymphoma (HL) Late Relapse Project**: Collaborated and supported clinicians in providing statistical analysis, including survival analysis, data visualization, and univariate analysis. Produced report, discovered, and analyzed the effect of the clinical risk factors of HL.
- **reportRx** R package: Maintained and developed compatibility features for multiple computer systems and platforms (Linux, Windows, macOS).

Research Assistant 2018 - 2019
Department of Community Health Sciences, University of Manitoba Winnipeg, MB
Supervisor: Dr. Depeng Jiang

- Developed clustered network model for predicting mental health problems on the community-based data (Manitoba Grade 5 students Mental Health Strengths & Difficulties Questionnaires).
- Applied unsupervised learning methods (K-means, Hierarchical Clustering) to identify the pattern of children's mental health, such as children with antisocial behaviour.

INDUSTRY EXPERIENCE

Software Developer Intern 2018
Oracle Nanjing, China

- Implemented performance test and optimization on MySQL Cluster (Stress test on CPU, IO, Memory, OLTP using SQL benchmark tool: sysbench).
- Built customer flow forecasting model using ARIMA and XGBOOST (Python).

TEACHING ACTIVITIES

Teaching Assistant University of Toronto

- **CHL5230 Applied Machine Learning for Health Data,** Instructor: Prof. Zahra Shakeri 2023 Fall
- **CHL5209 Survival Analysis I,** Instructor: Prof. Kevin Thorpe 2023 Winter
- **STA 305 Design of Scientific Studies**, Instructor: Prof. Nathan Taback 2019 Fall

Workshop Instructor in the Health Data Working Group University of Toronto

- Intro to Deep Learning - Applications in Image Data Analysis and Medical Research Oct 2023

- Intro to Deep Learning - Image Classification from Scratch — April 2023

INVITED TALKS, SEMINARS and WORKSHOPS

Invited Speaker in VADA Graduate Training Program, Univ Manitoba/Victoria — Winnipeg, MB

- Intro to Deep Learning - Applications in Medical Research (Workshop) — June 2023

MENTORING

Internship supervision at SickKids Research Institute
Qiyue (Lily) Zhang (BSc Statistics, Queens University) — Summer 2023

SERVICE

Workshop Instructor and Student Member — 2023 - Present
Health Data Working Group, DLSPH — University of Toronto
Organized and Conducted workshops to promote the adoption of programming-related tools to enhance public health research outcomes.

Biostatistics Section Editor — 2022 - Present
University of Toronto Journal of Public Health (UTJPH) — University of Toronto

Co-President — 2022 - 2023
Student-Led Seminar Co-Chair — 2019 - 2020
Biostatistics Union of Graduate Students (BUGS) — University of Toronto

Panel Moderator — 2022
DLSPH 15th Annual Student-Led Conference — University of Toronto

AWARDS

Roche Canada Scholarship in AI for Population Health	$10000	2023
John Hsieh Award, DLSPH, University of Toronto	$ 300	2022-2023
First Prize Virtual Poster Presentation at Canadian Statistics Student Conference (CSSC 2023)	$ 100	2023
DLSPH Graduate Award in Data Science for Population Health and Health System	$ 10000	2023 - 2024
University of Toronto Doctoral Fellowship	Variable	2022 - 2026

University of Waterloo President's Scholarship	$ 2000	2015
DLSPH Conference Travel Award	$ 145	2023
CADTH Symposium Travel Award	$ 2150	2023
Statistical Society of Canada (SSC) Annual Meeting Student Grant	$ 100	2023

PUBLICATIONS (PEER-REVIEWED)

1. Bernard, C., **Zhang, J.Z.,** Klieb, H., Blanas, N., Xu, W., Magalhaes, M. (2023). Clinical outcomes of oral epithelial dysplasia: Observation vs. excision at a Canadian tertiary center. *Head & Neck.*

2. Cherniawsky, H., Ting, E., **Zhang, J.Z**., Xu, W., Prica, A., Bhella, S., Yang, C., Kridel, R., Vijenthira, A., Kukreti, V., Crump, M., Kuruvilla, J. (2023). Very late relapse in Hodgkin lymphoma: Characterizing an understudied population. *Clinical Lymphoma, Myeloma and Leukemia.*

3. **Zhang, J. Z.,** Xu, W., Hu, P. (2022) "Tightly Integrated Multiomics-based Deep Tensor Survival Model for Time-to-Event Prediction" *Bioinformatics, Oxford.*

4. Liu, Q., Huang, S., **Zhang, Z.,** Lakowski, T., Xu, W., Hu, P. (2021). "Multiomics-based Tensor Decomposition for Characterizing Breast Cancer Heterogeneity". Invited chapter for "Machine Learning Methods for Multi-Omics Data Integration" edited by Luis Rueda. *Nature Springer -Verlag Press.*

5. Jiang, D., Lin, Y., **Zhang, Z.,** Jiang, S. (2020) "Estimating Unknown Change Points and Variation Using SAS." *Proceedings of SAS Global Forum 2020*

6. Wu, S. Q., Wang, Y., **Zhang, Z.** (2019) "Large-scale Hydraulic Engineering Vehicle Detection Based on SSD." *Proceedings of IEEE Big Data Service and Applications*

CONFERENCE PRESENTATIONS (PEER-REVIEWED)

1. **Zhang, J. Z**, Neimark, D.M.J., Sander, B., Pechlivanoglou, P. (2023) "Guidance for Developing Agent-based Models for Infectious Diseases in R." Society for Medical Decision Making 45th Annual North American Meeting (**Poster Presentation)**

2. **Zhang, J. Z.,** Rios, J. D., Pechlivanoglou, T., Yang, A., Zhang, Q., Cromwell, I., Pechlivanoglou, P. (2023) "An Algorithm for Automated Survival Curve Digitization." Society for Medical Decision Making 45th Annual North American Meeting (**Poster Presentation)**

3. **Zhang, J. Z.,** Rios, J. D., Pechlivanoglou, T., Yang, A., Zhang, Q., Cromwell, I., Pechlivanoglou, P. (2023) "SurvdigitizeR: R Package to Automate the Digitization of Published Kaplan-Meier Curves." T-CAIREM AI in Medicine Conference 2023 (**Poster Presentation**)

4. **Zhang, J. Z.,** Xu, W., Hu, P. (2023) "Multiomics Integration with Deep Tensor Factorization for Cancer Survival Analysis" 2023 Joint Statistical Meetings (JSM2023) (**Oral Presentation**)

5. **Zhang, J. Z.,** Rios, J. D., Pechlivanoglou, T., Yang, A., Cromwell, I., Pechlivanoglou, P. (2023) "SurvdigitizeR: R Package to Automate the Digitization of Published Kaplan-Meier Curves." R-HTA Workshop 2023 (**Oral Presentation**)

6. **Zhang, J. Z.,** Xu, W., Hu, P. (2023) "Integrating Multiomics Data Using Deep Tensor Factorization for Survival Outcomes Prediction" 2023 SSC Annual Meeting (SSC2023) (**Oral Presentation**) *Student Travel Grant**

7. Li, L., **Zhang, J. Z.,** Zhuang, Z., Zhang, Q. (2023) "Optimizing Patient Flow in Emergency Department Using Multistate Model and Discrete Event Simulation" 2023 SSC Annual Meeting (SSC2023) (**Poster Presentation in SSC Case Study Competition**)

8. **Zhang, J. Z.,** Rios, J. D., Pechlivanoglou, T., Yang, A., Cromwell, I., Pechlivanoglou, P. (2023) "SurvdigitizeR: R package to automate the digitization of Kaplan-Meier Curves." The Eleventh Annual Canadian Statistics Student Conference (2023 CSSC) (**Poster Presentation***) First Prize Virtual Poster Presentation**

9. **Zhang, J. Z.,** Neimark, D.M.J., Sander, B., Pechlivanoglou, P. (2023) "Agent-based Model for infection disease." 2023 CADTH Symposium (**Poster Presentation**) *Student Travel Award**

10. **Zhang, Z.** Xu, W., Hu, P. (2020) "Deep Tensor Factorization for Survival Prediction" The Eighth Annual Canadian Statistics Student Conference (2020 CSSC) (**Oral Presentation**)

SOFTWARES

1. **SurvdigitizeR (R Package)**
   - Authors: **J. Z. Zhang**, J. D. Rios, T. Pechlivanoglou, A. Yang, Q. Zhang, I. Cromwell, P. Pechlivanoglou
   - Description: An R package designed to automate the digitization of published Kaplan-Meier Curves, facilitating the extraction of survival probability data for meta-analysis.
   - Availability: Available on GitHub at github.com/Pechli-Lab/SurvdigitizeR

2. **KM Survival Curve Digitizer (RShiny App)**
   - Authors: Q. Zhang, **J. Z. Zhang**, P. Pechlivanoglou
   - Description: An RShiny application that provides an interactive platform for digitizing Kaplan-Meier survival curves from published research.
   - Availability: Hosted online at pechlilab.shinyapps.io/Shiny-KMcurve/

3. **Multiomics-based Deep Tensor Survival Model for Time-to-event Prediction (Python, MATLAB)**
   - Authors: **J.Z. Zhang**, W. Xu, P, Hu
   - Description: Tightly integrated multi-omics-based deep tensor survival model for time-to-event prediction
   - Availability: Available on GitHub at https://github.com/jasperzyzhang/DeepTensorSurvival

TECHNICAL PROFICIENCIES

Programming Languages: Python, C++, C, R, MATLAB, SQL, SAS
Data Science: Numpy, Pandas, scikit-learn, Tidyverse
Computing Tools: Kubernetes, Docker, UNIX, HPC platform (Compute Canada, Sickkids)
Deep Learning: TensorFlow, Keras, Pytorch, NLTK, Hugging Face
Human Languages: English, Mandarin Chinese and Nanjing Dialect

CERTIFICATES and ADVANCED TRAINING

SAS Certified Advanced Programmer for SAS 9	2018
SAS Certified Base Programmer for SAS 9	2018

MEMBERSHIPS

Statistical Society of Canada (SSC)	2019 - Present
American Statistical Association (ASA)	2022 - Present
Temerty Centre for AI Research and Education in Medicine (T-CAIREM)	2022 - Present
Data Sciences Institute, University of Toronto	2022 - Present