# Xiangjie **Xue**

PASSIONATE ABOUT PROGRAMMING · DRIVEN BY STATISTICS

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## Overview

- PhD in Statistics, BSc (Hons) in Statistics and BSc in Applied Mathematics and Operations Research.
- Experience in various software and environment, including R, C++, Git and Unix.
- Advanced statistical modelling and inference, spatial analysis, machine learning and mathematical background.
- Strong programming skills and ability to learn a new programming language or software fast.
- Experienced in handling large and complex data and performing tasks on HPCs.
- Strong communication skills and time management skills.
- Two publications in preparation.

## Experience

### The University of Auckland — *Auckland*

RESEARCH ASSISTANT (CASUAL) — *Mar. 2021 -*

- **Project**: Statistical programming for temporal-spatial models
- **Responsibilities**: Use template model builder to estimate the parameters for various temporal-spatial models. This includes the use of Hawkes process, stochastic partial differential equations and Gaussian Markov random field.
- **Key Tools**: R and C++. More specifically, use Eigen numerical library (the R package RcppEigen), automatic differentiation (The C++ package CppAD) and template model builder (the R package TMB).

### The University of Auckland — *Auckland*

PART-TIME (GRADUATE) TEACHING ASSISTANT — *Mar. 2013 - Jul. 2020*

- **Responsibilities**: Provided guidance to students with various assignment questions, which includes explaining and clarifying concept, as well as debugging the R codes required by those courses.

### The University of Auckland — *Auckland*

SUMMER RESEARCHER — *Nov. 2015 - Feb. 2016*

- **Project**: A Topic in Statistical Computing: Quadratic Reduced-Rank Vector Generalised Linear Models
- **Responsibilities**: Investigate several fundamental tools for statistics specifically for Quadratic Reduced-Rank Vector Generalised Linear Models and implement them.
- **Key Tools**: R, C, probability theory and numerical optimisation.
- **Achievement**: Understand more about the process of doing research and statistical computing and the rigorousness that a researcher should have. Develop understanding of the underlying structure of the statistical software R. Some of the functions have been incorporated into VGAM package in R.

### The University of Auckland — *Auckland*

SUMMER RESEARCHER — *Nov. 2013 - Feb. 2014*

- **Project**: Dynamics in 3D Hodgkin-Huxley System
- **Responsibilities**: Use numerical techniques to explore solutions to the Hodgkin-Huxley equations as system's parameters are varied, and focused on finding the attracting solution for each of parameters.
- **Key Tools**: Matlab and partial differential equations.
- **Achievement**: Develop mathematical understanding of the complicated dynamics in this important physiological model as well as systems of partial differential equations. Learn to deal with frustration and grow resilience towards the frustration.

## Education

### The University of Auckland — *Auckland*

PHD IN STATISTICS — *May. 2016 - Mar. 2021*

- Large-scale Inference Using Non-parametric Mixtures, with applications on multiple hypothesis testing and covariance matrix estimation.
- Some work was presented externally as a presentation in NZSA2017 (New Zealand Statistical Association 2017 in Auckland) and as a *poster* in JSM2019 (Joint Statistical Meeting 2019 in Denver, US.)

### The University of Auckland — *Auckland*

BACHELOR OF SCIENCE (HONOURS) — *Mar. 2015 - Nov. 2015*

- Major in Statistics and graduated with First Class Honours (GPA: 8.25/9).
- The *Honours dissertation* is about using simulation to find the largest radius in the complement of the Brownian motion in two-dimensional torus.

**The University of Auckland** *Auckland*

Bachelor of Science *Mar. 2012 - Nov. 2014*

- Major in Applied Mathematics and Operations Research (GPA: 8.85/ 9)

**The University of California, Los Angeles** *Los Angeles, US*

Exchange Student *Sep. 2014 - Dec. 2014*

- A non-degree exchange programme provided by the University of Auckland (GPA: 4/4).

## Research

**Large-scale Inference Using Non-parametric Mixtures** *The University of Auckland*

PhD Project supervised by Dr. Wang Yong *May. 2016 - Mar. 2021*

A new approach to solving large-scale inferential problems using non-parametric mixtures is proposed. In particular, it is applied to solve several statistical problems, including the difficult problems in multiple hypothesis testing and covariance matrix estimation. This approach successfully makes use of the fast computation of a non-parametric maximum likelihood estimate and the advantages of empirical Bayes. Numerical studies have shown that our approach out-performs existing methods.

**Gap Properties of Brownian Motion on the Two-dimensional Unit Torus** *The University of Auckland*

Honours Dissertation supervised by Dr. Mark Holmes and Dr. Jesse Goodman *Mar. 2015 - Nov. 2015*

The tail distribution of the global largest radius in the complement of the Brownian motion on two-dimensional unit torus is studied using simulations. Observations are simulated using **C** and then fitted with power-law distributions using two different approaches in **R**. The accuracy of the estimated circles is also assessed by looking at the movement of a Brownian motion between two consecutive points in the simulated random walks.

## Awards and Scholarships

- First in Course Award in Multivariate Analysis (2016)
- University of Auckland Doctoral Scholarship (2016)
- Summer Research Scholarship in Statistics (2015)
- First in Course Award in Topics in Statistical Inference (2015)
- The $360^\circ$ Auckland Abroad Exchange Travel Awards (2014)
- Senior Scholar Award in the Faculty of Science (2014)
- Summer Research Scholarship in Mathematics (2013)
- First in Course Award in Stochastic Processes (2013)

## Reference

Available upon request