

FENGNAN DENG

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EDUCATION

George Mason University

Aug 2025 (expected)

PhD in Statistical Science

Related courses: Probability Theory, Mathematical Statistics, Statistical Learning and Data Analytics, Categorical Data Analysis.

Rutgers University

May 2019

M.S. in Statistics

Related courses: Foundations of Financial Statistics and Risk Management, Time Series Analysis, Data Mining, Linear Models and Advanced Regression Modeling.

Shandong University

May 2017

B.S. in Mathematics

Related courses: Mathematical Analysis, Linear Algebra, Real Analysis, Stochastic Processes, Differential Equations.

RESEARCH INTERESTS

My focus includes developing computational methods guided by theoretical considerations. I work on creating robust and efficient inference techniques, particularly for private data analysis and temporal event modeling, which involves analyzing and predicting events over time. Additionally, I explore high-dimensional statistical models to study rare events and credit risk in financial portfolios.

Keywords: Differential Privacy, Hawkes Processes, Branching Processes, Large Deviations.

RESEARCH EXPERIENCE

Hellinger differential privacy and noisy optimization methods

2021 - Present

Supervisor: Anand N. Vidyashankar

George Mason University

- Developed a novel differential privacy framework unifying several existing mechanisms.
- Developed computational methods for private, robust, and efficient inference.
- Created noisy version of gradient descent and Newton Raphson methods.
- Performed numerical experiments to compare various differential privacy mechanisms using Matlab.
- Created a Python package to implement the developed methods.

Sparse high-dimension models for portfolio credit risk

2021 - Present

Supervisor: Anand N. Vidyashankar

George Mason University

- Investigated total default loss of a portfolio.
- Developed asymptotic distribution theory for total default loss.
- Extended these methods to cases when number of factors and types of obligors diverge.

Sharp Large Deviation Estimates for Branching Processes with Immigration

2021 -

Present

Supervisor: Anand N. Vidyashankar

George Mason University

- Investigated sharp large deviation behaviors for branching processes with immigration, conditioned on different growth rates.
- Studied properties of probability generating functions for branching processes with immigration.
- Established the local limit theorem for various growth rates, and revealed the oscillation property for small growth rate.

Robust inference for Hawkes process with application to healthcare data 2021 - Present
Supervisor: Anand N. Vidyashankar George Mason University

- Developed and fitted Hawkes process model to healthcare data.
- Performed numerical experiment using thinning algorithm.
- Developed density power divergence based inference.
- Investigated the robustness properties both numerically and theoretically using Matlab.
- Established a relationship between the Hawkes process model and the integer-valued autoregression model.

Building categorical models to determine forest cover types in mountain area 2019
Supervisor: Zijian Guo Rutgers University

- Predicted tree types based on environment information such as 'Distance To Roadways', 'Soil Type', 'Slope in degrees' and so on.
- Used R to apply LDA, QDA, SVM, KNN models to do the prediction.
- Built up decision tree and random forest models to the data. Compared with other models, random forest method gave the most accurate prediction.

PUBLICATIONS

- Deng, F. and A. N. Vidyashankar (2025a). Local limit theorem and large deviations for branching process with immigration.
- Deng, F. and A. N. Vidyashankar (2025b). Portfolio credit risk using high dimensional factor models.
- Deng, F. and A. N. Vidyashankar (2025c). Private and robust inference for hawkes process data and integer valued auto regression.
- Deng, F. and A. N. Vidyashankar (2025d). Private minimum hellinger distance estimation via hellinger distance differential privacy.

PRESENTATIONS

Invited speaker

- Computational and Financial Econometrics (CFE) and Computational and Methodological Statistics (CMStatistics) 2024. *Dec 14 2024, King's College London, UK*
Session: Branching and related processes.
Title: Sharp large deviations for branching process with immigration.
- International Conference on Robust Statistics (ICORS) 2024. *July 29 2024, VA, USA*
Session: Differential Privacy And Robustness.
Title: Hellinger Differential Privacy and Its Application to Hawkes Processes.
- Western North American Region (WNAR) 2024. *June 10 2024, CO, USA*
Session: Privacy Analytics: Theory and Applications.
Title: Privacy preserving synthetic Hawkes process data.

Contributed speaker

- Joint Statistical Meetings (JSM) 2024. *Aug 6 2024, OR, USA*
Session: New Methods for Correlated Data.
Title: Robust privacy preserving estimator for Hawkes process.

TEACHING EXPERIENCE

Teaching Assistant for 'Probability and Statistics for Engineers and Scientists' 2019-2022

- Held office hours to assist students with course material and questions.
- Conducted practice and homework classes to reinforce concepts and help students with assignments.
- Graded homework and provided feedback to students to improve their understanding of the subject.

SERVICE EXPERIENCE

Volunteer for ICORS 2024 Meeting	2024
<ul style="list-style-type: none"> · Assisted in organizing and coordinating conference activities. · Helped with registration and provided support to attendees. · Provided technical support during sessions and events to ensure smooth operation. 	

ACHIEVEMENTS

Washington Statistical Society Outstanding Graduate Student Award	2022
Shandong University Scholarship	2014

SKILLS

Programming Languages	Matlab, R, Python, SAS, SQL, C++
Others	Strong written and verbal communication, teamwork and collaboration, adaptability and flexibility.