

Yuan Fang

Contact Information

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EDUCATION

Doctor of Philosophy, Statistics/Mathematics August 2020
Binghamton University, Binghamton, NY
Advisor: Dr. Sanjeena Subedi (Dang)
Dissertation Title: “Model-based clustering approaches for non-Gaussian data“

Master of Arts, Mathematics
Binghamton University, Binghamton, NY May 2016

Bachelor of Science, Mathematical Physics
University of Waterloo, Waterloo, ON, Canada June 2014

EMPLOYMENT AND RESEARCH EXPERIENCE

Boston University School of Public Health September 2020 - present
Department of Biostatistics
Postdoctoral Associate, Supervisor: Dr. Kathryn Lunetta

- Investigate associations between circulating inflammatory biomarkers, cognitive, and brain aging outcomes using the Framingham Heart Study (FHS) data.
- Analyze data on immune cell phenotypes and explore their associations with cognitive outcomes in the FHS.
- Model heterogeneity in cognitive decline using the longitudinal Neuropsychological test data in the FHS.

Binghamton University / Carleton University May 2020 - present
Research Assistant / Ongoing collaboration, PI: Dr. Utkarsh Dang

- Model trajectories of motor performance in Duchenne Muscular Dystrophy using both natural history data and clinical trials data.

PROFESSIONAL EXPERIENCE

Binghamton University, Teaching Online Certification Program January – May 2019
Online Course Developer

- Reorganize an existing course and extend it to fit online instructing structure.
- Record lecture videos, include engaging course content and activities, and design assessments for the course that are suitable online.

Binghamton University January – May 2017
Statistical Consultant

- Provide statistical consultations on study designs, analysis methods, and results interpretations to faculty, research staff, and graduate students in all departments of Binghamton University.

PUBLICATIONS

- **Fang, Y.**, Doyle MF, Chen J, Alosco ML, Mez J, Satizabal CL, Qiu WQ, Murabito JM., Lunetta KL, “Association between protein biomarkers and cognitive aging”. *PloS one*. 2022 Sep 9;17(9):e0274350. [doi]. [PMID: 36083988].
- **Fang, Y.**, Karlis, D., Subedi, S., “Infinite Mixtures of Multivariate Normal-Inverse Gaussian Distributions for Clustering of Skewed Data”. *Journal of Classification*. 2022 Aug 23:1-43. [doi].
- **Fang, Y.**, Doyle MF, Alosco ML, Mez J, Satizabal CL, Qiu WQ, Lunetta KL, Murabito JM. “Cross-Sectional Association Between Blood Cell Phenotypes, Cognitive Function, and Brain Imaging Measures in the Community-Based Framingham Heart Study”. *Journal of Alzheimer’s Disease*. 2022;87(3):1291-1305. [doi]. [PMID: 35431244].

SUBMITTED

- **Fang, Y.**, MacDonald, C., Clemens, P., Gordish-Dressman, H., Hoffman, E., and Dang, U., “Modeling early heterogeneous rates of progression in Duchenne muscular dystrophy boys”. (Under review at *Journal of Neuromuscular Diseases*).
- **Fang, Y.**, Subedi, S., “Clustering microbiome data using mixtures of logistic normal multinomial models” (Major revision at *Statistics in Medicine*). [Preprint]

IN PREPARATION

- **Fang, Y.**, Karlis, D., Subedi, S., “A Bayesian Approach for Clustering Skewed Data Using Mixtures of Multivariate Normal-Inverse Gaussian Distributions”. [Preprint]
- **Fang, Y.**, Franczak, B., and Subedi, S. “Bayesian parameter estimation for mixtures of shifted asymmetric Laplace distributions”.
- Dai, W., **Fang, Y.**, Subedi, S., “Variational Gaussian approximation to finite mixtures of logistic normal multinomial regression models”.

PRESENTATIONS

- “Immune cell phenotypes in the Framingham Heart Study Offspring participants”, The Gerontology Society of America 2022 Annual Scientific Meeting, Indianapolis, IN (Poster presentation, Nov 2022).
- “Mixtures of logistic-normal multinomial regression models for microbiome data”, Statistics Seminar, Department of Mathematics & Statistics, Texas Tech University, online (Oct 2022). *Invited*.
- “Evaluation of latent-class mixed-effect models for trajectory clustering in complex data sets through simulation studies”, 2022 Joint Statistical Meetings, Washington, D.C. (Aug 2022).
- “Association of inflammatory proteins with cognitive aging, brain MRI markers, and incident dementia”, 2022 Alzheimer’s Association International Conference, online (Poster presentation, Aug 2022).
- “Association of blood cell phenotypes of peripheral inflammation with brain imaging measures”, The Gerontology Society of America 2021 Annual Scientific Meeting, online (Poster presentation [doi], Nov 2021).
- “Patterns of cognitive trajectories in the Framingham Offspring Study - some preliminary analysis”, Biostatistics Seminar Series, Boston University, Department of Biostatistics (Sep 2021).
- “Cross-sectional association of blood cell phenotypes of peripheral inflammation with cognitive functioning”, 2021 Alzheimer’s Association International Conference, online (Poster presentation [doi], July 2021).
- “Bayesian infinite mixtures of multivariate normal-inverse Gaussian distributions for clustering of skewed data”, Fields CQAM Focus Program on Data Science and Optimization, Conference on Data Science, Toronto, Canada (Nov 2019). *Invited*.
- “Bayesian infinite mixtures of multivariate normal-inverse Gaussian distributions for clustering of skewed data”, 2019 American Mathematical Society Fall Eastern Sectional Meeting, Binghamton, NY (Oct 2019). *Invited*.

- “A Bayesian approach to parameter estimation and clustering of skewed data using mixtures of multivariate normal-inverse Gaussian distributions”, Binghamton University Research Days Poster Session (Poster presentation April 2019).
- “Bayesian approach to parameter estimation and clustering for the mixtures of multivariate normal-inverse Gaussian distributions”, Statistics Seminar, Binghamton University Department of Mathematical Sciences (April 2018).
- “Bayesian estimation for the multivariate normal-inverse Gaussian model”, 2017 Joint Statistical Meetings, Baltimore, MD (Aug 2017).

SOFTWARE AND PROGRAMMING SKILLS

R Package

- **LNMVGA**: Mixture of logistic-normal multinomial models for clustering microbiome data
Github link: <https://github.com/yuanfang90/LNMVGA>

Programing Skills

R, Python, Shell Script, MATLAB, SASS.

TEACHING EXPERIENCE

Teaching Assistant Jan – May 2019, Jan 2020 – May 2020

PHRM 511: Biostatistics

Institute: School of Pharmacy and Pharmaceutical Sciences, Binghamton University.

Outlines: descriptive statistics, inferential statistics, hypothesis testing, non-parametric methods, simple and multivariable regression methods, and survival analyses.

Teaching Assistant

Jan – May 2019, Jan 2020 – May 2020

PHRM 515: Pharmaceutics II: Dosage Forms and Drug Delivery

Institute: School of Pharmacy and Pharmaceutical Sciences, Binghamton University.

Outlines: properties of dosage forms, drug delivery systems, technical and scientific considerations and methodologies required to produce dosage forms on a large scale, relationship of basic drug development and approval processes.

Instructor (Online)

July 2019, Dec 2019 – Jan 2020

MATH 329: Introduction to Scientific Computing

Institute: Department of Mathematical Sciences, Binghamton University.

Outlines: basics of programming in R: loops, reproducibility, graphics, data management, storage and retrieval, random number generation, matrix calculations, data simulation and numerical optimizations.

Teaching Assistant

Aug – Dec 2019

PHRM 501: Foundations I: Pharmaceutical Sciences

Institute: School of Pharmacy and Pharmaceutical Sciences, Binghamton University.

Outlines: foundations in Pharmacology, Medicinal Chemistry and Pharmacokinetics.

Teaching Assistant

Aug – Dec 2019

PHRM 514: Pharmaceutical Calculations I

Institute: School of Pharmacy and Pharmaceutical Sciences, Binghamton University.

Outlines: interpretation of prescription and medication administration orders; pharmaceutical

measurements; mathematical manipulations.

Instructor Oct – Dec 2018

MATH 227: Infinite Series

Institute: Department of Mathematical Sciences, Binghamton University.

Outlines: sequence; series; power series; Taylor series representation.

Instructor Mar – May 2017, Aug – Oct 2018

MATH 226: Integration Techniques

Institute: Department of Mathematical Sciences, Binghamton University.

Outlines: trigonometric functions; applications of integration; techniques of integration; indeterminate forms.

Instructor Oct – Dec 2016, Jan – Mar 2017, Mar – May 2018

MATH 225: Integral Calculus

Institute: Department of Mathematical Sciences, Binghamton University.

Outlines: antiderivatives; the fundamental theorem of calculus; integral and applications.

Instructor Aug – Oct 2016, Jan – Mar 2018

MATH 224: Differential Calculus

Institute: Department of Mathematical Sciences, Binghamton University.

Outlines: limits; continuity; derivatives and applications.

Instructor Aug – Dec 2017

MATH 220: Calculus for Business and Management

Institute: Department of Mathematical Sciences, Binghamton University.

Outlines: fundamental elements of calculus; emphasis on maximum and minimum problems.

Teaching Assistant Aug 2015 – May 2016

MATH 327: Probability with Statistical Methods

Institute: Department of Mathematical Sciences, Binghamton University.

Outlines: probabilistic concepts in discrete and absolutely continuous cases; classical combinatorial methods, independence, random variables, distributions, moments, transformations, conditioning, confidence intervals, estimation.

Teaching Assistant Jan – May 2015

MATH 130: Mathematics in Action

Institute: Department of Mathematical Sciences, Binghamton University.

Outlines: voting methods; counting; probability; normal distribution; statistical inference.

ACADEMIC SERVICE OUTSIDE UNIVERSITY

- Article Reviewer: Journal of Computational Biology
- Article Reviewer: Statistics and Computing
- Article Reviewer: Annals of the New York Academy of Sciences

UNIVERSITY LEVEL SERVICE

Graduate Student Ambassador for the Department of Mathematical Sciences, Binghamton University