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 pnflammation 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 asociation 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 processe.

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