Matthew Stuart

Assistant Professor of Applied Statistics
Loyola University Chicago

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Employment

- Loyola University Chicago – Department of Mathematics and Statistics
  Assistant Professor of Applied Statistics – 2022-Present
- Iowa State University – Center for Survey Statistics and Methodology (CSSM)
  Research Assistant – 2016-2017, 2020-2022
- SpiderSmart Katy Learning Center
  Online Instructor – 2021 - 2022
- Iowa State University – Department of Statistics
  Teaching Assistant – 2017-2019
- Transamerica Life Insurance Company
  Actuarial Student – 2014
  Actuarial Intern – 2013

Education

- **Ph.D.** Statistics – Iowa State University, July 2022
  Dissertation: "Statistical applications in actuarial science: From cryptocurrency to meme stocks to crop insurance"
- **M.S.** Statistics – Iowa State University, May 2019
  Creative Component: "A computationally efficient method for selecting a split questionnaire design"
- **B.S.B.A.** Actuarial Science – Drake University, May 2014

Publications

Journal Publications

- **Stuart, M.** and Yu, C. (2022), A computationally efficient method for selecting a split questionnaire design, *Communications in Statistics - Simulation and Computation*, Vol. 51, No. 5, 2464-2486. https://doi.org/10.1080/03610918.2019.1697819

Articles Under Revision or Review

- Follett, L., Kou, S., **Stuart, M.**, and Yu, C. (2022) [alph.], Inverse Leverage Effect for Cryptocurrencies and Meme Stocks: a Comprehensive Framework, under revision for *Operations Research* SSRN https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4284817
- **Stuart, M**, Yu, C., and Hennessy, D.A., The Impact of Stocks on Correlations between Crop Yields and Prices and on Revenue Insurance Premiums using Semiparametric Quantile Regression, under revision for American Journal of Agricultural Economics arVix https://arxiv.org/abs/2308.11805
- Hartnett, N.; Jing, P.; Zhang, B.; **Stuart, M.**; Wang, J., Impact of Wildfire Smoke on PM2.5 Levels in Chicago from 2019–2023, under review for Urban Climate

Articles in Preparation

- Evolution of Sexual Dimorphism in Fossil Stickleback (with Ozark, A., Siddiqui, R., Ghosh, A., Swank, S., Bell, M., Matthews, G., and Stuart, Y.)
- An Analysis of Cricket Results across Domestic Leagues (with Matthews, G., DeRango, L., and Rafique, H.)
- A Study of the Prevalence of Insect Types in Wetland Habitats (with Matthews, G., Ohsowski, B., Lishawa, S, and Schurkamp, S.)
- A Study of County Level Correlations between Crop Yields and Prices and their proximity to Core Production Areas (with Yu, C. and Hennessy D.A.)

Grants and Funding

- Finding Efficient Advances of the Hamiltonian Monte Carlo Algorithm with Continuous and Discrete Parameters
  - Principal Investigator
  - Funding Agency: National Science Foundation (NSF)
  - Amount Requested: $356,526
  - Status: Submitted (December 2024)

Advising

Graduate Students Advised

- Carol Jiang (Projected Graduation 2025)
- Leigha DeRango (Projected Graduation 2025)

Teaching Experience

Courses Proposed

- Loyola University, Chicago
  - DSCI 399: *Data Science Internship* - Proposed with Dr. Swarnali Banerjee and Dr. Gregory Matthews
    - Collaborating on the design and proposal of a course allowing data science undergradute students to receive course credit for internships
    - Planning to evaluate student progress and coordinate with direct supervisors as the course's internship coordinator

Courses Instructed

- Loyola University, Chicago
  - STAT 305/405: *Probability and Statistics II* – Spring 2023, Spring 2024, Spring 2025 (Scheduled)
    - Taught concepts such as unbiased estimators, consistency, sufficient statistics, uniformly most powerful tests, and Bayes estimators
  - STAT 410: *Categorical Data Analysis* – Spring 2025 (Scheduled)
    - Teaching Concepts such as logisitic and multinomial regression, chi-squared tests, ordinal data, small samples, and matched pairs
  - STAT 498: *Independent Study* – Spring 2025 (Scheduled)
    - Instructing Data Science Master's student Carol Jiang in Financial Mathematics

  - STAT 308: *Applied Regression Analysis* – Fall 2022, Spring 2023, Fall 2023, Spring 2024, Fall 2024
    * Taught concepts such as multiple linear regression, ANOVA, prediction intervals, model selection, and logistic regression
  - STAT 408: *Applied Regression Analysis* – Fall 2022, Spring 2023, Fall 2023, Spring 2024, Fall 2024
    * Taught concepts such as generalized linear models, non-linear regresison, time series regression, mixed effects models, and LASSO and ridge regression
  - STAT 335: *Introduction to Biostatistics* – Fall 2023
    * Taught concepts such as probability theory, normal distribution, central limit theorem, confidence intervals, hypothesis testing, and multiple comparisons
  - STAT 103: *Fundamentals of Statistics* – Fall 2022
    * Taught concepts such as probability theory, normal distribution, central limit theorem, confidence intervals, hypothesis testing, and linear regression

- Iowa State University
  - STAT 430: *Empirical Methods for the Computational Sciences* – Fall 2019
    * Taught concepts such as confidence intervals, t-tests, method of moments, maximum likelihood, and Bayesian statistics
  - STAT 226: *Introduction to Business Statistics I* – Fall 2017, Spring 2018, Fall 2018, Spring 2019
    * Taught concepts such as normal distribution, central limit theorem, confidence intervals, hypothesis testing, and linear regression
    * Ran weekly review session in Spring 2019 to help students review concepts that were troubling them

- SpiderSmart Katy Learning Center – Summer 2021, Fall 2021
  - AP Statistics
    * Taught concepts such as normal distribution, linear regression, sampling and experimental methods, and probability theory

Courses as Lab Assistant

- Iowa State University
  - STAT 326: *Introduction to Business Statistics II* – Summer 2019
    * Instructed Concepts such as multiple linear regression, ANOVA, and prediction intervals

Conference Presentations

Invited Presentations

- "Inverse Leverage Effect for Cryptocurrencies and Meme Stocks: a Comprehensive Framework", Fall 2022 Loyola University Data Science Seminar
- "Estimation of Asset Models with Stochastic Volatility and Asymmetric Laplacian Jumps and its Application to Cryptocurrency", 2021 Joint Statistical Meetings (JSM), Best Student Paper Award Presentation, Virtual 2021.
- "Estimation of Asset Models with Stochastic Volatility and Asymmetric Laplacian Jumps and its Application to Cryptocurrency", 14^{th} International Conference of Computational and Financial Econometrics, Virtual, 2020.

Contributed Presentations

- "The Impact of Stocks on Correlations between Crop Yields and Prices and on Revenue Insurance Premiums using Semiparametric Quantile Regression", Illinois Economic Association Conference, Chicago, IL, 2024.
- "Inverse Leverage Effect for Cryptocurrencies and Meme Stocks: a Comprehensive Framework", 2024 Joint Statistical Meetings (JSM), Portland, OR, 2024.
- "Inverse Leverage Effect for Cryptocurrencies and Meme Stocks: a Comprehensive Framework", Illinois Economic Association Conference, Chicago, IL, 2023.
- "A computationally efficient method for selecting a split questionnaire design", 2020 Communications on Statistical Practices (CSP), Sacramento, CA, 2020.
- "A computationally efficient method for selecting a split questionnaire design", JSM 2019, Denver, CO, 2019.

Contributed Posters

- "The Impact of Stocks on Correlations between Crop Yields and Prices and on Revenue Insurance Premiums using Semiparametric Quantile Regression", 2024 Agricultural and Applied Economics (AAEA) Annual Meetings, New Orleans, LA, 2024.

Co-authored Presentations

- "Inverse Leverage Effect for Cryptocurrencies and Meme Stocks: a Comprehensive Framework", 2024 Informs Anuual Meeting, Seattle, WA, 2024, presented by Steven Kou

Co-authored Posters

- "Investigating the Seasonal Impacts of Smoke on Fine Particle Pollution in Chicago": 2023 NASA - National Aeronautics and Space Administration Health and Air Quality Applied Sciences Team (HAQAST) Utah meeting, Salt Lake City, UT, 2023, presented by Nora Hartnett

Discussant

- "Chatbot or Humanaut? How the Source of Advice Impacts Behavior in One-shot Social Dilemmas", J. Jobu Babin and Haritima S. Chauhan, Illinois Economic Association Conference, 2023.

Committees Served

- Hiring Committee Member, Loyola University, Chicago Department of Mathematics and Statistics (November 2024 - Present)
  - Evaluated applications and coordinated with committee members on candidate assessments for open tenure track assistant professor positions
- Master's Students
  - Nora Hartnett (Spring 2024)

Professional Services

- Referee for Journals:
  - Statistical Methods and Applications
  - Journal of Quantitative Analysis in Sports
- Loyola University

  - Datafest (2023, 2024)
    * Helped organize data science competition sponsored by American Statistical Association
  - Introduction to R Short Course (2024, 2025)
    * Taught a three day short course on the basics of coding in R including basic arithmetic, data cleaning, data summarizing, and data visualization.
  - Teaching Seminar – Fall 2022
    * Gave talk on using RStudio and RStudio Cloud in classroom teaching
  - Recruitment Fair – Fall 2022, Fall 2024
    * Volunteered at high school recruitment event for mathematics, statistics, and data science
    * Volunteered at Loyola recruitment event to recruit data science students

- Iowa State University
  - Survey Working Group Student Coordinator – Spring 2022
    * Organized the schedule and weekly meetings for the survey working group
  - Graduate and Professional Student Senator (GPSS) – Fall 2019-Spring 2021
    * Represented the Department of Statistics in the Graduate Student Senate
    * Aided in passing annual budgets and developing a new GPSS constitution
  - Member of student organizations Stat-ers and StatCOM
    * Volunteered in annual STEAM night, which provides activities to teach statistics to elementary school students

Research Experience

Center for Survey Statistics and Methodology

- National Resources Inventory (NRI) Grazingland Survey: 2020-Present

  Assisted in weighting for single year and multi-year weights for NRI pastureland and rangeland surveys to help assess trends and status of health conditions on nonfederal grazinglands

- Pet Demographic Survey (PDS): 2016-2017

  Assisted in developing a representative survey for and calculating point estimates for the 5-year PDS from the American Veterinary Medical Association (AVMA)

Honors

- American Statistical Association (ASA)
  - 2021 Best Student Paper Award of the ASA Business & Economics Section ("Estimation of asset models with stochastic volatility and asymmetric Laplacian jumps and its application to cryptocurrency")

- Iowa State University
  - 2021 Research Excellence Award Recipient
  - 2021 Vince Sposito Award winner for Excellence in Statistical Computing
  - 2020 Teaching Excellence Award Recipient

- SOA Exams Passed
  - Exam C/4: May 2014
  - Exam MLC/3L: November 2013
  - Exam MFE/3F: March 2013
  - Exam P/1: January 2012
  - Exam FM/2: August 2011

Skills

Technological Skills

- R, C++, JMP, Excel, Shiny