Brian Neal **Curriculum Vitae**

Novato, CA
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Education

MA Mathematics San Francisco State University, expected May 2022
Thesis: An adaptive multivariate kernel-based test for association with multiple quantitative traits in high-dimensional data

BA Economics University of California at Santa Cruz, June 2010
Summa cum laude and Honors in the Economics major

Awards and Honors

- Travel award from the San Francisco Bay Area chapter of the American Statistical Association to present at the Joint Statistical Meetings, August 2021 (competitive award)

Research Publications and Working Papers

- Neal, Brian and He, Tao. "An adaptive multivariate kernel-based test for association with multiple quantitative traits in high-dimensional data." *Genetic Epidemiology* (not yet submitted).

Research Experience

- B. Neal and T. He. *An adaptive multivariate kernel-based test for association with multiple quantitative traits in high-dimensional data.* (MA thesis, in progress)
  - Developed an adaptive nonparametric kernel-based test of association between a high-dimensional feature set and a multivariate quantitative response with supervised methods for kernel selection and feature selection
  - Developed methods to reduce random variation in the P-value of the adaptive test
  - Developed an `R` package for the proposed test, written using a combination of `R` and `C++` for computational speed (available at `github.com/brianpatrickneal/AMKAT`)
  - Designed simulation studies in `R` to empirically evaluate the proposed methodology (code available at `github.com/brianpatrickneal/AMKAT_simstudy`)
  - *(In progress)* Applied the proposed test to genetic and neuroimaging data from an Alzheimer's study

Instructional Experience

Graduate Teaching Associate

San Francisco State University
Fall 2017 – Spring 2020

Instructor of record for over 300 students across 10 course sections totaling 22 semester units. Duties included lecturing; designing and planning course curriculum and content; grading; holding office hours; facilitating group work for class sizes ranging from under 20 to over 40.

Primary instructor for the following courses:

Math 122 Mathematics for Statistical Quantitative Reasoning
Spring 2019 – Spring 2020 (5 sections)

Math 123 Mathematics for Elementary Statistics
Fall 2018, Fall 2019, Spring 2020

Math 60 Entry Level Math
Fall 2017, Spring 2018

Instruct'l Student Assistant

San Francisco State University
Fall 2018 – present

Graded quizzes and homework for 16 upper-division and graduate course sections in probability and statistics.

Grader for the following courses:

Math 748 Theory & Applications of Statistical & Machine Learning
Fall 2021

Math 442 Probability Models
Fall 2019, 2020, 2021

Math 440 Probability Theory
Fall 2018 – Fall 2021 (6 sections)

Math 448 Introduction to Statistical Learning & Data Mining
Spring 2020, 2021, 2022

Math 324 Probability & Statistics with Computing
Spring 2019, 2020, 2021 (4 sections)

Conference Presentations

- *An adaptive multivariate kernel-based test for association with multiple quantitative traits in high-dimensional data.* Presented at the Joint Statistical Meetings, August 2021

Technical Skills

Programming Languages	`R`, `C++`, `Python`
Markup Languages	LaTeX, `R Markdown`, `Sweave`
Software Development	◦ `R` packages with `C/C++` integration ◦ Version control and sharing with Git/GitHub ◦ Unit testing, `R` documentation files and vignettes, style standards, licensing and copyright
Software & Platform Knowledge	◦ `Stata` statistical software package ◦ `Armadillo C++` library for fast linear algebra and scientific computing ◦ `Rcpp R/C++` interface and syntactic sugar ◦ Parallel computing in `R` with `foreach`, `iterators` and `doParallel` ◦ Distributed computing with Apache Spark via Databricks platform or `sparklyr` R/Apache Spark interface ◦ `PLINK` software toolkit for managing and analyzing genomic data

Published Software

- Neal, Brian. AMKAT: An Adaptive Multivariate Kernel-Based Association Test. R package. https://www.github.com/brianpatrickneal/AMKAT

Professional Development

- *Empowering the Statistician with Spark, Machine Learning and Deep Learning.* ASA traveling short course. Online, October 9 – 10, 2021

Relevant Courses and Studies

Independent Study	Measure-theoretic Probability, Large Sample Theory, Reproducing Kernel Hilbert Spaces, Programming and Computing with Python
Graduate Courses	Measure and Integration, Advanced Linear Algebra, Commutative Algebra and Algebraic Geometry, Real Analysis, Mathematical Statistics, Rings, Modules and Field Extensions
Undergraduate Courses	Statistical Learning and Data Mining, Probability Theory, Probability Models, Linear and Discrete Optimization, Advanced Econometrics, Complex Analysis, Group Theory, Number Theory, Mathematical Proof

References

Tao He hetao@sfsu.edu	Assistant Professor, San Francisco State University *MA Thesis advisor; Grading supervisor* *Instructor: Statistical Learning and Data Mining*
Serkan Hosten serkan@sfsu.edu	Professor, San Francisco State University *Supervisor: Graduate Teaching Associate* *Instructor: Advanced Linear Algebra*
Alexandra Piryatinska alpiryat@sfsu.edu	Professor, San Francisco State University *MA Thesis committee member; Grading supervisor* *Instructor: Probability Theory, Probability Models*
Mohammad Kafai kafai@sfsu.edu	Professor, San Francisco State University *MA Thesis committee member* *Instructor: Mathematical Statistics*
Chun-Kit Lai cklai@sfsu.edu	Associate Professor, San Francisco State University *Instructor: Measure and Integration*