

Boyang Fu

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Education

- **University of California, Los Angeles** **Los Angeles, CA**
Ph.D., Computer Science (Advisor: Prof Sriram Sankararaman) *September 2019 - now*
- **Rutgers, The State University of New Jersey** **New Brunswick, NJ**
B.S (Summa cum laude). Computer Science & Mathematics *January 2016 – May 2019*

Relevant Courses

Linear Algebra	Convex Optimization	Graph Theory
Statistics Theory	Database Management	Algorithms
Principles Prog. Language	System Programming	Machine Learning
Operating System	Machine Learning	Bioinformatics

Skills

- **Programming Languages:** Python, R, C++, C, Java, MATLAB, Bash
- **Frameworks & Softwares:** TensorFlow, Keras, MySQL, Docker
- **Operating Systems:** Windows, Linux (Ubuntu), Unix.

Research and Internship

- **Machine Learning and Genomics Lab** **Los Angeles, CA**
UCLA, Advisor - Prof. Sriram Sankararaman *August 2019 – Now*
 - Developing interpretable machine learning algorithms and leverage them to find meaningful biological signals (Emphasis on counterfactual analysis and feature importance explanation).
 - Developing highly scalable statistical tools to model genetic architecture of complex traits (Emphasis on hypothesis testing, variance component estimation, kernel learning)
- **Independent Study & Research Assistant** **New Brunswick, NJ**
Rutgers University CS Department, Advisor - Prof. Desheng Zhang *May 2018 – May 2019*
Our research focuses on designing a new road construction algorithm that takes important road features (i.e. road type and speed limit) into account to generate a high-quality real-time map
 - Constructing the raw roadmap based on sparse GPS points and vehicle trajectory regeneration
 - Designing road construction algorithm through roadmap segmentation, then applying kernel density estimation on each segment to filter outliers and then use supervised learning to perform road type classification
 - Analyzing the influence of anomalies level and category to the passengers' waiting time based on spatio-temporal information.
- **Research Assistant, Bruins-In-Genomics (B.I.G.) Summer Program** **Los Angeles, CA**
University of California, Los Angeles, Advisor - Prof. Sriram Sankararaman *June 2018 – August 2018*

We developed a comprehensive benchmarking tool during the summer to compare 4 representative genome-wide association study algorithms under multiplexed simulated genetic architectures.

- Designed data simulation algorithm based on multiple underlying genetic structural assumptions and parameters
- Developed software to statistically compare the performance of different algorithms
- Designed theoretical performance threshold to detect the statistical power of each SNP by estimating the non-centralized parameter under the linear model assumption

Aresty Research Assistant

New Brunswick, NJ

- *Rutgers University Genetics Department, Advisor - Prof. Kevin Chen* **July 2017 – December 2017**
The objective of this research is to apply novel machine learning algorithms to the field of genetic association study

- Processed raw data, including DNA binary transformation, normalization, and sparse matrix data processing
- Researched performance comparison of dimension reduction algorithms (PCA and autoencoder) and performed feature analysis on SNPs dataset
- Applied DNNregressor to predict the numerical phenotype value based on SNPs sparse matrix and studied the best hyperparameters combination with the help of computer cluster

Publications

- "Marginal Contribution Feature Importance—an Axiomatic Approach for The Natural Case"
Authors: A Catav, **B Fu**, J Ernst, S Sankararaman, R Gilad-Bachrach. *arXiv*
- "A Statistical Model for Quantifying the Needed Duration of Social Distancing for the COVID-19 Pandemic"
Authors: N Rakocz, **B Fu**, E Halperin, S Sankararaman. *medRxiv*
- "PrivateBus: Privacy Identification and Protection in Large-Scale Bus WiFi Systems"
Authors: Zhihan Fang, **Boyang Fu**, Zhou Qin, Fan Zhang, Desheng Zhang *In ACM UbiComp 2020*
- "MAC: Measuring the Impacts of Anomalies on Travel Time of Multiple Transportation Systems"
Authors: Zhihan Fang, Yu Yang, Shuai Wang, **Boyang Fu**, Zixing Song, Fan Zhang, Desheng Zhang. *In ACM UbiComp 2019*

Teaching

- **Web Applications** **Los Angeles, CA**
UCLA Computer Science Department **March 2021 – Now**
- **Introduction to Formal Languages and Automata Theory** **Los Angeles, CA**
UCLA Computer Science Department **September 2020 – December 2020**
- **Learning Assistant of Calculus II** **New Brunswick, NJ**
Rutgers University Mathematics Department **September 2018 – May 2019**
- **Grader of Calculus III** **New Brunswick, NJ**
Rutgers University Mathematics Department **September 2017 – December 2017**

Poster & Presentation

1. Non-linear set-based association tests for Biobank-scale data

Boyang Fu, Mukund Sudarshan, Ali Pazokitoroudi, Kathryn Burch, Bogdan Pasaniuc, Lakshminarayanan Subramanian, Sriram Sankararaman; Annual meeting of the American Society of Human Genetics, Oct 2020, Virtual

2. Pandemic Prediction Modeling Tutorial

Boyang Fu; Focus on variation SIR models and IHME model and the implementation; Tutorial presentation on Bruins-In-Genomics Hackathon, July 2020, Virtual

3. Non-linear set-based association tests for Biobank-scale data

Boyang Fu, Mukund Sudarshan, Ali Pazokitoroudi, Kathryn Burch, Bogdan Pasaniuc, Lakshminarayanan Subramanian, Sriram Sankararaman; Probabilistic Modeling In Genomics, April 15 2021, Virtual

Award

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| ○ Graduate Division Fellowship Award | November 2020 |
| ○ Most Unique Hack Award in HackHer Competition, Rutgers University | February 2018 |
| ○ Best Use of Amazon Web Services in HackRU | October 2017 |
| ○ Academic Excellence Scholarship | 2016-2018 |
| ○ Rutgers University School of Arts and Sciences Dean's List | 2016-2018 |
| ○ Member of Phi Beta Kappa Society | from 2018 |
| ○ Member of Hall of Fame Data 101 | from 2016 |

Mentoring Experience

- Kevin Delao (Master Student) & Maya Singh (Undergrad student), Bruins in Genomics Summer Program.
Project title: An Analysis on the Performance of SHAP at Predicting Phenotypes in Complex Machine Learning Models