RUONAN (ELIZABETH) ZHAO
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EDUCATION

NEW YORK UNIVERSITY	New York, NY
The Courant Institute of Mathematical Sciences	
MS in Mathematics	09/2017 – 01/2020
UNIVERSITY OF CALIFORNIA, IRVINE	Irvine, CA
BS in Mathematics	09/2013 – 08/2017

RESEARCH INTERESTS

Recommender Systems, Interpretability of Machine Learning

PROJECTS

Nonallosteric Mechanism for Bounded and Ultrasensitive Chromatin Remodeling — 2020

- Analyzed chemical reaction network system under mass-action kinetics to determine steady state concentrations of specific chemical events
- Verified with theory accuracy from numerical algorithms
- Generalized probability of molecular events within microbiological system and plotted outcomes of multiple events in MATLAB

A Theoretical Analysis of the Comparison Between LIME and SHAP (*Link*) — 2019

- Mathematically proved that LIME fails when width of Gaussian kernel is arbitrarily small
- Reproduced key results from LIME in Python utilizing open source code and data
- Researched different options of kernels to verify theoretical claims of SHAP in Python

Chromatin Remodeling Using Percolation Theory — 2016 - 2017

- Tested percolation theory by using shortest-path algorithms in MATLAB to explain ultrasensitive transitions in chromatin remodeling

Finding Optimal Conversion Rate from Reticulate Body to Elementary Body of C. Trachomatis in a Cell (*Link*) — 2015

- Developed logistic growth model of *C. Trachomatis* to find optimal conversion rate and switch point between *C. Trachomatis* states
- Applied calculus of variations to find critical points in the transition between *C. Trachomatis* states
- Computed conversion rate of *C. Trachomatis* applying numerical methods in MATLAB
- Verified optimal conversion rate existence is dependent on the optimal switch point

HONORS/AWARDS/FELLOWSHIPS

- Undergraduate Research Opportunities Program (UROP) Scholarship Award — 2016
- Physical Science Summer Research Program (PHY7) Award — 2015

PRESENTATIONS

- Mathematics Association of America (MMA) So-Cal Section — 2016
- UCI Undergraduate Research Opportunity Program (UROP) Symposium — 2015

EXPERIENCE

UNIVERSITY OF CALIFORNIA, IRVINE	Irvine, CA
Research Assistant	04/2020 - Present

- Collaborated closely with research team to design, implement and test MATLAB programs for exploring properties of chromatin architectures
- Formally analyzed mathematical theories to prove experimented results
- Wrote and edited manuscript for publication

NEW YORK UNIVERSITY   New York, NY
Teaching Assistant for Probability, Statistics, & Decision Making   09/2019 - 12/2019

- Prepared recitations on graph theory, probability, statistics, and game theory for 50 students
- Cooperated with course instructors to keep track of recitations
- Evaluated students' performance by grading quizzes and final exams

Teaching Assistant for Data to Discovery Lab Sessions   09/2018 - 12/2018

- Supervised 50 students to work on lab assignments on analyzing large datasets in R
- Resolved any inquiries made by students
- Assessed students by grading midterm and final exams

TECHNICAL SKILLS/OTHER

Programming Languages: Python (numpy, pandas, scikit-learn, matplotlib), MATLAB, R (dplyr, ggplot2)
Other Softwares: LaTex, Git, Microsoft office
Languages: English (fluent), Mandarin (native)