

RUIYANG WU

Department of Mathematics, University of Arizona

617 N Santa Rita, Tucson, AZ 85721

(520) 312-0382 ruiyangwu@math.arizona.edu

https://ywwry66.github.io/personal_page

RESEARCH INTERESTS

- High-dimensional statistics, machine learning, geometry and topology

EDUCATION BACKGROUND

University of Arizona, Tucson, AZ

Aug 2016-Present

- Ph.D. in Mathematics
- GPA: 4.00/4.00
- Major Courses: *Real Analysis, Topology-Geometry, Algebra, Complex Analysis, Global Differential Geometry, Theoretical Statistics, Statistical Machine Learning, Recurrent Neural Networks*

University of Arizona, Tucson, AZ

Aug 2020-Dec 2020

- M.S. in Statistics and Data Science
- GPA: 4.00/4.00
- Major Courses: *Theory of Probability, Theory of Statistics, Theory of Graphs and Networks, Advanced Statistical Regression Analysis, Monte Carlo Methods, Design of Experiments, Statistical Consulting*

Peking University, Beijing, China

Sept 2012-Jun 2016

- B.S. in Mathematics
- Major Scores Average: 85.5/100
- Major Courses: *Mathematical Analysis, Advanced Algebra, Abstract Algebra, ODE, PDE, Real Analysis, Complex Analysis, Functional Analysis, Topology, Differential Geometry, Measure Theory*

University of California, Berkeley, CA

Jul 2014-Aug 2014

- Summer Session, GPA: 4.00/4.00
- Courses: *Introduction to Statistics, Game Theory*

RESEARCH EXPERIENCES

Rank Constrained QDA

Aug 2021-Present

Supervisor: **Prof. Ning Hao** | University of Arizona, Tucson, AZ

- Developed rank analysis for heteroscedastic models.
- Proposed appropriate conditions under which the sufficient subspace of a low rank heteroscedastic model can be calculated without inverting covariance matrices.
- Developed a rank reduction algorithm to implement a robust version of QDA which can handle high dimensional data.

TRIPODS Graduate Research Assistant

Aug 2018-May 2020

Supervisor: Prof. Ning Hao | University of Arizona, Tucson, AZ

- Analyzed massive astronomical data by feature selection, dimension reduction and deep learning techniques.

Rank Constrained Quadratic Regression

Aug 2018-Present

Supervisor: Prof. Ning Hao | University of Arizona, Tucson, AZ

- Proposed a low rank quadratic regression model that is more flexible than sparse quadratic models.
- Developed an algorithm to solve the low rank quadratic model, which finds the best rank one approximation in sequential order.

A New Approach to QDA

Jan 2017-Dec 2017

Supervisor: Prof. Ning Hao | University of Arizona, Tucson, AZ

- Proposed a classification and dimension reduction method based on the Quadratic Discriminant Analysis
- Derived some theoretical results of the method, including invariance under affine transformation and rank analysis
- Applied the method to real and simulated data, and compared it with LDA, QDA, RDA, etc.

High Dimension Data Analysis with Single Cell RNA Sequencing

Jun 2014-Jun 2016

Supervisor: Prof. Minping Qian & Prof. Daquan Jiang | Peking University, Beijing, China

- Reported papers about classic clustering algorithms including K-means, DBSCAN, SPADE, PCA, etc.
- Applied SPADE to flow cytometry data from leukemia patients and found some details which used to be ignored by clinical doctors
- Picked out message-carrying genes of RNA-sequencing data from the same patients and applied PCA to them
- Used quantile normalization to map these two data sets, and compared the clustering results

Social Network and Epidemic Spreading

Jan 2015-Feb 2015

Supervisor: Dr. Aming Li | Peking University, Beijing, China

- Analyzed the spread of epidemic using scale-free network model and optimized the strategy of giving medicine
- Generated a network based on real data set and performed randomized experiment to compare random immunization and selective immunization

CONFERENCE PRESENTATION

- “Quadratic Discriminant Analysis by Projection”, TRIPODS 2nd Southwest Summer Conference, Oracle, AZ, May 2019
- “Quadratic Discriminant Analysis by Projection”, ICSA 2018 Applied Statistics Symposium, New Brunswick, NJ, Jun 2018

AWARDS

- Galileo Circle Scholarship, University of Arizona Apr 2021
- Data Science Academy Fellowship, University of Arizona Nov 2020
- Galileo Circle Scholarship, University of Arizona Apr 2019

SKILLS

- Computer Programming: C, R, MATLAB, Emacs Lisp
- Languages: Mandarin(native), English(proficient)
- Interests: violin, chess, painting