# Zhengwei Song

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## EDUCATION

**Columbia University Mailman School of Public Health, New York City, NY**          Sep 2022 – Present

*MSc Biostatistics (GPA: 3.96)*

- Relevant Coursework: Biostatistical Methods I & II, Advanced Statistical Computing, Epidemiology, Data Science I & II
- Award: AAAI 2022 Security AI Challenger VIII Award (44 out of 3692)

**University of Manchester, Manchester, UK**          Sep 2019 – Jul 2021

*BSc Mathematics and Statistics (GPA: 3.65, with First Class Honours)*

- Relevant Coursework: Real Analysis, Statistical Inference, Markov Processes, Probability, Medical Statistics

**Shandong University, Jinan, China**          Sep 2017 – Jun 2021

*BSc Mathematics (GPA: 3.62, top 20%)*

- Relevant Coursework: Advanced Algebra I & II, Mathematical Analysis I - III, Geometry
- Award: Third-level Academic Scholarship

## RESEARCH EXPERIENCES

**Multi-region brain transcriptomes uncover two subtypes of aging 3 individuals with differences in Alzheimer risk and the impact of APOEε4, Assistant Professor Annie Lee Lab, Dept of Neurology, Columbia University**          Mar 2023 – Present

- Perform the adaptive gene-environment interaction test
- Implement mediation analysis among protein, gene expression, infarcts and Alzheimer Disease
- Conduct cluster analysis of Alzheimer's Disease patients, identifying distinct subtypes of aging individuals with differences in Alzheimer's risk and the impact of APOEε4

**Black-Scholes Pricing Model Data Simulation by Multilevel Monte-Carlo, Professor Kody Law Lab, Dept of Mathematics, University of Manchester**          Sep 2020 – Jun 2021

- Applied the Euler-Maruyama Method to solve the discretized linear stochastic differential equations on Ito Integral version
- Implemented Monte-Carlo simulation of expectations with strong and weak rates of convergence
- Deduced the properties of an independent estimator by a sequence of Monte-Carlo samples
- Applied Rejection Sampling to Black-Scholes pricing model and improved computational efficacy

**Edible Tableware based on Finite Element Analysis, Professor Song Yu Lab, School of Mathematics, Shandong University**          Apr 2019 – Apr 2020

- Led a team with diverse academic backgrounds and secured full funding (around $900)
- Designed and produced a chopstick-like mold, testing its mechanical characteristics
- Connected and partnered with local restaurants and pubs for testing and review

## WORK EXPERIENCES

**Biostatistics Intern, Medical Scientific Affairs Dept, Roche Diagnostics (Shanghai)**          Apr 2022 – Sep 2022

- Developed statistical methods for analyzing clinical trial data, including the development of novel approaches to address specific research questions and issues with existing methodologies
- Provided statistical support in preparation of regulatory submissions by developing analytical plans, performing analyses, interpreting results, and summarizing findings into concise reports that are understandable to non-statisticians

- Collaborated with the medical team to develop statistical analysis plans for clinical trials, including sample size calculations and power analyses
- Developed R package for linear mixed effects models for the tumor size over time by Bayesian inference using MCMC

### Data Analyst Intern, Information System Dept, Sina Weibo (Beijing)               Oct 2021 – Apr 2022
- Responsible for scraping data, wrangling data, and creating visualization for rankings in the entertainment section, and presented final statistics for several popular TV series, variety shows, and documentary
- Maintained Hive SQL and data warehouse services for business parties to support daily needs
- Analyzed user data and modelled user portraits to provide data support for social media influencers and internal operations

## SKILLS
### Computer
- R: tidyverse, caret, survival, bioconductor, ggplot2, httr, lme4, gee, etc.
- RShiny, C, MATLAB, SQL, Unix, Microsoft Office, AutoCAD

### Tests
- Continuous: t, z, ANOVA
- Categorical: chi-squared, Fisher's exact, McNemar's
- Non-parametric: sign, Wilcoxon signed-rank and rank-sum

### Modeling
- Linear: linear, logistic, weighted least squares, Poisson, mixed effect
- Model Selection: LASSO, Elastic net, Ridge, PCR, PLS, cross validations
- Non-parametric: decision tree, random forest, boosting, K-NN, cubic splines, local regression, GAM, MARS, LDA, QDA, NB, SVM
- Unsupervised: clustering (K-means, Hierarchical)

### Numerical/Optimization
- Data generation, Newton-Raphson, EM, bootstrapping, MCMC

### Epidemiology
- Causal Inference: Mediation, Confounder
- Study Design, Effect Modification, Meta-Analysis, Screening

## EXTRACURRICULAR ACTIVITIES
### Treasurer, Enactus, Shandong University                                        Oct 2018 – Oct 2019
- Tutored students in budget planning for every program
- Responsible for the entire budget arrangement of the organization
- Award: Enactus Annual Outstanding Individual (Top 10%)

### Secretary, Association of International Exchange, Shandong University          Oct 2017 – Oct 2018
- Assisted in events and activities for the international student exchange
- Trained students to avoid and bridge the gap of culture shock