

# Qitong Zhao

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Personal Website: <https://zqt0101.github.io/qzhao.github.io/>

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## Education

<b>Columbia University</b>		New York, NY
M.S. in Applied Mathematics	GPA: 3.666/4.000	08/2022-12/2023
<b>University of California, Santa Barbara</b>		Santa Barbara, CA
B.S. in Mathematics		09/2018-05/2022

## Publication

### **A Machine Learning Driven Approach on Evaluating Second-hand Housing Price, Heterogeneity Test, and Optimization Path**

Submitting on *Journal of Housing Economics* in Progress

Co-Author, Guided by Prof. Fan Zhang from Massachusetts Institute of Technology 04/2023-10/2023

(<https://zqt0101.github.io/qzhao.github.io/house-price/>)

- Assisted in examining factors influencing housing prices using a data set of 2799 second-hand units for sale
- Analyzed and compared the importance level of factors using regression trees, random forests and heterogeneity test methods
- Plotted marginal effect diagrams to unveil the nonlinear relationship between factors and price
- Drafted suggestions for government to supervise the supermarket and buyers to avoid overpaying based on the outcome of analysis for factors

## Research Experiences

### **Research on the Developmental Cognitive Neuroscience Mechanism and Intervention of Procrastination**

Research Assistant, Advised by Prof. Tingyong Feng from Southwest University 06/2021-09/2021

#### ➤ **Statistical Analysis on Cognitive Factors of Pupils' Susceptibility to Academic Procrastination and the Developmental Characteristics**

- Adopted the overall sampling method to collect experimental data and filtered out 4,120 sets of valid data from 5,048 sets of data
- Performed the independent t-test, correlation analysis, and 4×3 ANOVA to analyze individual differences in students' academic procrastination behavior
- Applied regression analysis, correlation analysis, and one-way ANOVA to analyze 4 cognitive susceptibility factors that affect primary school students' academic procrastination behavior such as self-control and emotion regulation

#### ➤ **The Empirical Study of the Mechanism of Cognitive Susceptibility Factors in Decision-making of Academic Procrastination**

- Assisted in experimental design, data collection and preprocessing
- Carried out hierarchical regression analysis to explore the predictive effect of self-control ability on procrastination decision-making
- Partook in establishing an intermediary model to explore the cognitive mechanism of self-control on delayed decision-making
- Employed the multiple linear regression model to investigate the moderation effect of emotional adjustment difficulties in task utility and procrastination tendency

### **Research on the Theories and Application of Bayesian Statistics Under the Latent Growth Model**

Research Assistant, Advised by Associate Prof. Yuan Liu from Southwest University 07/2020-08/2020

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- Used the maximum likelihood estimation and the model selection technique to process missing values based on Bayesian statistics; compared the effect of parameter estimation of traditional (frequency-based) statistical inference and Bayesian statistics
- Assisted in building the Piecewise Growth Mixture Model based on BSEM to analyze the factors that affect the mood of teenagers based on data from 150 samples at 8 time points

## Academic Highlights

### A Study on Preconditioning Sparse Matrices with Alternating and Multiplicative Operators 01/2023-05/2023

(<https://zqt0101.github.io/qzhao.github.io/preconditioning/>)

- Repeated and verified the methods and theories used in one published paper for the Preconditioning Sparse Matrices study (Christoph Klein and Robert Strzodka, 2023)
- Implemented and tested the direct and adaptive construction for general sparse matrices
- Evaluated the computational cost of M\_alt-i and verified that it is not suitable as the best preconditioner for solving linear systems
- Combined elliptic and parabolic PDEs on a 2D tensor product grid to understand Alternating Direction Implicit (ADI) method
- Unveiled a new operator splitting method, multiplicative operator splitting, which generalizes the implicit LU method and ADI method and offers much more flexibility in preconditioner construction

### Realization of Methods of Solving Linear Algebraic Equations Based on C++ and MATLAB 03/2021-06/2021

- Deduced the elimination process and back-substitution process of the Gaussian elimination method, and analyzed the corresponding cycle times in the program operation
- Programmed to realize the solution of 84-order equations by Gauss Elimination with Maximal Column Pivoting
- Used the Gaussian elimination method and Cholesky decomposition method to solve symmetric positive definite equations with the coefficient matrix of 100 orders respectively
- Compared advantages of the Gaussian elimination method and the Cholesky decomposition method

## Internship Experience

### Institute of Computing Technology, Chinese Academy of Sciences

Remote

Intern

09/2021-10/2021

(<https://zqt0101.github.io/qzhao.github.io/optimization-model/>)

- Realized various data visualization charts using Python and updated the codes in Python Data Visualization
- Modeled and solved mathematical problems with NumPy in Python, such as linear equations and numerical derivation
- Studied the research status quo of data science such as the application and existing problems of the 0/1 optimization model

## Skills & Interests

**Computer Skills:** Python, R, C++, MATLAB, SPSS

**Interests:** Mathematics, Fitness, Basketball, Hiking, Cooking, Singing