

# Guoqing Zhang

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## SUMMARY

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A PhD. student has proficiency in programming languages such as Python and Matlab, with extensive experience in applying mathematical concepts to solve complex financial problems.

## EDUCATION

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### North Carolina State University

*Operations Research Ph.D*

**Raleigh, NC**

Aug 2022 - Present

**Related Courses:** Linear Programming, Dynamic System and Multivariable Control, Applied Stochastic Models for Industrial Engineering, Dynamic Programming

### North Carolina State University

*Financial Mathematics MFM*

**Raleigh, NC**

Jan 2021 - May 2022

**Related Courses:** Investment in Financial Market, Option Derivative Pricing, Monte Carlo Method, Stochastic Calculus for Finance, Finite Element Methods in PDE, Finite Differential Methods in PDE, Corporate Finance, Financial Statistics and Data Science, Fundamentals of Statistical Inference

### Central South University

*Mathematics and Applied Mathematics B.A.*

**Changsha, China**

Sep 2017 - Jul 2021

**Related Courses:** Probability Theory, Numerical Analysis, Numerical Optimization, Mathematical Analysis, Time Series, Graph Theory, Real Analysis, Functional Analysis, Topology, Abstract Algebra, Complex Analysis, PDE, ODE

## PROFESSIONAL EXPERIENCE

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### North Carolina State University - Graduate Teaching Assistant

- *Recitation Leader of Calculus III*

- *Recitation Leader of Calculus II*

**Raleigh, NC**

Aug 2022 - Present

Aug 2021 - May 2022

## RESEARCH EXPERIENCE

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### Finite Differential Methods on Infinite Domain

Aug 2023 - Present

- Generating high-order finite difference methods and studying the accuracy on an infinite domain based on second-order finite difference methods for BVPs
- Developing criteria to filter out high frequencies

### Undergraduate Thesis: Finite Element Method in 1-D Gelfand Equation

Jan 2021 - Jun 2021

- Analyzed convergence and error in different numerical methods
- Applied numerical analysis to approximate the solution

### The Typhoon Frequency Prediction Based on Deep Learning

Sep 2018 - Aug 2019

- Predicting the frequency of typhoons based on the theoretical system of deep learning.
- Aiming at the disadvantage of a single neural network structure, such as misclassification of adversarial samples and poor fitting results

## PROJECTS

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### VIX derivatives & Machine Learning

Mar 2022 - Apr 2022

- Implemented the VIX multinomial trading signal with a dense neural network and different lookback window.
- Performed K-fold cross-validation for the lookback window

### Statistical Arbitrage

Feb 2022 - Mar 2022

- Used Ito Lemma to derive OU Process, computed ADF statistic for each residual, used backtest for a trading signal with different transaction

### Stock Price Prediction & Algorithmic Trading

Sep 2021 - Dec 2021

- Explored techniques to predict stock prices that include Time series methods range from basic learning concepts to more in-depth recurrent neural networks.
- Examined models including moving averages, regression, ARIMA, LSTM

### Multi Barrier Reverse Convertible Pricing

Apr 2021 - May 2021

- Priced an Autocallable Multi Barrier Reverse Convertible by Standard Monte Carlo method
- Reduced Variance ( Control Variate, Antithetic Variates Method )