

Hao Quan

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EDUCATION

University of Illinois–Urbana Champaign	Champaign, IL, USA
BS in Actuarial Sciences and Statistics Dean’s List	Dec 2022
University of Waterloo	Waterloo, ON, CA
MMath in Actuarial Sciences Supervisor: Mingbin (Ben) Feng	Sep 2024
University of Waterloo	Waterloo, ON, CA
PhD in Actuarial Sciences In progress Supervisor: Mingbin (Ben) Feng	Sep 2027 (Expected)

RESEARCH INTEREST

Markov Chain Monte Carlo (MCMC), Financial Pricing Models, Risk Hedging Strategies, Registered Index-Linked Annuities, Variable Annuities, Deep Learning in Finance, and Unsupervised Learning Techniques.

PROFESSIONAL EXAMS

SOA Exam P: Passed (2024)
SOA Exam SRM: Passed (2024)
SOA Exam FM: Passed (2020)

PROFESSIONAL EXPERIENCE

UBS AG	Shanghai, China
Remote Quantitative Analysis Part-Time Assistant	Aug – Sep 2022

- Applied time-series regression models to historical US treasury futures data in Python
- Reviewed and experimented with different futures pricing models
- Performed one-year back testing, conducted sensitivity analysis, and compared with benchmark
- Beat baseline model performance and drafted deliverable as reference for broader strategy efforts

Shokz (Rising Bone Conduction Headphone Brand)	Chicago, IL
Part-time Marketing Analyst	Dec 2021 – Jul 2022

- Used SQL to extract data and generated weekly sales and profitability reports among Shokz’s offline retail store channels
- Analyzed sales data from Statista and internal sales and financial data from selected retailers like Costco and Dicks; created dashboards and visuals to support decisions in new partnership
- Performed unsupervised learning using clustering analysis of demographic data of selected regions for new store locations
- Conducted principal component analysis to further pinpoint Shokz’s market expansion strategies

KPMG	Shanghai, China
Elite Program Intern	May - Aug 2021

- Evaluated Citi Bank’s digital transformation using the Open Digital Maturity Model with 6 dimensions and 174 metrics
- Identified problems in Citi’s data integration, extracted relevant data and did feature engineering
- Converted results into insights and actional plans and presented to manager for review in a team of 5
- Supported Citi’s profiling of high net-worth clients by summarizing statistics and creating dashboards using its Customer Relationship Management (CRM) system to guide future consumer services

China Life	Beijing, China
Actuarial Intern	Dec 2020 – Feb 2021

- Reassessed risks with sensitivity analysis and stress testing and regenerated relevant disclosures on 50+ insurance products in accordance with IFRS-17 updated regulations

- Analyzed gross premium reserves of multiple insurance and annuity products of the past 20 years using Excel and VBA
- Developed an automated gross premium reserves calculation tool using Python and regression and back-tested the model using past data for improved accuracy.

China Everbright Bank Co., Ltd

Comprehensive Clerk

Beijing, China

Jun – Aug 2020

- Established and maintained a CRM database for 34 branches across China
- Created additional performance metrics and benchmarking designs; developed frequently-used commands in Excel and pertinent dataset for automatic weekly and monthly reports and dashboards

ACADEMIC PROJECTS

Two Stage Model for Stock selection and Asset Allocation

- Reviewed relevant literature built a deep learning model for stock selection and used mean-variance model for asset allocation
- Designed a stock random selector to automatically obtain stock history data
- Compared the performance of Random Forest, extreme learning machine, support vector machine, back propagation neural network, and long-short term memory using run time, MSE, RMSE, MAE, and hit rate
- Used Mean-Variance Optimization to determine the optimal asset allocation that maximizes return for a given level of risk

Variable Annuities Portfolio Fee Determination via Monte Carlo Simulation and Stochastic Root-Finding

- Reviewed actuarial and financial literature on variable annuity riders (GMDB, GMAB, GMWB) and built Monte Carlo simulation models to capture mortality and market risks
- Estimated expected present values of benefits under diverse fee structure
- Employed stochastic gradient estimation techniques (finite differences and infinitesimal perturbation analysis) to compute sensitivities and solve the root-finding problem, analyzing convergence properties and computational performance to enhance pricing accuracy
- Developed a hot start algorithm to elevate the Fee estimation process for a large variable annuity portfolio
- Refine a three-stage model (Compressor-Simulator-Predictor) using augmentation.

TEACHING ASSISTANT

University of Waterloo

Graduate-level course:

- MATH 631: Statistics for Teachers (2024 Winter)
- STAT 940: Deep Learning (2025 Winter)
- ACTSC 631: Financial Mathematics 3 (2025 Spring)
- ACTSC 634: Quantitative Risk Management (2025 Spring)

Undergraduate-level course:

- ACTSC 372: Investment Science and Corporate Finance (2025 Winter, 2025 Spring)
- STAT 372: Sampling and Experimental Design Techniques for Business (2024 Spring)
- STAT 230: Probability (2024 Winter, 2024 Spring)
- ACTSC 231: Introductory Financial Mathematics (2023 Fall, 2024 Fall)
- COMM 101: Introduction to Financial Markets (2023 Fall, 2024 Fall)

University of Illinois at Urbana-Champaign

- ASRM 461: Loss Models (2022 Fall)
- ASRM 471: Life Contingencies (2022 Fall)

SKILLS & ACTIVITIES

- Programming: Python, R, SQL, VB programming, STATA, Excel Data Analysis and ANOVA
- Activities: HR Department of UIUC Chinese Scholar and Student Association (organized 5 events with average 50+ attendees in 2020)