

Ningyuan (Howard) Xie, CFA, FRM

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PROFESSIONAL EXPERIENCE

• Reinsurance Group of America, Incorporated

Global HQ | Chesterfield, MO

Senior Financial Risk Analyst, Market Risk Services

Mar. 2023 – Present

- **Option Validation:** Designed and implemented an automated **VBA** workflow for market data ingestion and option spread pricing across various indices, enabling accurate validation of recurring trading activities
- **Market-Neutral Hedging:** Monitored daily Greeks and P&L of hedged positions using a real-time market dashboard; executed hedging trades with derivative instruments to maintain market-neutral exposures, minimizing risk and P&L volatility
- **Static Option Strategy:** Developed and backtested a static bull call spread strategy in **VBA**; leveraged **Excel Solver** to reverse-engineer optimal short OTM strikes given budget constraints, enabling efficient batch scenario analysis
- **Dynamic Option Strategy:** Designed and backtested a delta hedging strategy in **MATLAB**, which calculated daily value and delta of bull call spreads, and dynamically replicated delta exposure with equity futures; achieved hedge effectiveness close to 95%
- **Rolling Option Strategy:** Designed and backtested a 5-year rolling option strategy in **MATLAB**, which adjusted participation annually under fixed budget and reinvested payoffs into future notional; achieved annualized returns $\geq 30\%$ under 4% annual cost
- **Liability Hedging:** Modeled liability reserves using risk-neutral scenarios in **VBA**; constructed a swaption portfolio replicating liability cash flows by minimizing absolute value of net cash flows, improving hedging efficiency and portfolio monitoring

Financial Risk Analyst, Market Risk Services

Jan. 2021 – Mar. 2023

- **Real-World Rates Modeling:** Engineered factor models in **MATLAB** analyzing treasury and credit spreads using time-varying level, slope, and curvature components; calibrated autoregressive models and forecasted real-world interest rate curves
- **Real-World Equity Modeling:** Modeled equity returns in **MATLAB** as risk-free rate plus risk premium, with volatility captured via GARCH models; calibrated in-sample volatility and forecasted real-world returns using an ARMA-GARCH framework
- **Risk-Neutral Rates Modeling:** Built hybrid models (**Hull-White Two-Factor**, **Black-Scholes**, **Heston**) in **Python** with **Numerix SDK** for derivative calibration and interest rate scenario generation
- **Risk-Neutral Equity Modeling:** Developed Local Volatility models in **Numerix Excel** calibrated to GAAP volatility surfaces; simulated risk-neutral equity paths and validated model quality with custom **MATLAB** diagnostics

Risk Management Intern, Market Risk Services

Sept. 2020 – Jan. 2021

- **Market Data Processing:** Collected and processed raw market data from **Bloomberg**; cleaned interest rate and equity time series in **MATLAB** under no-arbitrage assumptions for various model inputs
- **Workflow Automation:** Developed reusable tools in **Python**, **MATLAB**, and **VBA** for data ingestion, curve construction, scenario preprocessing, and derivative hedging workflows, accelerating production processes

PROJECT EXPERIENCE

• Academic Data Analytics Platform | *Python, Dash Plotly, MySQL, MongoDB, Neo4j, AWS, Render* | [website](#) | [🐙](#)

- **Full-Stack Development:** Designed a web-based analytics dashboard enabling prospective graduate school applicants to explore academic programs, compare universities, and identify prominent researchers through intuitive visualizations
- **Cloud Deployment:** Utilized AWS RDS, MongoDB Atlas, and Neo4j Aura for backend cloud databases; deployed the application on Render for seamless hosting and real-time updates

• Mobile Weather Application | *Android Studio, Java*

- **Android Development:** Built a feature-rich weather application with user authentication, customizable UI themes, real-time weather and map integration via Google API, and AI-powered weather Q&A using Gemini API
- **Quality Assurance:** Developed comprehensive instrumented tests with the Espresso framework to validate core functionalities, ensuring application stability and reliability across different user scenarios

• C++ Systems & Game Development | *Visual Studio, C++* | [🐙](#) [🐙](#)

- **Game Development:** Built 2D console-based games in C++ including Tic-tac-toe (with AI opponent) and Gomoku (with customizable board size and winning rules), applying object-oriented programming principles and design patterns
- **File System Implementation:** Implemented a modular file system supporting file operations (create, delete, open, close) with password protection, and developed custom shell commands (**ls**, **rm**, **cat**, **copy**) for terminal-based file manipulation

• Computer Vision & Neural Networks | *Jupyter, Python, TensorFlow/Keras*

- **Image Processing & Feature Engineering:** Preprocessed raw paperclip images to reduce noise; performed feature engineering by extracting average RGB pixel depths and frequency components as independent variables for model training
- **Neural Network Design:** Designed a 4-layer neural network using the TensorFlow/Keras framework; trained the model on 45,000 samples with extracted features to predict paperclip quantities, achieving $RMSE \leq 2.0$

TECHNICAL SKILLS

Programming: Python, MATLAB, VBA (Microsoft Office Suite), R, SQL, C++, Java, HTML/CSS, \LaTeX
Developer Tools: VS Code, JetBrains IDEs, Jupyter Notebook, Google Colab, RStudio, Git, Bloomberg API, Numerix SDK
Databases & Cloud: MySQL, MongoDB, Neo4j, AWS (RDS), Render
ML & AI Frameworks: PyTorch, TensorFlow/Keras, Scikit-learn, GPT API

EDUCATION

• University of Illinois Urbana-Champaign, Siebel School of Computing and Data Science

Champaign, IL

Master of Computer Science | GPA: 4.00/4.00

May 2024 – May 2027

• Washington University in St. Louis, Olin Business School

St. Louis, MO

M.S. in Finance—Quantitative Finance | GPA: 3.99/4.00 (1/102), GMAT: 750 (98%)

July 2019 – Jan. 2021

- **Honors:** Charles F. Knight Scholar & Outstanding Finance Student Award—Quantitative (**Top 1**)

• University of Nottingham, Nottingham University Business School

Nottingham, UK

B.S. in Finance, Accounting and Management | GPA: 3.90/4.00, First Class Honours

Aug. 2015 – June 2019

- **Honors:** Provost's Scholarship 2018 (**1.5%**), Best Student of the Year 2017 (**Top 1**), President's Scholarship 2017 & 2016 (**1%**)