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 and reducing processing time by 75%
  - **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 within +2%/-2% delta and rho limits
  - **Static Option Strategy:** Developed and backtested a bull call spread strategy in **VBA** with **Excel Solver** optimization for reverse-engineering optimal strikes; enabled efficient batch scenario analysis for 20+ years of daily time series data
  - **Dynamic Option Strategy:** Built 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, achieving 95%+ hedge effectiveness
  - **Rolling Option Strategy:** Designed and backtested 5-year rolling strategy in **MATLAB** with annual participation adjustment and payoff reinvestment; achieved 30%+ annualized returns under 4% annual cost constraints
  - **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 interest rate models using **Numerix Python SDK**, covering workflows from derivative calibration to interest rate scenario generation; results include forecasted rates and discount factors for liability modeling
  - **Risk-Neutral Equity Modeling:** Developed equity models in **Numerix Excel**, including calibration to GAAP volatility and simulation of risk-neutral equity paths; validated, reformatted, and stored outputs for liability modeling using **MATLAB** scripts

  Risk Management Intern, Market Risk Services *Sept. 2020 – Jan. 2021*
  - **Market Data Processing:** Collected and processed raw market data from **Bloomberg**; cleaned interest rates in **MATLAB** under no-arbitrage assumptions, which serve as the main reference rates within the company 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 various production processes by 20%

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 on 45,000+ samples
  - **Neural Network Design:** Designed a 4-layer neural network using the TensorFlow/Keras framework; trained model with extracted features to predict paperclip quantities, achieving RMSE ≤ 2.0 and 92% accuracy on validation set

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 (Expected)*
- **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%)**