Mobasher Khan

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Contact Information

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Education

Columbia University, New York, NY *September 2018 - May 2019*

- *Degree: Master of Arts* in Mathematics (*Mathematics of Finance*), *GPA:* 3.9/4.0
- *GRE: Quant:* 168/170, *Verbal:* 166/170, *AW:* 5/6
- *Courses:* Brownian Motion & Stochastic Calculus, Time Series Analysis, Non-Linear Option Pricing, Futures & Vanilla Options, Fixed Income PM, Numerical Analysis & Monte Carlo

Princeton University, Princeton, NJ *September 2013 - June 2018*

- *Degree: Bachelor of Science in Engineering* in Mechanical & Aerospace Engineering
- *Departmental GPA:* 3.6/4.0; Elected to *Sigma Xi*

Work & Research Experience

Machine Learning & Energy Storage Research, Princeton, NJ *August 2017 - June 2018*

- Evaluated the performance of 15 regressors and 7 time series data preprocessing techniques in predicting battery state of charge, capacity, & rate retention by creating a Python library.
- Created interactive *Capacity vs Cycle* graphs and differential capacity curves to display different capacity degradation regimes by modifying the *Bokeh* visualization library in Python.

Propulsion Engineering Intern, Williams International, MI *May 2016 - August 2016*

- Utilized and amended CFD codes in FORTRAN for running aerodynamic simulations & wrote scripts in Python and Unix Shells to assess convergence, compare test data with simulation results, intelligently update CFD parameters and rerun simulations until within tolerances.

Manufacturing Engineering Intern, AAI Corp., Hunt Valley, MD *May 2015 - July 2015*

- Created manufacturing process documents for teardown & retrofitting of RQ-7 Shadow UAVs.
- Converted Manufacturing & Repair warehouse into a full UAV repair system in AutoCAD & Siemens NX, accounting for hardware, workflows, FOD areas, and repair processes.

Projects in Financial Mathematics

Exotic & American Option Pricing, Columbia University, NY *January 2019 - May 2019*

- Wrote vectorized code in Python for pricing exotic and American options under uncertain volatility, stochastic volatility, uncertain mortality (CVA), and with smile calibration.

Greeks & Curve Calibration in Excel, Columbia University, NY *January 2019 - May 2019*

- Created interactive spreadsheets using VBA and Excel Macros for risk managing currency options, interpolating IV curves, and solving pricing PDEs with finite difference schemes.

Trading Short-Term Volatility Forecasts, Columbia University, NY *Sept. 2018 - Dec. 2018*

- Used a GARCH(1,1) model to generate σ forecasts and trading signals, where increasing vol. trends signaled *mean reversion* and decreasing vol. trends signaled *trend following* trades.
- Incorporated transaction costs, NASDAQ rebates, & price improvement during backtesting.

Paper Fixed Income Portfolio, Columbia University, NY *September 2018 - December 2018*

- Created and dynamically hedged a $500M bond portfolio using swaps, futures, and short sales
- Calculated interim P&L, Yield, DV01. *Final P&L:* $1.65M, *Final Basis Point Value:* -$9100

Skills & Languages

Technical: Python, Microsoft Excel, VBA, Unix Shell, Option Pricing, Volatility Modeling
Languages: English, Portuguese, Arabic, Bengali, Spanish