MSCF
Carnegie Mellon University

MSCF Career Services Application Packet - Morgan Stanley - (OCI) Valuation and Risk Infrastructure Developer

Morgan Stanley
Job Title: (OCI) Valuation and Risk Infrastructure Developer

TABLE OF CONTENTS

JINGYI GUO

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EDUCATION

Carnegie Mellon University, Tepper School of Business Pittsburgh, PA
Master of Science in Computational Finance - MSCF ***GRE Quant: 170/170*** ***GPA: 3.79/4.33*** Expected 12/2017

- An interdisciplinary program including finance, mathematics, statistics and programming

Peking University Beijing, China
Bachelor of Arts in Economics (Dual Degree) ***GPA: 3.81/4.00*** 07/2016

- **Dual Degree:** Completed second Bachelor degree while studying full-time at Beijing Institute of Technology (2014-2016)
- Member of China Center for Economics Research Club; Research Assistant of Prof. Yanbo Wang

Beijing Institute of Technology Beijing, China
Bachelor of Science in Mathematics ***GPA: 3.94/4.00*** 07/2016

- **Honors:** National Scholarship (Top 2%, 2012-2015); Excellent Undergraduate Student Honor

COURSEWORK/SKILLS/PROJECTS

- **Programming**: C/C++, Python, Matlab, R, Stata, SAS, SQL, Excel VBA
- **Statistics**: Econometrics, Time Series Analysis, Machine Learning
- **Mathematics**: Numerical Methods, Stochastic Calculus, Monte Carlo Simulation, ODE/PDE
- **Finance**: Fixed Income, Options, Risk Management, Market Microstructure and Algorithmic Trading, Financial Optimization, Statistical Arbitrage*, Asset Management*
- **Projects**:
  - **Simulation**: Priced exotic options and estimated Greeks using Monte Carlo simulation in Matlab; Priced interest rate derivatives under different models such as Hull-White, HJM, Vasicek, and CIR. Applied antithetic variables, control variables, importance sampling, stratification, and conditional Monte Carlo to reduce standard error.
  - **Machine Learning**: Participated in the Winton Stock Market Challenge on Kaggle. Analyzed historical stock performance and masked features using R, incorporating Lasso, PCA, nonparametric regression and tree regression to predict intra and end of the day returns.
  - **Asset-backed Securitization:** Analyzed underlying collateral, cash flows for lease receivables to determine the appropriate deal structure. Structured an ABS deal and performed scenario analysis to evaluate the potential risk. Pitched and presented evaluation analytics, investment analysis and solutions to clients group.
  - **CCAR Stress Testing**: Utilized 8-year historical data to compute the ten-day 95% VaR for various risk factors including interest rates, FX, equities, volatility, credit spread, RMBS, private equity and S&P 500 implied correlation and 95% VaR of the whole portfolio using historical and parametric methods; Backtested our results with data in 2008.

**denotes current or future coursework*

EXPERIENCE

Kershner Trading Group Austin, TX
Quantitative Trading Summer Intern 05/2017 - 08/2017

- **Alpha Generation**: Researched momentum and mean-reversion models, trading stocks gapping up/down in US Equity market. Developed a trading strategy using Python and back-tested on Cloudquant platform, incorporating news sentiment analysis and tree model, and achieved Sharpe Ratio of 4.1 (considering transaction costs).
- **Quantitative Research**: Implemented momentum signals utilized by discretionary traders using Python and applied tree regression, random forest, SVM and ensemble model to enhance the signal prediction performance using R.
- **Risk Management**: Shadowed risk team and communicated with traders, monitoring adherence to risk limits for trading activities using quantitative measures including VaR, risk threshold and P&L attribution.

Bank of America Merrill Lynch Beijing, China
Corporate Credit Risk Intern 11/2015 - 12/2015

- **Credit Analysis**: Reviewed Credit Proposal Memos and analyzed counterparty credit profiles across sectors through detailed study of each client's business model, financial analysis and business projections to assess risk exposure; Presented overall risk report highlighting both potential risks and recommendations to senior management.
- **Teamwork**: Collaborated effectively within the credit risk team and the operations team in Shanghai and Beijing, re-engineered existing databases and related processes to automate various report and analyses using SQL and VBA.

ChinaVenture Investment Consulting, Ltd. Beijing, China
Financial Data Analyst Intern (Part-time) 09/2015 - 10/2015

- **Database Management**: Maintained and updated market and news data in CVSource database using SQL on a daily basis.
- **Credit Modeling**: Implemented an Excel-based model to assess the credit risk exposure of small and medium-sized enterprises. Prepared credit reports for 20 companies to evaluate their profitability, sustainability and solvency.

HARRIS JIANG

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EDUCATION

CARNEGIE MELLON UNIVERSITY, TEPPER SCHOOL OF BUSINESS — New York, NY
Master of Science in Computational Finance – MSCF — ***GRE Quant: 170/170*** — 12/17

- An interdisciplinary program including finance, mathematics, statistics and programming

NANYANG TECHNOLOGICAL UNIVERSITY — Singapore, SG
Bachelor of Science in Mathematics and Economics — ***GPA: 4.7/5.0*** — 6/16

- Honors: First Class Honors Degree (Top 5%), Full Scholarship by Singapore Government
- Leadership: Elected as College Student Union Representative, Leader of URECA Club (for student researchers)
- Teaching Assistant: Linear Algebra, Algorithm and Computing I

COURSEWORK/SKILLS/PROJECTS

- **Statistics**: Econometrics, Regression and Time Series Analysis, Statistical and Machine Learning
- **Finance**: Fixed Income, Option and Futures, Asset Management, Bloomberg Terminal
- **Mathematics**: Probability, Optimization, Stochastic Calculus, Financial Mathematics
- **Programming**: C++ /C#, Python, MATLAB, R, Excel/VBA, Kdb/Q
- **Projects**: Implemented a trading strategy of factor model with reference-dependent preferences; Conducted research on Active Share as fund performance indicator; Proposed a solution of asset backed securitization for financing; Constructed a portfolio to track S&P100 index; Performed a CCAR-style stress test on a multi-asset portfolio

EXPERIENCE

CME GROUP — Chicago, IL
Quantitative Risk Summer Intern — 5/17 – 8/17

- **Model Improvement**: Modified the historical VaR models used for BRL ZCS (zero coupon swap) based on researches on rate products as well as non-deliverable FX products. Extended the margin calculation methodologies to include the FX product settlement prices and implemented the extensions into current C# framework.
- **Risk Analysis**: Aided with the analysis on monthly back testing report of the CME IRS Production Portfolio which will be delivered to clients, investigated the under-coverage issue, irregular margins as well as Guarantee Fund fluctuations.
- **Market microstructure:** 3rd place in CME Group Future Trading Employee Challenge

GUOTAI JUNAN SECURITIES (Top Investment Bank in China) — Shanghai, CN
Quantitative Summer Analyst — 5/16 – 7/16

- **Option Pricing**: Simulated the hedging process with Monte-Carlo (MATLAB) to estimate the payoff of exotic option contracts, incorporated variance reduction techniques (antithetic variates, control variates) and conducted research on VIX index in the context of China A-stock market.
- **Modelling**: Optimized an equity investment strategy by diversifying the risk with dynamic hedging, developed VBA-based program to track the VaR of the portfolio. The strategy has a Sharpe-ratio of 1.8 and was further implemented by the team.

CITIGROUP — Singapore, SG
Operations and Technology Summer Intern — 5/15 – 7/15

- **Data Analysis**: Identified expense reduction opportunities by developing VBA programs to cluster and analyze customer service records. Successfully reduced 20% of the customer hotline contact volume with the initiated campaigns.
- **Cross-functional Teamwork**: Collaborated with stakeholders from Singapore and Malaysia to streamline and automate the quality control process, constructed a key production index database which saved the team 2 hours per day spent in data gathering and report generation.

CHINA CONSTRUCTION BANK — Harbin, CN
Investment Banking Intern — 6/14 – 7/14

- **Financial Analysis**: Researched on Chinese coal energy industry associated with a proposed acquisition project, analyzed the profitability and potential of the target firm.
- **Communication**: Facilitated in the launch of a retail investment product by preparing presentations and marketing materials, liaised with sales and financial consultants to clarify the details.

ADDITIONAL INFORMATION

- Certificate: CFA Level II Candidate
- Languages: English (Fluent), Mandarin (Native), French (Basic)
- Interests: Chess, Guitar, Sky Diving
- Volunteer Activities: Red Cross Singapore Chapter, Taught mandarin to Indian children in Singapore

YUANSHEN (KEVIN) LI

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EDUCATION

CARNEGIE MELLON UNIVERSITY, TEPPER SCHOOL OF BUSINESS — New York, NY
Master of Science in Computational Finance – MSCF — ***GPA: 3.9/4.3*** — 12/17

- An interdisciplinary program including finance, mathematics, statistics and programming

UNIVERSITY OF CALIFORNIA, LOS ANGELES — Los Angeles, CA
Master of Arts in Economics — ***GPA: 3.5/4.0*** — 06/16

- Departmental Scholar in Economics: one of three students to obtain B.S. and M.A. simultaneously

B.S. in Financial Actuarial Mathematics / B.A. in Business Economics — ***GPA: 3.9/4.0*** — 06/16

- Honors: Alpha Lambda Delta National Honor; College Honor; Latin Honor
- Champion: Ernst & Young Advisory Case Competition UCLA Champion

COURSEWORK/SKILLS

- **Factor Research Project:** Applied various bootstrapping algorithms on over 2000 equities in Chinese stock market to identify significant features and factors. Dynamically hedged positions in a portfolio by shorting futures according to market trend
- **Statistics**: Econometrics, Probability Theory, Game Theory, Statistical Inference, Machine Learning, Time Series
- **Finance**: MSCF Finance, Financial Computing, MSCF Options, Simulation, Macroeconomics, International Finance, Behavioral Economics, Money and Banking
- **Mathematics**: Fixed Income, Linear Algebra, Stochastic Calculus, Multi-Period Asset Pricing, Differential Equation,
- **Programming**: C++, Excel VBA, R, Stata, Java, Python

EXPERIENCE

BNY MELLON — New York, NY
Portfolio Management Risk Summer Associate — 06/17-08/17

- **Portfolio Management:** Built up weighted average ETF portfolios of equity and other asset classes. Conducted Monte-Carlo simulation with bootstrap to estimate annual performance and risk of ETF portfolios
- **Time Series Forecast:** Developed a one-year rolling risk-variance model to predict return and volatility with forward adjustment on 49 asset classes. Achieved accuracy of 98% with 95% confidence level
- **Risk Management**: Created efficient model to estimate economic capital required by CCAR for any given portfolios to accommodate losses. Tested on different simulated scenarios to validate capital adequacy.
- **Model Validation**: Validated assumptions of asset and liability management model by considering behaviors of asset returns and liability returns. Approximated return distribution by Kolmogorov-Smirnov Test and Anderson-Darling Test

UNITED HEALTHCARE — Santa Ana, CA
Actuarial Intern, E&I Healthcare Economics — 06/15-09/15

- **Financial Modeling**: Aggregated over 50, 000 medical institutions by K-means Clustering and calculated reserve requirement for each of them. Avoid overfitting and multicollinearity by applying PCA to reduce the dimension of regression model. Improved the fit by 30%.
- **Data Automation**: Generated models to automatically analyze seasonal factors and large account factors by building VBA program. Optimized code to improve running time efficiency by 50%
- **Back-Testing**: Back-tested trend management model through various assumptions and sensitivities using out of sample data.
- **Communication:** Tested the influence of time value factors on large accounts using Lasso Regression and moving average and presented these risks controlling methods to senior managers of multiple divisions

CHINA RESOURCES SZITIC TRUST CO., LTD. (A state-own investment company with AUM 736B RMB) — Shanghai, CH
Summer Strategist — 07/14-09/14

- **Data Cleaning:** Applied backward elimination and forward selection to screen factors based on current profit data. Fitted missing data using spline interpolation and integrated market sensitivity factor into the model.
- **Return Prediction**: Constructed and evaluated risk reward transferred models. Performed robustness check across various regions and factors. Predicted returns of two large projects with error less than 3 percent
- **Product Development**: Managed and publicized Asset-Backed Security (ABS) and Mortgage-Backed Security (MBS). Ran scenario test on various prepayment rate and default rate to predict weighted average life of products
- **Client Interaction**: Represented company to meet with clients and designed specialized products for five institutional clients

ADDITIONAL INFORMATION

- Interests: Basketball, Taekwondo (Black Belt), Texas Hold'em, Golf, Billiards
- Certification**:** Passed SOA Exams in Probability and Financial Mathematics

U.S Permanent Resident

YINGQI (BILL) LI

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EDUCATION

CARNEGIE MELLON UNIVERSITY, TEPPER SCHOOL OF BUSINESS Pittsburgh, PA
Master of Science in Computational Finance – MSCF ***GRE Quant: 170/170*** 03/18

- An interdisciplinary program including finance, mathematics, statistics and programming

UNIVERSITY OF INTERNATIONAL BUSINESS AND ECONOMICS (UIBE) Beijing, China
Bachelor of Economics in Finance ***GPA: 3.7/4.0 Major GPA: 4.0/4.0*** 7/16

- Honors: Outstanding Graduate Student in Beijing Municipal Level (Top 5% in Beijing), Outstanding Student of UIBE
- Awards: National Scholarship (Top 1% within department), Honorable Mention in Mathematical Contest in Modeling

COURSEWORK/SKILLS/PROJECTS

- **Projects:**
  - **Text Mining and Empirical Analysis of Volatility Skew using C++:** Parsed CME raw market data and extracted relevant data into clean text file. Coded up Black's formula into C++ functions and used bisection method to calculate implied volatility of call options for different strike prices and visualized volatility skew in Excel.
  - **Stock Return Prediction Using Machine Learning in R**: Built linear regression models and used the Lasso methods to achieve dimension reduction. Further enhanced flexibility of the models by fitting the additive smoothing spline functions, experimented with the Random Forest Model and Boosting Algorithms to improve prediction results.
  - **Portfolio Construction Using Optimization:** Constructed long-only portfolios of fast food company stocks using mean-variance optimization, scenario optimization and mixed integer optimization with Lagrangian relaxation. Achieved better return and Sharpe Ratio with comparison to benchmark food and beverage ETF.
- **Finance**: Fixed Income (A+), Financial Derivatives (A+), Financial Engineering (A+), Risk Management (A), Optimization (A)
- **Mathematics**: Stochastic Calculus I & II (A+), Multi-Period Asset Pricing (A+), Probability (A), Linear Algebra (A)
- **Statistics**: Econometrics (A+), Monte Carlo Methods for Option Pricing (A), Machine Learning I (A), Statistical Inference (A), Time Series Analysis (A), Statistical Arbitrage (A)
- **Computer Skills**: Financial Computing (I to III) (A), Financial Computing IV (A+), C++ (Proficient in STL), Python (Proficient in Pandas, Numpy, Matplotlib and Seaborn), SQL, R, Excel VBA, Matlab, Bloomberg (Bloomberg Market Concepts Certificate)

EXPERIENCE

ACADIAN ASSET MANAGEMENT Boston, MA
Quantitative Investment Research Summer Intern 6/17-8/17

- **Python and SQL on Large Datasets**: Utilized SQL and Python Pandas package to extensively extract, clean, process and visualize large datasets from different sources.
- **Statistical and Econometrics Modeling**: Performed time-series regression to explore the relationship between dynamic factor dispersion and its efficacy. Used cross-sectional regression to compute dynamic factor efficacy. Computed t-statistics for different factor returns and alpha efficacy.
- **Dynamic Factor Weighting and Alpha Research**: Recommended a new method to correct the scale of dynamic alpha, significantly reduced the dispersion volatility of combined alpha therefore had promising potential to reduce transaction cost. Performed analysis of insider trading information on the profitability of different factors for potential alpha signal.
- **Exposure to Linux and Parallel Computing in Python**: Conducted research under Linux environment and gained proficiency with basic Linux commands. Used Python multiprocessing package to accelerate portfolio analytics computation. Significantly reduced the run time of a program from four hours to ten minutes.

CHINA INTERNATIONAL CAPITAL CORPORATION LIMITED Beijing, China
Summer Intern- Fixed Income Strategy Team 7/15-9/15

- **Interest Rate Term Structure Modeling and Simulation in VBA**: Incorporated Nelson-Siegel and Vasicek interest rate model into the Excel interface using VBA for traders. Created visualization of term structure of a particular day and allowed spot rate inquiries within same day. Built a simulator within Excel spreadsheet to simulate interest rate paths for pricing.
- **Macroeconomic Data Template Automation**: Took initiative to make an Excel data template containing macroeconomic indicators and commodity market data, which is able to automatically update itself when new data is released.
- **Bloomberg Exposure**: Investigated the volume of current REIT products using Bloomberg Terminal.

ADDITIONAL INFORMATION

- **Goldman Sachs (China) Scholars Program (2014)**: Selected to join a 2-month program to gain exposure to careers in finance. Won first place in stock pitch competition among 8 teams
- **Interests:** Skiing, swimming, karaoke, badminton, travelling, reading

ZHONGCAN (VITO) WANG

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EDUCATION

CARNEGIE MELLON UNIVERSITY, TEPPER SCHOOL OF BUSINESS Pittsburgh, PA
Master of Science in Computational Finance – MSCF ***GPA: 3.95/4.33*** ***GRE Quant: 170/170*** 12/17

- **Memberships**: International Association for Quantitative Finance, Quantitative Finance Club.

RENMIN UNIVERSITY OF CHINA Beijing, CHINA
Bachelor of Science in Mathematics and Applied Mathematics ***GPA: 3.76/4.0 (Top 5%)*** ***Major: 4.0/4.0*** 6/16

- **Honors & Awards**: Academic Excellence Scholarship for three consecutive years (Top 5%), 2014 Art & Sports Scholarship (Top 3%), Honorable Mention in 2015 National College Mathematical Contest in Modeling.
- **Leadership**: Captain of Information School Men's Soccer Team; won two campus championships against 21 school teams.

KING'S COLLEGE LONDON *(Summer School)* London, UK
Journalism: Production, News Writing, and Reporting 8/14

COURSEWORK/SKILLS/PROJECTS

- **Finance**: Financial Engineering, Multi-Period Asset Pricing, Simulation Methods for Option Pricing (A+), Macroeconomics.
- **Mathematics**: Stochastic Calculus (A+), Fixed Income (A+), Partial Differential Equation, Real Analysis, Advanced Algebra.
- **Statistics**: Machine Learning, Time Series Analysis, Statistical Inference, Stochastic Processes, Statistical Arbitrage.
- **Fall 2017 coursework includes**: Market Microstructure & Algorithmic Trading, Numerical Methods, Risk Management (A+).
- **Computer Skills**: C++, Python, R/Shiny, Q/KDB+, SQL, VBA, Linux, LaTeX, TortoiseSVN, Microsoft Office, Java, Prezi.
- **Projects**:
  Statistical Arbitrage on China A-Share Funds
  Fitted price spread data of highly correlated funds into GARCH (1,1) in R; arbitraged according to current spread and predicted conditional standard deviation obtained from the model.
  Machine Learning: Feature Selection Based on Fuzzy Rough Sets
  Applied random sampling to feature selection; examined the efficacy and stability of random sampling algorithm through hypothesis testing, SVM testing, and C++ programming.

EXPERIENCE

CITIGROUP GLOBAL MARKETS Houston, TX
Quantitative Analysis, Commodities Summer Analyst 6/17 – 8/17

- **Library Building**: Collaborated with oil team to add functions to C++ commodities library and tested them in Python; ten projects included Breeden-Litzenberger formula, early expiry European option, linear combination info generalization.
- **Trading Support**: Communicated with gas traders and coded macros in Excel VBA to publish future curves and volatility surfaces to database; created a Gabillon parameter calibrator to minimize errors of implied volatilities of option trades.
- **Option Pricing**: Revised power-gas revenue put option model; improved Gamma calculation by applying Vega-Gamma relation and finite difference on price covariance matrix.
- **Virtual Trading**: Traded oil futures and future spreads on EMI simulation platform based on tech indicators and news alerts.

WIZARDQUANT *(Hedge Fund)*
Quantitative Research Intern (9/15 – 12/15) Beijing, China

- **Strategy Development**: Developed an automatic trading strategy in discount and premium arbitrage in China A-Share structured funds in Python; backtested with intraday tick data.
- **Market Microstructure Research**: price spread between primary and secondary markets, net asset value prediction, aperiodic split, hedging with IF futures, optimal daily trading limit on a single fund, and daily trading time pick.

Option Trading Intern (7/15 – 9/15) Zhuhai, China

- **Virtual Trading**: Implemented volatility strategies and constructed delta neutral combinations of SSE 50 ETF options on CFFEX virtual transaction platform.
- **Risk Management**: Analyzed positions' Greeks and implied volatility surface with QuantLib in C++; conducted Delta/Vega stress tests on the portfolio.
- **Database Administration & Creativity**: Created a MySQL database for traders to collect realized and implied volatility in one year and built an application in Python to visualize volatility curves.

ADDITIONAL INFORMATION

- **Certifications**: CFA Level II Candidate, Bloomberg Market Concepts.
- **Languages**: Mandarin Chinese (native), English (fluent).
- **Interests**: Piano (17 years), Soccer, Basketball, Swimming, Cue Sports, Tennis, Ballroom Dance.

CHEN (OLIVIA) ZHANG

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EDUCATION

CARNEGIE MELLON UNIVERSITY, TEPPER SCHOOL OF BUSINESS — New York, NY
Master of Science in Computational Finance – MSCF — ***GRE Quant: 170/170*** — 12/17

- An interdisciplinary program including finance, mathematics, statistics and programming

UNIVERSITY OF WASHINGTON — Seattle, WA
Bachelor of Science in Applied and Computational Math Science — ***GPA: 4.0/4.0*** — 6/16

- Double Major: Bachelor of Science in Economics
- Award: Summa Cum Laude Baccalaureate Honor, Albert L. Bodgen Scholarship in Economics

COURSEWORK/SKILLS/PROJECTS

- **Courses**: Fixed Income, Stochastic Calculus, Time Series, Machine Learning, Optimization, Asset Management.
- **Programming**: R, Python, MATLAB, C++, Java, and Excel/VBA.
- **Interest Rate Swaps Statistical Arbitrage Strategy**: Built a PCA based systematic butterfly trade on yield curve. Obtained the third principal component loadings over a rolling window of a specific length and gained the trading signals from the percentiles of the third principal component weighted butterfly trade. Utilized in sample data to choose parameters and run out of sample test to validate the strategy.
- **Portfolio Mean-Variance Analysis Project**: Conducted analysis on returns and risk on six Vanguard Index Funds spanning five years. Calculated VaR, analyzed and compared the Sharpe ratio of tangency portfolios and made rolling analysis of the CER (Constant Expected Return) model parameters.
- **Machine Learning Project**: Developed a machine learning model to predict short-term stock behavior. Reduced feature space dimension by PCA. Compared prediction power between random forest and xgboost. Avoided overfitting by adding L1/L2 regularization and achieved decent out-of-sample result.

EXPERIENCE

BANK OF AMERICA MERRILL LYNCH — New York, NY
Global Wealth & Investment Management(GWIM)-Quantitative Management Summer Analyst — 6/17 - 8/17

Participated in the initiative of the development of a unified wealth/investment management process across Merrill Lynch and US Trust, including Capital Market Assumption and Strategic Asset Allocation.

- **Quantitative Modeling**: Developed Black-Litterman methodology to incorporate market views for analyzing risk and return attributions of the portfolios managed by Chief Investment Office (CIO).
- **Scenario Analysis**: Conducted 10 scenario analysis on CIO portfolios and analyzed the performance of Black-Litterman methodology across different portfolios.
- **Interactive Analytics**: Built a highly-visual interactive risk and performance budgeting application for Tactical Asset Allocation (TAA) portfolios by utilizing R Shiny package.

BANK OF CHINA — Beijing, China
Quantitative Summer Analyst — 8/15 - 9/15

- **Research**: Researched global asset-backed security (ABS) risk-retention regulatory practice. Analyzed Basel III's and Dodd-Frank's impacts on ABS risk-retention ratio.
- **Communication and Teamwork**: Presented research results to the team members and presented and wrote a report to People's Bank of China (China's central bank).
- **Data Analysis**: Consolidated ABS market data and analyzed its credit, market and prepayment risk using Excel.

TSINGTAO SDAOVC MANAGEMENT (Private Fund with AUM of USD 22.5 MM) — Qingdao, China
Assistant to Investment Manager — 7/15 – 8/15

- **Portfolio Optimization**: Implemented robust optimization to handle estimation error problem in the portfolio construction process, suggested changes to assets' weights to obtain a more diversified portfolio and improved portfolio performance by achieving lower turnover and higher Sharpe ratio.

MIZUHO BANK LTD. — Qingdao, China
Compliance Risk Summer Analyst — 6/14 – 8/14

- **Risk Management**: Developed data query tools in C++ for compliance system.

ADDITIONAL INFORMATION

- Leadership and Communication: Vice President (9/13-6/16) of Step Up Dance Crew.
- Passed FRM Exam Level I in May 2016.
- Volunteer: Helped registration in Undergraduate Scholarship and Fellowship Fair.
- Calculus tutoring: Mentored 30 students/week on complicated calculus problems.
- Interests: Piano, Singing, Running, and Dancing.

CHUANYI (ALLEN) ZHAO

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EDUCATION

CARNEGIE MELLON UNIVERSITY, TEPPER SCHOOL OF BUSINESS — New York, NY
Master of Science in Computational Finance – MSCF — ***GRE Quant: 170/170 GPA: 3.96/4.33*** — 12/17

- An interdisciplinary program including finance, mathematics, statistics and programming

NATIONAL UNIVERSITY OF SINGAPORE — Singapore
Bachelor of Science with Honours (Highest Distinction) — ***GPA: 4.8/5.0*** — 7/16

- Major: Quantitative Finance; Minor: Economics
- Honors: Ministry of Education (MOE) Scholarship, Dean's List
- Memberships: Statistics Committee, Japanese Studies Society, Kendo Club

UNIVERSITY OF CALIFORNIA, LOS ANGELES — Los Angeles, CA
Exchange Student, Applied Mathematics — ***GPA: 3.7/4.0*** — 12/14

- Honors: Dean's Honors List

COURSEWORK/SKILLS/PROJECTS

- **Finance**: Fixed Income, MSCF Finance, MSCF Options, Financial Products and Markets, Corporate Finance, Risk Management, Financial Optimization, Asset Management.
- **Mathematics**: Multi-Period Asset Pricing, Stochastic Calculus, Linear Algebra, Mathematical Analysis, Game Theory.
- **Statistics**: Probability, Regression Analysis, Statistical Inference, Statistical & Machine Learning, Financial Time Series Analysis, Simulation Methods for Option Pricing, Statistical Arbitrage.
- **Economics**: Econometrics, Microeconomic Analysis, Macroeconomics for Computational Finance.
- **Programming**: C++, R, Python, MATLAB, C, SQL.
- **Project:** Predicted the return of a stock given past intraday return data using statistical methods including Linear Regression, PCA, Lasso, Local Linear Regression, Additive Regression and Random Forest.

EXPERIENCE

BLOOMBERG L.P. — New York, NY
Derivatives Data Quant Intern — 7/17-8/17

- **Data Analysis**: Devised metrics for the analysis, scoring and quality assessment of implied volatility surface in Python.
- **Machine Learning**: Implemented the Robust Principal Component Analysis (RPCA) algorithm for outlier detection in time series of implied volatility surface.
- **Communication & Teamwork**: Collaborated with the team on revision and further improvements of the metrics. Presented metrics devised and quality assessment results to the team on a weekly basis.

NUS RISK MANAGEMENT INSTITUTE — Singapore
Research Intern — 5/15-3/16

- **Credit Rating**: Performed daily production of Probability of Default for over 60,000 firms listed in the database.
- **Data Verification**: Identified suspicious data in daily production and verified with external data suppliers.
- **Programming**: Revised the SQL scripts used in daily production and wrote MATLAB codes to automate the data-retrieving procedure.
- **Communication & Presentation**: Presented issues on credit risk and the current credit rating model used by RMI Credit Research Initiative to Production Team and senior research fellows.

BANK OF CHINA — Wuhan, China
Summer Intern — 5/13-7/13

- **Client Interaction**: Actively participated in day-to-day operations of the bank and promoted banking products and services including mobile banking and online banking to potential clients.

ADDITIONAL INFORMATION

- Certification: Passed CFA Level I, Bloomberg Market Concepts, Japanese-Language Proficiency Test N1
- Languages: Mandarin (native), English (fluent), Japanese (advanced)
- Interests: Badminton, Soccer, Reading, Travelling

Chuanyi Zhao
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February 22, 2018

Dear Hiring Manager:

I am a recent graduate of the Master of Science in Computational Finance program at Carnegie Mellon University's Tepper School of Business. I learned about the Valuation and Risk Infrastructure Developer position at Morgan Stanley from MSCF QuantConnect and I would like to apply to it. I am passionate about financial products and I am eager to apply my quantitative skills to develop and optimize the computational engine for valuation/risk of financial products. My strong educational background and past internship experience will make me a very competitive candidate for the position.

As a Derivatives Data Quant Intern at Bloomberg in the past summer, my primary role was to devise metrics for the analysis and quality assessment of model-generated implied volatility surface. I coded up an automated procedure in Python to analyze implied volatility surfaces in various aspects including arbitrary test, smoothness test, calibration error check, etc. I also applied some machine learning techniques including Robust PCA to time series of implied volatility surfaces for outlier detection. Prior to that, I interned at National University of Singapore Risk Management Institute performing production of Probability of Default. Besides the internship experience, the in-depth knowledge of multiple quantitative disciplines including mathematics, statistics and programming I have acquired at CMU also makes me a good fit for the position.

Thank you for considering me for this position. I would love to discuss these and other qualifications with you. If you have any questions, please call me at (646)331-0120 or e-mail me at chuanyiz@tepper.cmu.edu.

Sincerely
Chuanyi Zhao

SHANSHAN (JESSICA) ZHU

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EDUCATION

CARNEGIE MELLON UNIVERSITY, TEPPER SCHOOL OF BUSINESS — New York, NY
Master of Science in Computational Finance – MSCF ***GRE Quant: 170/170 GMAT: 760/800*** 12/17

- An interdisciplinary program including finance, mathematics, statistics and programming

EMORY UNIVERSITY, GOIZUETA BUSINESS SCHOOL — Atlanta, GA
Bachelor of Business Administration in Finance, Double Major in Applied Mathematics ***GPA: 3.9/4.0*** 5/16

- **Honors**: Highest Distinction, Beta Gamma Sigma, Wall Street Journal Student Achievement Award
- **Certificate**: Certified Business Researcher, competent in searching Factiva and Hoovers
- **Leadership**: VP., Emory Calligraphy Club; TA., Process & System Management

COURSEWORK/SKILLS/PROJECTS

- **Finance**: Options, Multi-period Asset Pricing, Fixed Income, Financial Modeling & Analysis, Micro/Macroeconomics, Advanced Corporate Finance, International Finance, Investments
- **Mathematics**: Simulation Methods for Option Pricing, Stochastic Calculus, Numerical Analysis, Optimization
- **Statistics**: Machine Learning (R), Statistical Inferences, Probability, Time Series Analysis, Econometrics
- **Programming**: MATLAB, R, C++, Python, Excel VBA
- **Projects**: Used Monte Carlo Simulation to price numerous exotic options and performed variance reduction by applying antithetic variables, importance sampling, control variables, stratification and Brownian bridge methods

EXPERIENCE

FEDERAL HOME LOAN BANK — Pittsburgh, PA
Quantitative Analyst Intern 7/17 – 8/17

- **Interest Rate Modeling/Derivative Pricing**: Implemented live market consistent calibration algorithms of Hull-White Model; Simulated interest rates term structure using Monte Carlo Simulation and priced exotic bonds, swaps and swaptions
- **Data Analysis/Programming:** Developed programs to read and parse in-house and Bloomberg data; Designed library MATLAB to capture features of exotic bonds and swaps
- **Portfolio Management:** Collaborated with traders to develop VBA programs to monitor portfolio performance
- **Model Validation:** Validated curve construction (OIS and LIBOR) and market risk models; Collected market data from Bloomberg for validation and carried out replication and sensitivity analysis in MATLAB
- **Communication:** Created and presented model validation reports reflecting new regulatory requirements

TEBON INNOVATION CAPITAL (Asset Management Firm with $10 Billion AUM) — Shanghai, China
Summer Asset Management Intern 7/15 – 8/15

- **Statistical Modeling**: Built a macro-economic based model by identifying key macro-economic factors affecting US stock portfolio and performing multivariate regression analysis in R; Evaluated portfolio's risk exposure to macro variables and stress tested portfolio performance against extreme macro events
- **Risk Management/Teamwork**: Collaborated with Risk team to facilitate a potential $10 million pre-IPO project by conducting both on-site and off-site due diligence
- **Financial Modeling:** Analyzed liquidity and profitability through Pro Forma model, constructed discounted cash flow models and performed comparable analysis for equity valuation (Excel)

INDUSTRIAL AND COMMERCIAL BANK OF CHINA — Hangzhou, China
Investment Banking Summer Analyst 6/13 – 8/13

- **Fundamental Analysis:** Performed detailed financial statements analysis on target company and its competitors; Created in-depth industrial report by analyzing economic, industry and market trends

ADDITIONAL INFORMATION

- **Certificate:** QuantNet C++ Programming for Financial Engineering Certificate;
- **Languages**: Mandarin (Native), English (Professional), Korean (Intermediate)
- **Volunteer**: Volunteer Emory: organized monthly events for autistic children
- **Interests**: Cooking (Chinese food, Korean food), Chinese Calligraphy (Taught Chinese Calligraphy to students from other cultures), Travel (Visited 3 continents and 10 countries in 3 weeks)