



MSFE ILLINOIS

MASTER OF SCIENCE IN FINANCIAL ENGINEERING

2015 PRACTICUM PROJECT COMPETITION

Each semester, teams of students from the financial engineering master's program work with industry partners (sponsors) to solve crucial business problems. In addition to their written reports, these student teams do a presentation to an outside panel of judges that include technical and nontechnical peers. The top three teams earn monetary prizes that are made possible by the program and by the generous donations of MSFE program alumni.



FIRST PLACE - \$1,500

Title: Back-testing for ETF Arbitrage Opportunities

Team: Arko Bhattacharya, Napat Chutumstid, Christine Vincent, Fei Yang, Ziwei Zhou, Yunke Zou

Company Sponsor: Wedbush Securities

Abstract: The focus of this project was to back-test ETF arbitrage strategies on niche funds using Lime Strategy Studio, which is a C++ trading strategy development platform provided by Wedbush Securities, to explore whether there is any opportunity to profit from the market. Back-tests are performed on full tick-by-tick data to simulate execution, and incorporate realistic institutional trading fees.

SECOND PLACE - \$1,000

Title: Anti-Money Laundering

Team: Anthony Ali, Ankita Pant, Shreyas Venkatasubramaniam, Jieyang Weng, Ji-aqi Xie, Jing Xu

Company Sponsor: BMO

Abstract: Money laundering is the process of transforming the proceeds of crime into ostensibly legitimate money or other assets. It is defined as the process of making illegally-gained proceeds (i.e. "dirty money") appear legal (i.e. "clean"). Typically, it involves three steps: placement, layering and integration. First, the illegitimate funds are furtively introduced into the legitimate financial system. We start with understanding the different processes of laundering money, performing statistical analysis on data sets to understand customer profile and behavior, evaluating a customer's overall risk profile and finally designing and implementing strategies to weed out potential money launderers.

We primarily base our analysis on Google BigQuery with complimentary use of Perl and Python. We make extensive use of Google infrastructure, including Google Analytics and Google Cloud storage systems. The skills developed over the course of this practicum include Big Data management, Data cleaning, SQL, Perl, regular expressions, Geo-spatial detection and Anti-Money Laundering techniques.



THIRD PLACE - \$500

Title: Sentiment Enhanced ETFs

Team: Yoshifumi Ichikawa, Seung Lee, Chuanning Li, Yunqian Li

Company Sponsor: Social Market Analytics

Abstract: Exchange traded funds (ETFs) track the performance of an index or a basket of assets. With high liquidity and low commissions, ETFs provide an attractive product for investors. In a time when online sentiment tracking and "social trading" continue to be integrated into the investment process, this report defines a new class of ETFs by modifying the constituent weights of index tracking ETFs (SPY, XLV, XLY) utilizing social media sentiments as new smart-beta factors. The sentiment data used come from analysis of the lexical content of the Twitter data stream. In general, equities with sentiment signals exceeding a positive threshold are amplified in the ETF constituents, while those with signals below a negative threshold are attenuated. Our formulation includes multiple methods to determine the constituent weightings, evaluating different weighting factors, thresholds and time span of sentiment data. Results indicate that sentiment enhanced ETFs yield better returns, during a 2-year test interval, and have more favorable Sharpe Ratios compared to the original three ETFs, but at the cost of slightly higher transaction fees.





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Other 2015 Practicum Projects:

Title: Optimizer for Retirement Plan

Team: Chongda Liu, Xiaoyun Hu, Zhengxun Zhang, Zhongkai Du

Company Sponsor: Ash Brokerage

Description: Gauging the optimal place of annuities in retirement accounts

Title: Optimal Hedging Strategy Analysis

Team: Cheng Min, Jinfei Tan, Jing Liu, Qi Xu, Shuanghui Sun, Ziwei Xu

Company Sponsor: BP

Description: Designing optimal hedging techniques for refined product

Title: Theoretical Option Pricing on the Maxeler Platform

Team: Hassan Ilyas, Zilan Lin, Chi Mu, Sittichok Thanomkulrat, Lishi Wang, Yizhong Zhou

Company Sponsor: CME

Description: Understanding and using CME data stream to calculate options prices at high speed

Title: A Study of the Federal Reserve Announcement

Team: Nigel Chan, Mina Gad, Bin Li, Fo-Han Lin, Di Xiao, Tanran Zheng

Company Sponsor: CME

Description: Designing strategies that utilize the dynamics of Order Book changes and programming in Maxeler

Title: Liquidity Profile for Two Bond ETFs

Team: Xiaoling Chen, Alexander Kment, Sankalp Krishnan, Xiao Liu

Company Sponsor: MarketAxess

Description: Anticipating bond trading adjustments that result from the FI ETFs creation and redemption process

Title: Maximizing Returns on Lending Club's Peer-to-Peer Lending Platform

Team: Chaehyun Pyun, Troy Sieburg, Mark Yakhou

Company Sponsor: PeerEx

Description: Using Lending Club's historic data set to design a portfolio of personal loans.

Title: Predictive Models for Volatility Indexes for Individual Equities Stocks' VIX with Twitter Sentiment Scores

Team: Anadi Gaur, Jiawei Lu, Zeyang Peng, Weixi Yu, Guohao Wang, Song Zhang

Company Sponsor: Social Market Analytics

Description: Investigating Sentiment Indicators for Sectors instead of individual names.

Title: Portfolio Risk Management Using Value at Risk, Key Duration and Spread Duration

Team: Sadik Atalay, Zesheng Chu, Yanfei Mao, Hendro Sugandi, Hanqing Wang, Yumeng Zhang

Company Sponsor: University of Illinois Treasury

Description: Designing a GUI for the UIUC treasurer to be able investigate investment strategies based on historical scenarios.

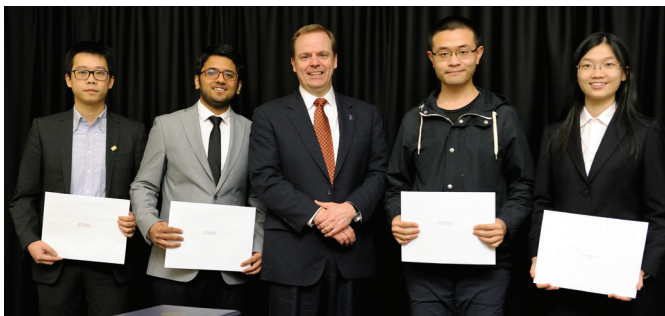
Title: Algorithmic Trading Strategies for After-Hour Trading Period

Team: Qi Liang, Michael Pan, Yash Shah, Tiwari Prakhar

Company Sponsor: Wedbush Securities

Description: Calculating the returns and strategies available from after-hours trading. Comparing Lit vs Dark hours Betas

Illinois Team Shares Victory at IAQF Academic Competition



UI MSFE team (l-r): Hanqing Wang, Anadi Guar, UI College of Business Dean Jeff Brown, Zeyang Peng and Xiao Liu. Not pictured: Hassan Ilyas, Shuanghui Sun.

A team from Illinois' MSFE program was one of four winners of the 2015 IAQF Academic Affiliate Membership Student Competition. Students were asked to develop a product which can be used to reduce the risk in defined benefit pension plans, and 25 papers from 17 schools were submitted. Four teams were selected as winners in a four-way tie, with each awarded a share of \$2,000 and invited to present their solutions at an IAQF sponsored event in New York.