Seung Lee

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# Summary

* Experience in developing, solving and testing models.
* Experience in analysis of large data sets.
* Knowledge of various numerical and statistical methods.
* Experience in working collaboratively with other researchers.
* Experience and knowledge of financial markets and market structure.

# Research Experience

## Dissertation

* Developed a sovereign default model in which government decision to make foreign debt payments are decided by majority voting similar to Greek referendum of 2015.
* The model was able to replicate key feature of the referendum results: young and low income voters favoring default.
* Solved the model using memory optimized parallel C++/matlab/cuda code in order to traverse the large state space of the model.
* [Link to codes for the model on github.](https://github.com/slee126/votetodefault) [Link to preliminary draft.](https://github.com/slee126/votetodefault/blob/master/paper/paper.pdf)

## Working PapeR with Eric Aldrich

* Analyzed trading patterns of two arbitrage-able products: S&P 500 Exchange Traded Fund on NASDAQ (SPY) and S&P 500 Futures on Chicago Mercantile Exchange.
* Using python, raw high frequency data was parsed into Pandas data frames.
* Applied various statistical methods such as Relative Entropy, Kullback-Leibler Divergence and Granger-Causality.
* Developed a model, which was able to replicate the asymmetrical response of the two very similar products by including bid/ask widths of the products.
* [Link to python codes on github.](https://github.com/slee126/highfreqTick) [Link to preliminary draft on SSRN.](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2772142)

## Working Paper with Lilia and Serguei Maliar

* Analyzed the impact of the aging workforce on the solvency of the Social Security Trust Fund.
* Modeled future workforce participation and efficiency of various age groups using projected college entrance and life expectancy.
* Developed a theoretical model to analyze the impact of higher proportion of college educated workers and increase in life expectancy on the solvency of the Social Security Trust Fund.
* Projected a delay in the solvency of the Social Security Trust Fund due to the increase in the productivity of the 65 and over.
* [Link to matlab codes for empirical analysis on github.](https://github.com/slee126/olg) [Link to sample of the preliminary draft.](https://github.com/slee126/olg/blob/master/paper/olg_sample.pdf)

## Research assistant to e. Aldrich, G. Laughlin, and J. Grundfest

* Analyzed trade logs from various financial exchanges to find possible causes of the rapid market decline on May 6 2010, the day of the flash crash.
* Parsed and analyzed over 200GB data stored in hdf5 format.
* Applied various statistical methods such as Granger-Causality, hazard analysis, linear discriminant analysis and change point detection to ascertain the cause of the flash crash.
* Constructed complex plots to convey multiple facets of the data and analysis to a single dimension.

# Work Experience

## Teaching Assistant | UC Santa Cruz | 2012-2016

* Led small discussion groups to supplement lectures with focus on student interactions.
* Supervised between 5 and 7 teaching assistants.
* Performed administrative duties such as maintaining the grade book for 300-450 students and updating class websites

## Derivatives Trader | Old Mission Capital | 2007-2010

* Forecasted foreign stock futures and ETFs using market factors such as currency markets, performance of similar stocks, and sector news to statistical models of foreign stock futures and ETFs in order to statistically arbitrage the products.
* Implemented dispersion trading strategies between index options and individual components of the indices.
* Managed risk using variety of products such as index futures, currency futures, currency swaps, ETFs, and basket of stocks to reduce the cost of risk management.
* Analyzed the rules of world exchanges in the event of rare occurrences.

## Proprietary Trader | AMEX | 2003-2006

* Arbitraged ETFs with components

## Assistant Trader | Susquehanna International Group | 2000-2002

* Filtered potential options trade for head desk trader
* Created and maintained database of trades
* Helped manage portfolio risk

# Education

## University of California Santa CRUZ phd Economics Expected degree 12/16

## Universit of california Berkeley BA Economics 1998-2000 w/ honors

# Skills

## Programming Languages - Matlab, mex, C++, Cuda, Fortran, Python, R, Visual Basic, SQL

## other – mpi, openmp, lapack, numpy, scipy, PANDAS, LINUX, MS Office, Latex, Git, Bloomberg API

## Statistical methods – Linear Model, Generalized Linear Model, Non-linear Models, Principal Component Analysis, Convex-Optimization, Bayesian Methods, Kalman Filter, Bootstrap, Monte Carlo Simulations, MCMC, Time Series

# References

## [Kenneth Kletzer](https://people.ucsc.edu/~kkletzer/)

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## [Lilia Maliar](http://stanford.edu/~maliarl/)

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## [Seguei Maliar](http://stanford.edu/~maliars/)

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## [Greg Laughlin](http://astronomy.yale.edu/people/gregory-laughlin)

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