



## FSRM Newsletter

### From the FSRM Director

Welcome to this issue of the FSRM newsletter. I hope that you will enjoy catching up on the Program's activities and news since our last issue in the Fall of 2013.

First, I am delighted to report that the outcome of the first "Statistics in Finance and Risk Management Conference" hosted by FSRM in November 2014 was a great success. Six leading experts representing a balanced mix of academic and practitioner experts presented their current work to the 170 plus attendees from academia and industry. The response to, and interest in, the material presented was overwhelmingly positive. This success could not have happened without the support of the whole statistics department, the involvement of the FSRM students and the efforts of all members of department administration team. I would like to thank all of them for their contribution to making the event a success.

Second, I would like to congratulate those of our students who graduated in January and May. Most of you have already found jobs in the financial industry and we wish you all the best for success in your careers.

Now, let us move on to updating you on some of the major milestones, achievements and activities of the program since we last touched base in the Fall of 2014.

As always, we welcome any news, comments and suggestions you may have. Please keep the feedback coming.



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## Update - Statistics in Financial Risk Management Conference and Center for Excellence

In the Fall Newsletter, we informed you a "Financial Statistics in Risk Management" Conference to be hosted by FSRM on November 7 2014. The event was a great success. It featured presentations by an international roster of globally distinguished experts, including Nassim N. Taleb, the best-selling author of *The Black Swan* and *Anti-Fragile*. These presentations were followed by a lively panel discussion on the protocols and standards that are the most important for young modelers to



follow as they start out on their careers. The "full house" had 170+ attendees, including a mix of practitioners and academics, filling the auditorium seats plus some "overflow" seats in the back of the room. A survey was distributed to attendees as part of their conference package. It was completed and returned by most of the attendees before they departed the event and others completed it subsequently online. The survey results showed that the event was a great success. Ratings in all categories, from speaker session quality and content relevance to event logistics, received scores of between 4 and 5, on a scale of 1 to 5.



There was also significant interest among the attendees in participating in the "Center for Excellence in Financial Statistics and Risk Management" which was inaugurated at the Conference. The FSRM program is currently in discussions with a number of practitioners about their participation in the Center and their sponsorship of either practical or research projects to which students and faculty can contribute. We will have a more detailed update on the Center progress in a later edition of the newsletter.

## GARP-FSRM Partnership and Master's Degree in Risk Education

GARP and FSRM had entered into an Academic Partnership in 2013 to jointly promote and advance risk education. Our joint activity covers reciprocal sponsorship and promotion of activities and events, input to FSRM curriculum evolution and content from GARP surveys of industry needs, the opportunity for students to participate in GARP research scholarship and fellowship competitions and eligibility of FSRM students to obtain GARP memberships, access GARP resources and to enroll in the Financial Risk Manager Certification exams at a reduced cost. Twenty one FSRM students enrolled in the FRM certification in the Spring and took the FRM I exam on May 17.



"Taking the FRM exams in parallel with my FSRM Master's degree allows me to take advantage of overlapping content and achieve two goals simultaneously. I can earn a Master Degree and also



complete the exam portions of the FRM Certification by my graduation date", said Stanley Shen, an FSRM student who is also enrolled in the FRM. "An additional benefit is that, immediately after I start working, I can focus all my efforts on learning my new job and making use of what I learned both in my degree and in doing the FRM." Diego Millalen, from Chile, added this perspective on the value of taking the FRM exams: "Coming from a country

outside the USA and having existing work experience as a risk professional, I am keenly aware of the importance of having a certification that is recognized globally. The FRM is recognized and accepted as the premier risk management certification worldwide."

Dr. Neville O'Reilly, the FSRM Associate Director, participated in a panel discussion on Master's level risk management education at the 15th Annual GARP Risk Convention held in New York on March 4 and 5. Also participating in the panel were John Hull from the Rotman School at Toronto University and Raghu Sundaram from the Stern School at NYU.

The emphasis of their respective programs were somewhat different with different demographic target students. In particular, Rotman accepts students who have already had six or seven years of work experience in the financial industry before they enter the program, while Stern is a one year executive education program and FSRM accepts not only part time students and students with work experience, but also students who have just earned undergraduate degrees. Nonetheless, the panelists found that their programs faced many of the same challenges. In particular, keeping up with the fast changing regulatory environment and deciding how much of this constantly changing landscape to communicate was flagged as challenging for all of the programs.

A second topic on which there was much discussion among the panelists, and interest from the audience, was the importance of effective communication by quantitative financial analysts and risk managers to senior management and non-quantitatively trained colleagues in the organization. One of the methods for doing this that was emphasized, not only by the panelists, but also in one of the

Convention tracks was "Data Visualization". It turns out that, while new technology provides an easier path to produce the visuals and graphic displays that communicate the findings of a model visually, many of the effective techniques for doing so have been used by statisticians in different fields for many years.

## Practitioner Seminar Series

### The Optimal Hedging Monte Carlo

By Rupak Chatterjee, Ph.D., Stevens Institute of Technology



*Dr. Chatterjee is an Industry professor and Deputy Director of Financial Engineering at the Stevens Institute of Technology. He has over fifteen years' experience as a quantitative analyst working for various top--tier Wall Street firms.*

Dr. Chatterjee introduced the optimal hedging Monte Carlo (OHMC) method for derivative pricing model calibration and risk management. The OHMC approach is a methodology which attempts to address the problems of hedge slippage, selection of optimal hedge ratios and estimation of residual risk. Dr. Chatterjee explained how OHMC can be used to disaggregate the risk premiums associated with hedge slippage, transaction costs and sources of systematic risk. Dr. Chatterjee answered questions from students and gave them some advice. He suggests our students, as job hunters with no working experience, apply early for internships and jobs and highlight their data analysis and statistics expertise. He believes that that sophisticated data analysis is an under-supplied and sought after capability.

### A Structural Model of Sovereign Credit and Bank Risk

By Emilian Belev, CFA, Northfield Information Services



*Emilian has headed the development of Northfield's Enterprise Risk Analytics for the last 13 years. His domain of responsibilities include modeling equity and fixed income, currency, equity, interest rate, and credit derivatives, structured products, directly owned real estate, private equity, and infrastructure, and developing an integrated framework for these asset classes to be analyzed side-by-side in a coherent, accurate, and economically logical fashion. Emilian is a winner of the 2013 PRMIA award for New Frontiers in Risk Management.*

In this presentation, Mr. Belev presented an overview of a model for assessing sovereign credit risk and default probabilities, which took center stage in the market's perception of major systemic risks during the recent European banking crisis. It builds on the seminal work of Merton, but takes it in a new direction to adapt the method to a sovereign debt setting. The proposed model caters to economic intuition and resorts to explicit measures of macroeconomic activity as its building blocks. Furthermore, the model elucidates the connection between the viability of sovereign entities and the viability of their corresponding jurisdictional financial institutions.

## Statistical Quirks, Subtleties and Surprises in Financial Data

By Martin Goldberg, Ph. D., ValidationQuant.com

*Dr. Goldberg has worked as a quantitative analyst since 1988, first as a desk quant in fixed income and commodities, then developing market risk and VaR models, and Head of Model Validation at Citi, then at Standard and Poor's. His main research interests are copulas and Extreme Value Theory as applied to risk management.*



Dr. Goldberg presented examples and the corresponding appropriate statistical techniques where financial data demands a more sophisticated treatment than one finds in the elementary or standard textbooks. Further, he commented on the dangers in relying on the applicability of the standard distributional assumptions which are widely used in the industry for modeling and introduced some approaches to test for the validity of the applicability of these assumptions to the context at hand.

## The Sortino Ratio and the Generalized Pareto Distribution: An Application to Asset Allocation

By John Paul Broussard, Ph.D., CFA, FRM, PRM, Rutgers University-Camden



*Dr. Broussard's financial market research interests are currently related to extreme value applications to portfolio decision-making, high frequency trading, and the efficacy of various mutual fund investment strategies.*

In this talk, Dr Broussard illustrated some of the ramifications for portfolio allocations which are implied by asymmetrical “upside” and “downside” investor risk appetites. He discussed how the Sortino Ratio could be used to aid the asset allocation process in reflecting this asymmetry more appropriately.

## Quant Trading: Who Does It and What Is It?

By Anthony Brockwell, Ph.D., Two Sigma Investments and Carnegie Mellon University

*Dr. Brockwell is currently acting as adjunct associate professor, and was a regular faculty member in Department of Statistics at CMU from 1999 to 2007. In 2007 he left academia to join a small startup hedge fund as a quant in New York City, where he developed and managed a portfolio of quantitative trading algorithms. In 2010 he joined Two Sigma Investments LLC, where he currently works.*



Dr. Brockwell began this presentation by giving a comprehensive overview of hedge funds and algorithmic trading. Then he discussed some important areas in finance where statistics is needed, including risk control, portfolio management and strategy development. He gave several example of “quantitative trading” and approaches for constructing automated trading

strategies. At the end of his talk, Dr. Brockwell emphasized that a statistical background and programming skills are primary for those who want to work in this area, and gave some advice on job hunting to the students.

## Deconstructing Black-Litterman: How to Get the Portfolio You Already Knew You Wanted

By David Esch, Ph.D., New Frontier Advisors

*Dr. Esch is an applied statistician with experience in multiple fields. He specializes in solving difficult numerical problems and is proficient in mathematical analysis and computation. Dr. Esch research interests include quantitative and data analysis problem solving using compute-intensive methods; mathematical statistics with applications in finance and econometrics, health care research, and astrophysics, technical writing and computer programming in several languages.*



At the beginning of this talk, Dr. Esch introduced The Markowitz mean-variance (MV) frontier which has been the theoretical standard for defining portfolio optimality for more than a half century. However, MV optimized portfolios are highly susceptible to estimation error and difficult to manage in practice. The Black and Litterman (BL) proposal attempts to resolve these MV optimization limitations by introducing a subjective or “Bayesian” element in the asset allocation process. However, by comparing BL to traditional MV and the Michaud optimization for a simple data set, Dr. Esch showed that constrained BL is no better than Markowitz, but that Michaud portfolios are better diversified under identical inputs and optimality criteria. At the end of this seminar, Dr. Esch shared his own working experiences with the audience, and expressed his confidence in future of quantitative finance. He said that statisticians are in great demand.

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## Faculty Profile



Professor Cun-Hui Zhang is a prolific researcher who has contributed in many areas of statistics, including high-dimensional statistical inference, compressed sensing, empirical Bayes, de-convolution, wavelet signal processing, functional MRI, microarray data, network tomography, semi-parametric and non-parametric methods, survival analysis, sequential analysis, and probability theory. His work impacts a broad range of applications, including financial data. Professor Zhang is a fellow of the Institute of Mathematical Statistics and of the American Statistical Association. His research has been supported by the National Science

Foundation and other government agencies.

Professor Zhang has been involved with the FSRM program since its inception. He is currently teaching FSRM535 Advanced Statistical Methods in Finance. According to Professor Zhang “The course covers important fundamentals in financial statistics. The students are intelligent and highly

motivated. It is a real joy to teach this class and guide the students in preparation for successful careers in financial industry.”

## Student Profiles

Before joining the FSRM program, **Namwoo Kim** earned a B.S. in Mathematics at Sogang University in Korea and an M.S. in Applied Mathematics and Statistics at SUNY. After graduation, she worked in Citigroup for 6 years. Her main roles at Citigroup were developing MIS and analytical research in Marketing and Risk management. However, Namwoo found it difficult to move up to the next level and explore challenging opportunities in investment bank. While looking for a school program to broaden her knowledge in finance with statistical application and strengthen quantitative skills, she discovered that Rutgers has such a program which could fulfill her desire of promotion, which is FSRM. Currently she is working as model validation specialist at Morgan Stanley in New York.



*“The experience from the FSRM program is priceless. The invaluable materials from course work and the devoted faculty members gave me inspiration and confidence to improve myself every day. Owing to resources from the program, I was well prepared for job interviews and finally got a job offer from Morgan Stanley. I believe that the FSRM program is nourishing students equipped with advanced analytical skills and powerful financial knowledge so that they could accomplish the goal in their journey.”*



**Ruisi Wang** earned her Bachelor’s degree in Economics at Nankai University in China. In 2012, she participated in a student exchange program at the school of business of Westminster College in Salt Lake City, UT. Out of many graduate school offers, she chose to join the FSRM program at Rutgers University as it provided the blend of advanced statistics and quantitative risk management courses that she was seeking. In the summer of 2013, Ruisi interned at Global Risk Management Advisors, LLC in NYC as a Market Risk Quantitative intern. In this role she was responsible for trading support and market risk analysis for hedge fund clients as well as performing research on effective hedging strategies for energy firms. Ruisi will graduated from the FSRM program in May of 2014.

Currently, Ruisi is working as an Economic Capital Modeler in the Credit Tech/Quant Analytics group at SunTrust Bank. In her role her responsibilities are researching unexpected losses arising from the Bank’s portfolio management efforts as well as doing model development and performance monitoring. Her day to day tasks involve fitting economic capital regression models, loss distribution simulation, probability of default and term-structure modeling primarily using SAS and Matlab. Ruisi’s work experience validates the relevance of the skills and training she received in the FSRM program. Her FSRM background made her an attractive candidate to the Bank’s hiring managers, and

helped her to start in the position with minimal guidance. According to Ruisi, *"The FSRM program not only prepared me with advanced statistical modeling and risk management knowledge, but also gave me a vision of combining academic projects with industry application. The courses contained the right blend of theory and application. The Advanced Simulation, Regression, and Time Series courses are all extremely relevant to my current job as a quant. It was very helpful that the program provided weekly practitioner seminars to give students like myself more exposure to current industry topics. As more and more statistical quants are demanded in the risk industry, I hope more degree candidates will be aware of the advantages that the FSRM can bring to their career paths."*

## FSRM Student Awarded Prestigious GARP Research Fellowship

FSRM student Skye Zovak makes a regular practice of attending the FSRM Practitioner Seminar Series and the talks by practitioners at industry association conferences such as IAQF and QWAFEFW. These sessions inspire him to investigate and delve into topics on a deeper level, leveraging his FSRM studies and experience on Wall Street. "Attending practitioner seminars are



great way to supplement my FSRM training and experience in the financial services industry. I think students should not miss out on attending these sessions as they link academic study with real world issues. They also provide opportunities to network with influential practitioners in quantitative finance and risk management," says Skye. "When I attended Dr. Emilian Bevlev's presentation on 'A Structural Model of Sovereign and Bank Risk' last fall, it occurred to me that the Merton Model for default risk and other techniques used by Dr. Bevlev of Northfield Information Services to study sovereign

credits could also be applied to municipal and state credits. After his seminar, I spoke with Dr. Bevlev and Professor Chen, Director of the FSRM Program, about my ideas for extending Dr. Bevlev's work into the sphere of municipal credit risk. They were supportive of the ideas, and I submitted them as a research proposal for the 2013 GARP Research Fellowship. I am very happy to have been awarded the fellowship as a result, and I am grateful to Dr. Bevlev and Professor Chen for their input and support."

Skye's research proposal, "Structured Fundamental Credit Valuation of City/Local Municipal Bond", was one of only three proposals globally to be awarded a 2013 GARP Research Fellowship. The other two winners were from Lehigh University in the USA and the Frankfurt School of Finance and Management in Germany. Please join us in congratulating Skye. In fact, Skye is the second FSRM student to receive the prestigious GARP Research Fellowship. Patrick Ewane, a FSRM graduate now working at xxx, won 2012 GARP Research Fellowship.