



FSRM Newsletter

From the FSRM Director

Welcome to this issue of our FSRM newsletter. It is my pleasure to share with you latest highlights and activities since our last newsletter in the Spring/2015 semester.

Let me start by greeting our new class entering Fall/2015. This is our biggest class to date, and is made up of 45 students admitted out of over 250 applicants. Please join me welcoming them into the FSRM family and helping them achieve success in their studies, careers and lives.

In June 2015, the Department of Statistics and the FSRM program hosted an international conference, the Fifth International IMS workshop in Finance, Insurance, Probability and Statistics workshop. It was a great success. For details, see page 9.

During the summer, several of our students interned at leading consulting, financial and insurance firms. Furthermore, many received return offers before their graduation. Their achievement is a testament of our program's strength and reach. On this front, we are also upgrading our capabilities and activities in student career services and practitioner involvement.

We are very excited to introduce a financial industry veteran, Mr. Joseph Libretti, as our Managing Director of Employer Relations and Career Development. I encourage every student to schedule a meeting with him as he will be an indispensable valuable resource for your career building.

In this issue, we review some activities of FSRM and practitioner seminar series. One of FSRM faculty members Professor Harry Crane and three students are introduced in faculty profile and student profiles. Prof. Harry Crane, who joined Rutgers in 2012, is one of the most popular professors, teaching probability and inference courses in the FSRM program and other courses in the Department. The three other students introduced in this issue will start their career in financial consulting firms after graduation.

I hope you will enjoy the news and profiles. As always, we welcome any news, comments and suggestions you may have, and will be glad to hear news from you. Please keep the feedback coming. I wish you and your families all the best and fulfillment of your goals and dreams in the coming academic year.



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Appointment of Managing Director of Employer Relations and Career Development



We are pleased to announce that **Mr. Joseph Libretti** has joined FSRM as the **Managing Director of Employer Relations and Career Development**. The FSRM Program has grown substantially since its inception in the fall of 2011, now requires additional dedicated support in the areas of career development, student pre-graduation and post-graduation employment placement.

Accordingly, responsibility for supporting students with these services is being transitioned from Dr. O'Reilly to Mr. Libretti. Dr. O'Reilly will continue to be the Deputy Director of the FSRM Program and the Director of the Center of Excellence in Financial Statistics and Risk Management. Dr. O'Reilly will continue to support students in FSRM's internal relationships with Global Services, with the Registrar's Office and with the Dean's Office for graduation process and requirements, program transfers, leaves of absence and related issues. He will also continue as the FSRM Program's liaison with the industry and with practitioners in the areas of industry associations (IAQF, GARP, SQA, QWAFEFW et al), FSRM program development and program content support (i.e. practitioner seminars, practitioner workshops and practitioner sponsored projects).

Mr. Libretti's immediate prior position to joining the FSRM program was the Managing Director of Corporate Advisory at IFS Securities. He has 25+ years of experience in the capital and financial markets. He is a highly strategic thinker with a strong financial services background assisting institutions, treasury teams, and multi-billion dollar publicly traded companies providing debt offerings and equity market repurchase solutions. Mr. Libretti's experience includes client relations, financial analysis, and business development and his ability to assess customer needs. Fundamental Equity Long Short, Asset Allocation, Hedge Fund Due Diligence, Exchange Traded Funds, Minority Mandate business for Pension funds and Asset Managers.



Welcome! New Students of 2015 Fall!



We are excited to welcome our new students of fall 2015! This is our biggest class to date. 45 students are admitted out of over 250 competitive applicants. They come from a wide range of backgrounds and all have demonstrated excellence in their current profession and aspiration to take on new challenges. Every one of them will discover its own very unique journey at Rutgers. And let's try our best to help them grow individually, professionally, and succeed in their future endeavors. □

New Student Orientation and Annual Picnic

On Aug 31 in Hill center, all new students entering in the fall of 2015, program faculty members and staff and invited guests kicked off the start of the 5th year of the FSRM program with speeches, discussion sessions and a BBQ party!

Dr. Regina Liu, Department Chairwoman opened the whole day event by offering a warm welcome and essential advice to new students. Representatives from career services, information technology, library and administration followed Dr. Liu and gave detailed guide maps to their areas for the new class. Dr. Rong Chen, Program Director, gave a detailed breakdown of curriculums and academic resources provided by the FSRM program. Afternoon hours were dedicated to practical training and career preparation, led by Dr. Neville O'Reilly, Deputy Director of the program. FSRM student Pratik Ramprasad presented his research project "Efficient Asian Options Pricing with Hull White" to the new comers. Mr. Ramprasad's project received support from Market Memory Trading and he talked about how the FSRM training helped him conduct research with applications in financial markets. Another pair of our students Chencheng Cai and Xiao Li presented their research titled "Corporate Bond Electronic vs OTC Transaction Costs", which was a joint effort with another industry practitioner, MarketAxess. We also invited former student Stanley Shen from Oxbow Corporation to talk about how he explored the wide range of resources provided by the FSRM program and worked with program faculties and external partners in his own career building process.



After a whole day full of information, the students, faculty members, staffs and guests were invited to our annual outdoor picnic. Under the direction of former FSRM assistant director Anh Luu, many student volunteers has spent several weeks of effort on food preparation, transportations and logistics. Thanks to their help, everyone enjoyed the event! It was a great opportunity for the new students to get introduced to and to socialize with other students and faculty members. The organized sport and fun games allowed students and faculty members to interact and learn more about each other in an informal atmosphere. Delicious food, lovely lawns, trees, sunshine and friends made a perfect afternoon. Smiles spread across everyone's face and were recorded in the photos. □

Practitioner Seminar Series

Using Measures to Drive Decisions in a Financial Lending Company

By Dr. John Hughes, Director of Analytics, Concord Advice

Dr. John Hughes currently holds the title of Director of Analytics at Concord Advice. Prior to his current position, he founded and ran his market research consulting company for 17 years. Before his own venture, he worked at Bellcore in the Measurements Research Group for 7 years. Dr. Hughes received his Ph.D. in Cognitive Psychology from Rutgers University. His undergraduate degree was in Aerospace Engineering from the University of Texas.

Profitability in small financial decisions needs to be built on both reliable and valid measurements /analyses to quantify the possible consequences. The measurement framework being used to guide the measurements and tie them to decisions will be de described. This then sets the foundation for the analytical approaches and software tools being used to implement the framework.

The measurement framework focuses on customer value, its predictive characteristics/data sources, revenue potential and repeat potential. And the cost associated with a customer including acquisition cost, servicing cost, recovery cost and cost of money. And lastly it must also provide an accurate assessment of risk, i.e., variability in individuals and variability in environment. The analytical approaches used within the framework include statistical modeling such as regression, ARIMA, survival analysis, HB, predictive modeling. It also makes heavy use of empirical approaches and simple simulations. And tools for building such a framework include statistical packages (Angoss, R, python), exploratory tools (Tableau, Excel, VBA) and databases (SQL Server, MS Access).

Analytics and the Insurance Industry: A Discussion on the Development of Predictive Models and the Use of Analytics in Business Today

By Dr. Huijun Pan, Director and Senior Data Scientist, Advanced Analytics

Dr. Huijuan Pan is currently the Director of Advanced Analytics at Liberty Mutual Insurance. The team under her lead provides analytics support to personal insurance online/offline distribution. Specifically, her team focuses on product distribution optimization and model monitoring and stabilization. In Aug 2011, Dr. Pan received her Ph.D. in Statistics from Texas A&M University, College Station, Texas. After graduation, she joined Travelers as a Senior Consultant on the Claim Analytics team. She built claim frequency and severity models to explain loss trends, participated in building price elasticity model to improve marketing strategy and developed tools to monitor business trends by utilizing statistical stability analysis. She joined Liberty Mutual in Aug 2013 first as an Assistant Director in Advanced Analytics. She led the effort to build predictive and explanatory models to support Actuarial Reserving, provided analytical consulting to distribution, focusing on new customer acquisition and developed modeling tools and best practices to standardize and improve modeling process.



Liberty Mutual Statisticians and Analysts work in a collaborative and dynamic environment, addressing a broad array of challenging, cutting-edge problems. They apply statistical methods to translate business issues into meaningful and verifiable quantitative analysis and then develop models to understand and find solutions for these complex business questions.

To provide a broad view of analytics in insurance industry, Dr. Pan first introduced four major components in the insurance business lines -- product, marketing, distribution and claim handling, and then illustrated real-world applications of statistical and analytical methods in these four units. For example, statisticians and analysts have significantly improved the accuracy of their insurance product pricing by using General Linear Models to predict accident frequency and accident severity. They use Text Mining tools to target potential customers and support customer retention for marketing purpose. And they use machine learning method to identify fraud, enhance claims services or improve workforce planning.

According to Dr. Pan, however, the next best action in Liberty Mutual happens in distribution unit. With technological innovations, distribution has progressively broadened from an own-sales force

versus agent/broker paradigm to a wide variety of direct and indirect channels between insurers and existing and potential customers. The internet is fundamentally affecting customer buying behavior, from preliminary insurance information search to other pre-sales activity such as soliciting advice and obtaining personalized quotes, to policy insurance and post-sales services for the policyholder. Liberty Mutual Statisticians and Analysts develop models that anticipate needs of potential customers and provide value-add offers. Incorporating these new features, the Liberty Mutual homepage has become a unit platform for intelligent e-commerce sales. At the same time, they monitor existing models closely so as to stabilize current system, identify improvement opportunities, and generate marketing and communication strategies. Truly, by analyzing performance trends, identifying improvement opportunities, and building data-driven business rules, analytics professionals solve business issues and keep business moving forward.

Behavioral Economics, What's the Big Idea?

By Mr. Paul Westbrook, President of Westbrook Financial Advisers



Mr. Paul Westbrook, CFP, is the President of Westbrook Financial Advisers, a fee-only financial and retirement planning firm providing financial and retirement planning services from its office in New Brunswick, New Jersey.

Graduated with a master's degree from George Washington University and later received his Certified Financial Planner (CFP) designation in 1984, Paul was appointed to a financial planning task force to create standards for financial planners.

He teaches Finance I and II at Rutgers University, Cook Campus, where he has also given talks on Behavioral Economics. Although Paul has spoken at financial planning and benefit conferences, he has more recently devoted time to presenting ideas to high school teachers on how to increase the financial literacy of their students, including presenting to such educational organizations as NJEA, AMTNJ, NCTM, and ASCD. He has also been quoted in such magazines as Money Magazine, Fortune, The Wall Street Journal, and Barron's. He has appeared on CNN and CNBC.

He authors several popular books, including Word Smart for Business, Math Smart for Business, and Business Companion, all published by Random House and JK Lasser's New Rules for Retirement and Tax, published by John Wiley & Sons. His latest is Teaching Money Applications to Make Mathematics Meaningful, Grades 7-12, published by Corwin Press.

Neoclassic economic theory assumes that economic agents have stable preferences and engage in utility maximizing behavior. However, we as humans often make decisions out of mental shortcuts, social factors, and/or even emotions, rather than intellectually strict logic. Concerned with these bounds of rationality of economic agents, behavioral economics studies the effects of psychological, social, cognitive, and emotional factors on the economic decisions of individuals and institutions. With vivid everyday examples, Mr. Westbrook introduced to us important concepts and theories in behavioral economics. Rather than think in rigid logic, people tend to be influenced by the way in which choices are framed. Similarly, people base estimations on values known to them, even though

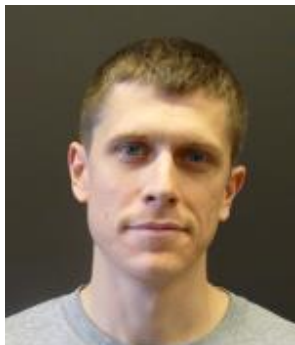
these facts may have no bearing on the actual values. In the context of financial investing, investors tend to hang on to losing investment and keep waiting for their investment to break even at their initial purchase price. Thus, they anchor the value of their investment to the value it once had, and instead of selling it to realize loss, they take on greater risk by holding it in the hope that its market value will recover though the market clearly shows a losing outcome is more likely.

Further, Mr. Westbrook explained the far-reaching applications of behavioral economics to various domains, including personal and public finance, health, energy, public choice, and marketing. Governments take on broad behavioral economics insights to “nudge” individuals to make choices favorable to society as a whole, such as increasing saving, eating healthy food, and quitting smoking. In the private sector, behavioral economics has reinvigorated practitioners’ interest in psychology, particularly in marketing, consumer research, as well as business and policy consulting. Behavioral economics shows that some errors made by consumers are persistent and predictable, which raises the prospect of firms designing business model that do not focus on competing on price and quality.

Specific to us future professionals in financial industry, Mr. Westbrook pointed out that people are more prone to mistakes in financial market because financial products are inherently more complex and decisions may require assessing risk and uncertainty. However, some financial decisions, such as choosing a retirement plan or mortgage, are made infrequently, with little learning from others, and with consequences revealed only after a long delay. Knowledge of behavioral economics can take us beyond intuition and helps us be precise in detecting, understanding, and remedying problems that arise from consumer mistakes.



Faculty Profile



Professor **Harry Crane** researches problems at the interface of probability theory, statistical inference, and combinatorics. Such problems arise in various applications in which a latent structure drives the phenomenon of interest, e.g., interacting particle systems, social network dynamics, and clustering applications. Dr. Crane is especially interested in understanding how fundamental modeling principles, e.g., exchangeability, stationarity, and the Markov property, affect the validity of certain assumptions, e.g., sparsity, and the resulting statistical inferences. Professor Crane's research has been published in a range of journals, including statistical theory, methods, and applications, theoretical and applied probability, combinatorics, algebra, and

statistical physics. Dr. Crane recently received the prestigious National Science Foundation Career Award for his excellent research.

In addition to mentoring and guiding student-led research projects, Professor Crane has taught introductory courses in the FSRM program (FSRM 582-583), which cover the basics of probability theory and mathematical statistics. His teaching stresses the core concepts needed to master advanced techniques from the higher level courses.

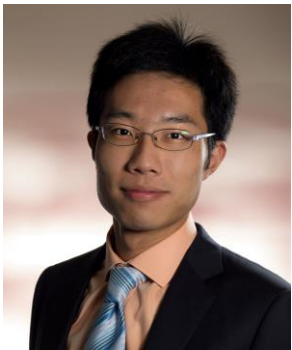


Student Profiles

Evanthia Tapiri earned her Bachelor's and Master's Degrees in Applied Mathematics and Physics from National Technical University of Athens, Greece. Her passion has always been statistics and especially Bayesian statistics. She is also keen in the financial applications of Statistics and FSRM was the program that best fitted her interests. She learned how to apply various statistical models in Finance and Risk Management and found various opportunities to meet and learn from very important and interesting professionals through the FSRM practitioner seminars and events.



“During summer, I was able to join Liberty Mutual as a Graduate Advanced Analytics Intern and I have been offered the return offer position of Advanced Analytics Analyst. The skills that I gained from the FSRM program can be applied in any industry sector and help me to be able to pursue a career not only in Finance industry, but also in Insurance and Banking Industry. The FSRM faculty and especially Dr. O'Reilly and Dr. Chen gave me a lot of support and they were there for any question that I had.”



Kangjun Wu earned his Bachelor's degree in Statistics at Zhongnan University of Economics and Law in Wuhan. With the passion about statistics and data analysis, he joined FSRM in fall 2014. The courses, projects and practical training in FSRM helped him lay a solid foundation in statistical techniques and programming skills, and gave him opportunities to learn how knowledge is used in business and industry. He interned in Data Science Team at MetLife in Bridgewater, NJ since June 2015.

At MetLife, he is involved in every stage of analytic projects. His responsibility includes data preparation, predictive modeling, reports generation, etc. He found the knowledge and skills learned from class extremely useful in interviews and are heavily used in daily work, such as statistical inference, regression analysis and data mining.

“The FSRM program fully meets my expectation in learning statistical methodology and techniques as well as its application in different fields, especially in finance. I felt I was delivering valuable business insights using statistical models when the presentation of our first project succeeded and it is helping MetLife save 20 million dollars from customer retention. The practical training and practitioner seminars are the most efficient way to increase competitiveness and have a close look at the industry. A wise student would definitely make use of all resources provided by FSRM.”

Shuanglu Xu earned her Bachelor's degree in Physics from Renmin University of China in Beijing. Being interested in Econophysics and interned at several financial organizations, she was determined to pursue her master's degree in statistical finance. After looking into many graduate programs, she decided to enroll in the FSRM program. The program not only helped her build on her mathematical and programming skills but also offered her practical knowledge in finance and risk management. In terms of career development, the resume workshop helped her revise her resume and gave her suggestions on how to succeed in a job interview. She also found the weekly seminars very helpful for providing her a great platform to communicate with leading researchers and professionals.



Thanks to the program's career development seminars, she became one of the summer interns at EY's Quantitative Advisory Service team. During her internship, she was engaged with the model governance and remediation project and conducted developmental testing on 8 financial models for a leading investment bank. She then gained the opportunity to join EY as a full-time employee in January 2016. She will further apply her knowledge learned from FSRM and add value to her company.

"The FSRM program has helped me to gain many technical skills through intensive courses and developed my career by providing very useful workshops and seminars. With the support from the program, I earned the internship opportunity at EY. I'm more than thankful to all the faculty members for helping me whenever I reach out to them."



Fifth IMS-FIPS Workshop

From Jun 25 to Jun 27, the Fifth IMS-FIPS (Finance, Insurance, Probability and Statistics) Workshop took place in Rutgers Student Center on College Avenue Campus of Rutgers University. It was jointly hosted by the Department of Statistics and FSRM program at Rutgers University, and Department of Statistics at Columbia University. The conference received partial financial support from National Science Foundation, and various contributions from other partner organizations including GARP, QWAFEFW and IAQF. This was a great venue for globally distinguished academic experts and practitioners to discuss current challenges and future opportunities in the interface of Finance, Insurance and Probability and Statistics, and their applications and practice in related industries. During each of the first two days of the event, 3 distinguished plenary speakers presented their latest research on mathematics and statistics and its application in finance and insurance. Following the plenary speeches, 6 invited discussion sessions in 2 main parallel tracks and 2 contributed "short talks" brought attendance further to their focused areas. The last day of the conference featured predominantly talks from industry practitioners, with 1 plenary speech and 9 invited talks. More than 150 participants attended the conference, including researchers from France, Australia, Japan, Hong Kong and other countries and regions.

FSRM students Pratik Ramprasad and Chencheng Cai presented their simulation results on "Complete Analytical Solution of the Heston Model for Pricing Vanilla European and American Options and Representing their Value-at-Risk" and "Understanding Derivatives Through Their Probability Density Functions". They closely worked with Alexander Izmailov and Brian Shay from Market Memory Trading to numerically simulate some of the innovative ideas from these two papers.

Professors Rong Chen, Lee Dicker, Han Xiao, Harry Crane and Neville O'Reilly presented their current research at the conference.



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