Statistical modeling, data analysis and risk management is central to what we do at AIG Investments. We need to recruit and retain talented, professional statisticians who not only understand how to measure, monitor and manage an array of exposures, but are also skilled financial data analysts. The FSRM program at Rutgers University develops the kind of people that meet our needs for these tasks.

David Li, Managing Director, AIG Investments
Professional Training to Meet Financial Institutions’ Needs

Risk taking is fundamental to a financial institution’s business. Today, these organizations have to react to events at lightning speed and compress the time to market for innovative new products. At the same time, they must measure, monitor, manage and mitigate various exposures including credit, liquidity, market, operational, political and country risk. High performance in both these areas provides a foundation for revenue generation and a source of competitive advantage. By taking a proactive stance in risk management, financial institutions can identify, address and develop opportunities, ultimately allowing them to execute effectively on their financial and strategic objectives.

While risk management always has been important, it has moved into the limelight recently. Terrorism, natural disasters, power outages, corporate scandals, the financial crisis and cyber security concerns have undermined the confidence of businesses and consumers globally. Regulators have responded by introducing mandates to manage and mitigate these risks including Dodd-Frank, Basel III and Sarbanes-Oxley. Financial institutions are now required to manage enterprise-wide risk, and non-compliance can lead to stiff penalties, damage to the firm’s reputation, diminished valuation and personal liability.

Financial institutions need to hire and retain talented people that have the statistical and mathematical expertise to model risk quickly and accurately, and the skills to operate successfully within an enterprise risk management framework. Additionally, they need skilled data analysts who can extract relevant information from ever increasing volumes and sources of data to identify and leverage opportunities that will improve their risk adjusted return on economic capital.
The Financial Statistics and Risk Management Program (FSRM) at Rutgers University offers a 30-credit Master’s degree in Statistics focused on the analysis of financial data, instruments, markets and risk management. Students in the program receive core training in probability theory, statistical inference and advanced statistical and computational methods tailored to financial applications and risk management. They also receive supportive education in related financial concepts and market structure, operations, trading instruments and risk-related regulation.

Courses are taught by a faculty of experts in the mathematics of uncertainty and in statistical modeling. Industry practitioners also contribute to class instruction. Students benefit from a dynamic learning environment featuring internships, projects and case study assignments using real financial data, as well as attendance at practitioner seminars, industry events, career workshops and mentorship opportunities. Through the FSRM program, students are exposed to a world-class faculty, expert Advisory Board and industry practitioners in a location close to New York City. This foundation prepares students for a wide range of careers in the financial industry.

I chose Rutgers’ FSRM program because it uniquely focuses on the broader application of statistical modeling, data analysis and risk management, not developing and pricing customized derivative products. I value the Practitioner Seminar series, internships, projects using Bloomberg data and the FRM certificate option. Being close to New York City and the competitive tuition fees are added benefits.

Skye Zovak, current student

Traditional quantitative finance programs focus primarily on mathematical modeling for developing and pricing complex derivative products. Fundamental financial engineering concepts, such as no-arbitrage pricing and risk neutral probabilities, are a component of the FSRM program. However, we are unique in emphasizing statistical and data analytics tools for measuring, monitoring, managing and mitigating uncertainty, risk and volatility.

Students will study and apply in depth important topics such as advanced applied parametric and non-parametric statistical methods in finance; advanced time series analysis applied to financial and economic data and forecasting; data mining, data visualization and predictive analytics; simulation of default probabilities, losses given default and exposures at default; stochastic scenario analysis and stress testing; event driven loss distributions for operational risk management and many other statistically driven topics as applied to financial data.

Our commitment is to ensure students are equipped to solve the complex problems financial institutions face today. We recognize that the standard assumptions or “stylized facts” of finance do not always apply in a real world situation. Students are taught to statistically examine and analyze the data for deviations from expected behavior and to use robust methods to mitigate and manage their impact.
For as long as I can remember, I’ve wanted a career in quantitative financial analysis. The FSRM program at Rutgers University taught me the skills I need to be successful in realizing my dream. I’m now working as a research associate at Cantor Fitzgerald Investment Banking, where I have an exciting future ahead of me.

Patrick Essouman, Cantor Fitzgerald Investment Banking
The FSRM program is designed for highly motivated students with a bachelor’s degree in mathematics, statistics, engineering, computer science, economics, finance or a related quantitative field. Fast-paced and demanding courses include hands-on assignments and projects. With appropriate preparation, a full-time student can expect to complete the program in three semesters (10 courses), but we also accommodate part-time students.

**Curriculum**

**Key Courses**
- Methods and Theory of Probability with Financial Applications
- Methods of Statistical Inference with Financial Applications
- Regression Analysis in Finance
- Financial Time Series Analysis
- Foundations of Financial Statistics and Risk Management
- Advanced Simulation Methods for Finance
- Advanced Statistical Methods in Finance
- Financial Data Mining
- Financial Risk Evaluation and Management
- Advanced Programming for Financial Statistics and Risk Management

Students may also choose from a wide range of elective courses in statistics, economics, finance and computer science.

**Sample Full-time Curriculum**

**Fall Semester, Year 1**
- Methods and Theory of Probability with Financial Applications
- Regression Analysis in Finance
- Foundations of Financial Statistics and Risk Management
- Advanced Programming for Financial Statistics and Risk Management

**Spring Semester, Year 1**
- Methods of Statistical Inference with Financial Applications
- Financial Time Series Analysis
- Advanced Statistical Methods in Finance
- Advanced Simulation Methods for Financial Applications

**Summer Semester, Year 1**
- Internship

**Fall Semester, Year 2**
- Financial Data Mining
- Financial Risk Evaluation and Management

**Admissions**
The FSRM program accepts applications from full-time and part-time students for both the Fall and Spring semesters. Acceptance to the program is on a rolling admissions basis, and there is no strict application deadline. However, space is limited so candidates are encouraged to apply by the end of May for the Fall semester and by the end of October for the Spring semester.

**Prerequisites**
Successful applicants will have completed courses in multivariate calculus, linear algebra, advanced undergraduate statistical methods and computer programming.

**Application Requirements**
- Official transcripts
- Three letters of recommendation
- Personal statement
- GRE or GMAT test scores
- TOEFL or IELTS test scores (international students)

**Minimum Test Scores**
The minimum GMAT/GRE requirements are 29/150 (Verbal) and 46/164 (Quantitative). The minimal requirements for applicants who must submit a TOEFL score are: 22 (Writing), 23 (Speaking), 21 (Reading) and 17 (Listening).
About Rutgers, The State University of New Jersey

Originally chartered in 1766, Rutgers is the eighth oldest university in the U.S. and the largest university in New Jersey. Rutgers offers more than 280 undergraduate, graduate and professional degree programs across 175 academic departments. Nearly 40,000 students study at the Rutgers New Brunswick campus, which is located less than 40 miles from New York City, one of the top financial centers in the world. The FSRM program is hosted in the Department of Statistics and Biostatistics at Rutgers. As one of the first of its kind in the nation, the Department enjoys the reputation of being the strongest based on its outstanding faculty in both research and instruction.