ANNUAL
REPORT
2011

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YACINE AÏT-SAHALIA

Director's Introduction

Eleven years ago, we opened the doors of the old Dial Lodge to the Bendheim Center for Finance to fulfill the same mission we have today: to develop new courses and programs in finance that will afford exciting learning opportunities to Princeton students, and to establish a leading center for research in modern finance.

Given ongoing dynamic market conditions, this continues to be one of the most exciting times for research and study of finance. Princeton's existing finance curriculum has been expanded and improved with the introduction of the Undergraduate Certificate in Finance in 1999 and Master in Finance in 2001. Recently we have added courses on the rise of the Asian financial markets, history of financial crises, and regulation of international financial markets, to name a few.

Center-affiliated faculty members continue to teach in both programs, as well as in a variety of contexts in their home departments across the University. By bringing together outstanding scholars from a wide variety of disciplines in a well-equipped setting that encourages dialogue and interaction, the Bendheim Center for Finance has been an ideal environment in which to conduct significant research in finance. It also has served as a major venue where the world's leading experts in finance from academia, government, and the private sector can meet regularly to exchange views and information, such as at our 10th Anniversary Conference this past September, in which Federal Reserve Chair Ben Bernanke returned to campus to address faculty, students, alumni, and friends of the University.

Proximity to Wall Street and other important centers of private-sector financial research continues to provide an additional source of intellectual stimulation and interchange for the Bendheim Center for Finance, and in recent years we have seen outreach and partnership with firms and alumni as far-flung as London, Hong Kong, Shanghai, and beyond. Our students are able to explore both internships and permanent job opportunities in an increasingly wide variety of finance-related areas, which have expanded from a few large Wall Street investment banks at the inception of the program to jobs in firms of all sizes and types around the world. The Bendheim Center for Finance also encourages students at all levels to conduct finance-related research at the University by providing such services as funding senior thesis projects, acting as a clearinghouse and major source of data, and providing expert faculty advisers for both undergraduate and master's research projects.

The scholars in the Bendheim Center for Finance are chosen for their ability to deploy cutting-edge methodologies to a wide range of finance-related topics, from stock-price determination and public policy toward financial markets to the role of financial institutions in economic growth. The center supports these leading scholars by encouraging their individual, collaborative, and multidisciplinary research and by providing facilities (including computer and data support), research assistance, financial resources, and venues for the exchange of ideas (such as weekly seminars and conferences). The University's existing strengths in areas such as economics, mathematics and statistics, operations research, computer science, psychology, and public policy provide a serious disciplinary basis for this research, leveraging our resources to produce a truly distinguished program. To promote maximum interchange among disciplines, all center faculty have appointments in regular University departments as well as in the Bendheim Center for Finance.

The past 11 years have proven finance's importance to Princeton's continued success as an educational and research institution, given increasing demands for training in these areas by our students at all levels, and because these fields have become central to research efforts in diverse disciplines, including economics. As one of the world's leading research and teaching universities, Princeton has much to offer to the future development and effective application of finance, including distinguished academic programs that can provide support in such areas as operations research, mathematics and statistics, decision science, and organizational theory. It has never been Princeton's objective to create a simulacrum of a business school. Rather, our strategy is to focus on those portions of the conventional business school curriculum in which the University has existing strengths—such as fields that can be solidly grounded in analytical, discipline-based research—and emphasize interdisciplinary research. Indeed, research and teaching in finance with an essential interdisciplinary component constitutes the distinguishing feature of the Bendheim Center for Finance.

By helping to attract outstanding new faculty, encouraging and supporting the work of existing faculty, and bringing outstanding scholars and practitioners from private industry to campus, the center continues to stimulate exciting new research, dialogue, and collaboration. And through its educational programs, the center will continue to enhance the education, training, and career opportunities of many of the world's best students for decades to come.

2010-2011 DEVELOPMENTS

On September 24, the Bendheim Center for Finance celebrated a decade of leadership in finance education and research with a day-long conference featuring leading faculty of the program. The conference, attended by faculty, alumni, corporate affiliates and students of the program kicked off with introductions by Dean of the Faculty David P. Dobkin, and Lynn Bendheim Thoman, co-president of the Lowenstein Foundation and daughter of the Center's generous benefactor, Robert Bendheim, who died in 2009.

The first panel, "Bubbles, Behaviors and the Origins of the Crisis," featured faculty members Harrison Hong, Daniel Kahneman, José Scheinkman, Ronnie Sircar and myself in a lively discussion on the financial crisis and the impact of overconfidence, poor risk management and greed on the industry and the economy as a whole. Addressing possible solutions to the repercussions of the crisis, Alan Blinder, Markus Brunnermeier, Governor Jon Corzine, Paul Krugman, and Hyun Shin outlined options for "A New Architecture for the Financial System."

In the final session, "Should Finance Research and Teaching Change in Light of the Financial Crisis?," René Carmona, Jianqing Fan, Burton Malkiel, Christopher Sims, and Wei Xiong debated possible outcomes from an academic viewpoint. The conference was followed by a standing room only public lecture by the founder of the program, Federal Reserve Chairman Ben S. Bernanke.

In early 2011, investment executive Mitch Julis, a member of Princeton's class of 1977, made a substantial gift to create the Julis-Rabinowitz Center for Public Policy and Finance.

In April, we celebrated the career of Professor Burton G. Malkiel with a conference and dinner among colleagues and friends. Malkiel retired this June after 47 years of teaching at Princeton.

PH.D. STUDENTS

- ANGIE ANDRIKOGIANNOPOULOU: University of Geneva, Assistant Professor (advisor: Hyun Shin)

- JELENA BRADIC: University of California, San Diego, Assistant Professor (advisor: Jianqing Fan)

- THOMAS EISENBACH: New York Federal Reserve, Economist (advisor: Markus Brunnermeier)

- XING HU: University of Hong Kong, Assistant Professor (advisor: Yacine Aït-Sahalia)

- ANDREW LEDVINA: Cal Tech, Postdoctoral Fellow (advisor: Ronnie Sircar)

- JIA LI: Duke University, Assistant Professor (advisor: Yacine Aït-Sahalia)

- JUN MA: Parhelion, Ltd, Associate (advisor: Warren Powell)

- PAULO NATENZON: Washington University of St. Louis, Assistant Professor (advisor: Faruk Gul)

- ALEX WUGALTER: Citigroup, Associate (advisor: Patrick Cheridito)

- DACHENG XIU: University of Chicago, Assistant Professor (advisor: Yacine Aït-Sahalia)

UNDERGRADUATE CERTIFICATE IN FINANCE

Now in its 13th year, the Undergraduate Certificate in Finance (UCF) continues to do extremely well, attracting record numbers of students. We enrolled 83 juniors from the Class of 2012. In previous years, the numbers were as follows: Class of '00, 61; '01, 82; '02, 85; '03, 122; '04, 113; '05, 126; '06, 158; '07, 154; '08, 105; '09, 120; '10, 79; '11, 89. This brings our total number of undergraduate students in the program (juniors and seniors) to 172. We instituted grade requirements starting with the Class of 2008 in order to admit a smaller, more manageable number of students into the program. We awarded 63 Undergraduate Certificates in Finance at graduation.

The success of the program has been overwhelming, especially in light of our limited resources for senior thesis advising. When the large size of the UCF stretched our limited advising resources, we worked with the dean of the college to introduce tougher admission requirements in order to cap the size of the program at a more manageable level. Specifically, we now require a minimum B+ average in the three prerequisite courses (mathematics, statistics, and microeconomics), with a minimum grade of B required for economics (ECO) and operations research and financial

engineering (ORF) majors. Once admitted, a minimum B average computed over the two core courses ECO 362 and 363, three elective courses, and independent work is required of all students to earn the certificate. We set these cutoffs based on grade data from previous classes, with the objective of limiting the number of UCF students to approximately 80, of which we expect about two-thirds to major in the ECO or ORF departments. We designed the tougher criteria for ECO and ORF students specifically to avoid "crowding out" the non-ECO/ORF majors from the UCF. With these new requirements in place, the program's reduced size provides an even better experience for students and faculty alike.

VISHAL CHANANI and QINGZHEN (SOPHIE) WANG were the recipients of the Birch Family Prize, which was presented at our Class Day ceremonies. This prize was established in 2004 by William D. Birch Jr. '64 and William Marco Birch '92. This is the sixth year we were able to present it to graduating seniors with the highest grade point average in course work related to the Undergraduate Certificate in Finance. The Kathleen Traynor '83 Senior Research Prize was awarded for the third time to the graduating female senior with the highest GPA in UCF course work, MARIA CHEVTSOVA.

Students earning the UCF are drawn from a wide cross-section of departments on campus, eight in total for the Class of 2011. In addition, UCF students are an extremely talented subgroup of the already high-achieving Princeton classes. They continue to receive a high proportion of the prizes awarded by their respective departments. Thirteen UCF students received departmental prizes; 15 UCF students were elected to Phi Beta Kappa Society; 22 UCF students were elected to membership in Society of Sigma Xi; 13 UCF students were elected to membership in Tau Beta Pi national engineering honor society; and 43 UCF students received academic honors (14 cum laude, 18 magna cum laude, and 11 summa cum laude). Twenty-one of our UCF students earned certificates of proficiency from eight other departments or programs.

MASTER IN FINANCE

The 9th class of the Center's Master in Finance (MFin) program graduated in June with 24 students. Years of investment in the placement of our graduating students continued to pay off in what remained a difficult job market. The networking efforts of our Director of Corporate Relations, the strong support from our Corporate Affiliates and our Advisory Council, and the success enjoyed by our previous graduating classes have been reflected once again in 100 percent placement of our first-year students in summer internships and our graduating students in permanent positions. While costly in the short run in terms of faculty and staff involvement, in the long run, a successful placement record is critical to maintain the program's leading position as recognized in industry surveys.

The number of MFin applications for 2011-12 was up significantly from 601 in January 2010 to 729 in January 2011, an all-time high. We continued to conduct interviews of the most promising subset of our applicant pool, a process that helps us ascertain which of the strong academic candidates we had identified through their

written applications also excelled in areas such as communication and leadership. This year, we interviewed 104 of the applicants and made 36 offers of admission (compared to 31 last year). Our selectivity rate continues to be extremely high, with our program admitting about 5 percent of its applicant pool. This is a much smaller percentage than our peer programs in quantitative finance (Carnegie Mellon University, Columbia University, Massachusetts Institute of Technology, New York University, Stanford University, University of California–Berkeley, University of Chicago, etc.), which typically admit around 25 percent of their applicant pool.

We received 29 acceptances (compared to 25 last year). Our yield (80 percent this year, similar to last year's) remained remarkably high, despite the absence in most cases of financial aid, which was limited to a handful of half-semester fellowships among the 29 students. To help the Graduate School's and the University's budget, we permanently gave up last year the 4 semester fellowships previously allocated to us out of general funds.

A strong applicant pool and yield reflect the recognition that the program is gaining in the wider quantitative finance community and among the top undergraduate institutions that are providing us with applicants. We have continued to rely on our Advisory Council to help us recruit the most promising applicants, we ask our members to speak or meet with the admitted students in order to tell them about Princeton and help steer them in our direction.

FUNDRAISING AND ADVISORY COUNCIL

As in past years, our greatest challenge will be to continue to recruit and retain top-flight faculty. Faculty recruitment and retainment is essential to our new educational initiatives and for continued expansion of course offerings. To be successful in this competitive market, we have found it necessary to make commitments to provide research support for faculty members. All of this requires active fundraising, and we continue to work closely with the Office of Development to increase the Center's resources. This year we give special thanks to DAVID BLAIR '67, WILLIAM JANEWAY '65, and ALFRED HURLEY '75 for their generous gifts to the center.

Looking back, similar gifts from generous alumni have established conferences and symposia, enabled ongoing faculty development, provided scholarships to deserving young students, and refurbished physical spaces important for interaction both inside and outside the classroom.

As we had anticipated during the flush years, our Corporate Affiliates Program has slowed down due to the economic environment and the continued budgetary challenges facing the industry. Recognizing the effect of the economic environment, we have focused on maintaining and developing long-term relationships, as well as recruiting partnerships with a broader group of firms. We are pleased to welcome two new corporate affiliates to the program—DC Energy and Deutsche Bank. In addition, the following firms have remained active in recruiting efforts and have expressed a continued interest in our program: Barclays Capital, Citadel Investments Group, Citigroup, Crédit Suisse, Goldman Sachs, and UBS/Prediction Company.

Over the past 11 years, the Center has relied on the help and advice of prominent alumni working in the financial sector. The ninth annual meeting of the Advisory Council took place on campus on April 28-29, 2011. We are grateful for their leadership, involvement and counsel.

Yacine Aït-Sahalia
Otto A. Hack '03 Professor of Finance and Economics
Director, Bendheim Center for Finance, June 2011

RECOGNITION OF BURTON G. MALKIEL

Burton Gordon Malkiel, the Chemical Bank Chairman's Professor of Economics, has been a popular teacher of generations of Princeton students and is responsible for a revolution in the field of investment management. His book, *A Random Walk Down Wall Street,* first published in 1973, recommended that all investors use passively managed "index" funds as the core of their investment portfolios. There were no publicly-available index funds when *Random Walk* first advanced this recommendation, and investment professionals loudly decried the idea. Today, indexing has been adopted around the world. *Random Walk* was published in a 10th edition in 2011. It has sold more than one and one-half million copies and has been translated into nine languages. It is widely regarded as one of the most influential books in the history of the field of investment management.

Professor Malkiel was born in Boston, Massachusetts on August 28, 1932. He attended the Boston Public Latin School (1949), Harvard College (1953), and Harvard Graduate School of Business (1955). After a three-year tour as a first lieutenant in the U.S. Army Finance Corps, he joined the investment firm of Smith, Barney & Co. as an investment banker. He received his PhD from Princeton University in 1964 and joined the Princeton faculty that year.

Professor Malkiel's scholarship has concentrated on understanding the pricing of financial assets. His first book, *The Term Structure of Interest Rates,* published by Princeton University Press, focused on the relationship between short-term and long-term rates of interest. What followed were books on reform of the international monetary system, the options market, forecasting, emerging markets, the Chinese economy, and a number of books and articles on investment management. During his career he has published 12 books and over 150 articles in addition to numerous op ed columns and book reviews

While most of Professor Malkiel's published work has focused on the stock market and optimal investment management, he has tackled an unusually broad set of topics. He has published in a number of areas including international monetary arrangements, tax and expenditure policy, money and banking, alternative investment markets, and the Chinese and other emerging economies. His published work has received several honorific prizes. He has served as President of the American Finance Association and has received lifetime achievement awards from professional investment organizations. He is also a fellow of the American Philosophical Society.

Professor Malkiel has been an active University citizen. He has twice chaired the Economics Department and Princeton's Financial Research Center. He has served on a number of University committees, including the Faculty Advisory Committee on Appointments and Advancements. He chaired the committee that established Univer-

sity policy on investing in Southern Africa and was a key member of the committee that established Princeton University's endowment spending policy. He also chaired the steering committee that planned Princeton's 250th anniversary celebration. During the anniversary, Princeton expanded its motto "in the nation's service" to include "and in the service of all nations." At that time the University also established the Pace Center for Civic Engagement, which Professor Malkiel was instrumental in conceptualizing, and for which he secured major funding.

Professor Malkiel spent two periods away from Princeton. During 1975-1977, he served on the President's Council of Economic Advisers in Washington, DC. He spent the years 1981-1988 in New Haven as Dean of the Yale School of Organization and Management and William S. Beinecke Professor of Management Studies.

During his career Professor Malkiel has served on government advisory committees and on several corporate boards of directors. He helped the U.S. Securities and Exchange Commission review its disclosure rules and the Chartered Financial Analysts Institute set up its guidelines for investor education. His numerous corporate board memberships have included Prudential Financial (where he chaired the Investment Committee of the board), the American Stock Exchange, and the Vanguard Group (for which he has lectured on investor education not only in the United States, but also in Latin America, Australia, and Asia). While he was at Yale, he served on the board of PRINCO, the Princeton University Investment Company, and he has served on the investment committees for several charitable foundations.

Professor Malkiel has taught large undergraduate courses at Princeton in macroeconomics, corporate finance, and investment markets, as well as a graduate course in money and banking. His undergraduate courses have always been highly rated and extremely popular. He has influenced generations of Princetonians to pursue careers in academia and in the financial community. The lasting impact of his teaching is immeasurable.

2010–11
FACULTY AND STAFF

FACULTY

DILIP ABREU is the Edward E. Matthews, Class of 1953, Professor of Finance and Professor of Economics. His research interests include behavioral economics and finance, economic theory, and game theory. He is a fellow of the Econometric Society and a member of its council, and a fellow of the American Academy of Arts and Sciences. He received a B.A. from Bombay University, an M.Phil. from the University of Oxford, and a Ph.D. in economics from Princeton.

COURSES TAUGHT
- ECO 200: Advanced Principles of Economics
- ECO 418: Strategy and Information

GRADUATE STUDENTS ADVISED
- Benjamin Brooks, "Robustness Analysis of Auctions"

REPRESENTATIVE PUBLICATIONS
- "Bargaining, Reputation, and Equilibrium Selection in Repeated Games with Contracts," *Econometrica* 75(3), May 2007 (with D. Pearce).
- "Bubbles and Crashes," *Econometrica* 71(1), January 2003 (with M. Brunnermeier).
- "Bargaining and Reputation," *Econometrica* 68(1), January 2000 (with F. Gul).
- "Information and Timing in Repeated Partnership," *Econometrica* 59(6), November 1991 (with P. Milgrom and D. Pearce).
- "On the Theory of Infinitely Repeated Games with Discounting," *Econometrica* 56(2), March 1988.

YACINE AÏT-SAHALIA is the Otto A. Hack '03 Professor of Finance and Economics and the director of the Bendheim Center for Finance. He was previously a professor at the University of Chicago's Graduate School of Business. He was named an outstanding faculty member by *BusinessWeek's 1997 Guide to the Best Business Schools* and is the recipient of the 1997 Michael Brennan Award and the 2003 Aigner Award. He is a past Sloan Fellow and Guggenheim Foundation Fellow. He is a fellow of the Econometric Society, the American Statistical Association, and the Institute of Mathematical Statistics, and a research associate for the National Bureau of Economic Research. He recently served as an editor of the *Review of Financial Studies* and edited the *Handbook of Financial Econometrics* with Lars P. Hansen. He received his Ph.D. in economics from the Massachusetts Institute of Technology in 1993 and his undergraduate degree from France's École Polytechnique.

COURSES TAUGHT
- FIN 515/ECO 462: Portfolio Theory and Asset Management
- FIN 575/ECO 575: The Econometrics of Continuous-time Finance

UNDERGRADUATE STUDENTS ADVISED
- Eric Eng, "Stock Return Predictability Using Fundamental and Technical Indications Across Various Time Horizons"

GRADUATE STUDENTS ADVISED
- Jia Li, "Testing for Jumps: A Delta-Hedging Perspective"
- Dacheng Xiu, "Essays on the Econometrics of High Frequency Data"
- Xing Hu, "Essays in Empirical Asset Pricing: Rollover Risk, Liquidity and the Rinancial Crisis"

REPRESENTATIVE PUBLICATIONS
- "Is Brownian Motion Necessary to Model High Frequency Data?," *Annals of Statistics,* 2010, 38 (with J. Jacod).
- "Estimating Affine Multifactor Term Structure Models Using Closed-Form Likelihood Expansions," Journal of Financial Economics, 2010, 98 (with R. Kimmel).
- "Portfolio Choice with a Jump: A Closed Form Solution," Annals of Applied Probability 19, 2009 (with J. Cacho-Diaz and T. R. Hurd).
- "Closed-form Likelihood Expansions for Multivariate Diffusions," Annals of Statistics 36, 2008.
- "Fisher's Information for Discretely Sampled Lévy Processes," Econometrica 76, 2008 (with J. Jacod).

ALEXANDRE D'ASPREMONT joined the Department of Operations Research and Financial Engineering in 2004. His research focuses on interest rate option pricing and risk management, applications of convex optimization to finance, statistics, and machine learning, and large-scale convex optimization in general. He received his undergraduate and graduate degrees from École Polytechnique and his Ph.D. from Stanford University. He is a member of the Institute for Operations Research and the Management Sciences and the Society for Industrial and Applied Mathematics.

GRADUATE STUDENTS ADVISED
- Vijay Krishnamurthy, "Convex Optimization with Applications in Sparse Multivariate Statistics"

REPRESENTATIVE PUBLICATIONS
- "Optimal Solutions for Sparse Principal Component Analysis," *Journal of Machine Learning Research* 9, July 2008 (with F. Bach and L. El Ghaoui).
- "Model Selection through Sparse Maximum Likelihood Estimation," *Journal of Machine Learning Research* 9, March 2008, (with O. Banerjee and L. El Ghaoui).
- "First-order Methods for Sparse Covariance Selection," *SIAM Journal on Matrix Analysis and Its Applications* 30:1, February 2008 (with O. Banerjee and L. El Ghaoui).
- "Static Arbitrage Bounds on Basket Option Prices," *Mathematical Programming, Series A* 106:3, July 2006, (with L. El Ghaoui).
- "Interest Rate Model Calibration using Semidefinite Programming," *Applied Mathematical Finance* 10:3, September 2003.

ALAN BLINDER is the Gordon S. Rentschler Memorial Professor of Economics. He has been the co-director of the Center for Economic Policy Studies at Princeton, which he founded in 1990. He is former vice chairman of the Board of Governors of the Federal Reserve System (1994–96) and before that was a member of President Clinton's original Council of Economic Advisers (1993–94). He also served briefly as deputy assistant director of the Congressional Budget Office in 1975. He is the vice chairman of Promontory Interfinancial Network, a director of the Council on Foreign Relations, and a member of the Economic Club of New York. Blinder was elected to the American Philosophical Society and the American Academy of Arts and Sciences. He is the author or coauthor of 17 books and has written scores of scholarly articles on topics such as fiscal policy, monetary policy, and the distribution of income. He received his Ph.D. from the Massachusetts Institute of Technology.

COURSES TAUGHT
- ECO 101: Introduction to Macroeconomics
- WWS 524: Domestic Macroeconomics: The Political Economy of Central Banking

GRADUATE STUDENTS ADVISED
- Andrew Tiffin, "Essays in International Finance: Institutions, Capital Flow and Growth"

REPRESENTATIVE PUBLICATIONS
- "Central Bank Communication and Monetary Policy: A Survey of Theory and Evidence," *Journal of Economic Literature,* December 2008 (with M. Ehrmann, Fratzcher, J. de Haan, and D. Jansen).
- "Leadership in Groups: A Monetary Policy Experiment," *International Journal of Central Banking,* December 2008 (with John Morgan).
- "It's Broke, Let's Fix It: Rethinking Financial Regulation," paper prepared for the *International Journal of Central Banking* conference, "The Theory and Practice of Macro-prudential Regulation," June 2010, forthcoming in an IJCB conference volume.
- "How Central Should the Central Bank Be?" *Journal of Economic Literature,* March 2010.

MARKUS BRUNNERMEIER is the Edwards S. Sanford Professor at Princeton University. He is a faculty member of the Department of Economics and affiliated with Princeton's Bendheim Center for Finance and the International Economics Section. He is also a research associate at CEPR, NBER, and CESifo, and a visiting scholar at the Federal Reserve Bank of New York. He was awarded his Ph.D. by the London School of Economics (LSE), where he was also affiliated with its Financial Markets Group. His research focuses on financial markets and the macroeconomy with special emphasis on bubbles, liquidity, financial stability and its implication for financial regulation and monetary policy. His models incorporate frictions as well as behavioral elements. He is a Sloan Research Fellow, the recipient of the Bernácer Prize granted for outstanding contributions in the fields of macroeconomics and finance and Fellow of the Econometric Society. He recently received a Guggenheim Fellowship for studying the impact of financial frictions on the macroeconomy. He is also an associate editor of the American Economic Review, Journal of European Economic Associa-

tion, Journal of Finance and was previously on the editorial board of the Review of Financial Studies and the Journal of Financial Intermediation.

GRADUATE STUDENTS ADVISED
- Thomas Eisenbach, "The Good and Bad of Liquidity Risk"

REPRESENTATIVE PUBLICATIONS
- "Computational Complexity and Information Asymmetry in Financial Products," Communication of the ACM, May 2011
- "Deciphering the 2007–08 Liquidity and Credit Crunch," *Journal of Economic Perspectives* 23 (1).
- "Market Liquidity and Funding Liquidity," *Review of Financial Studies* 22(6) (with Pedersen).
- "Money Illusion and Housing Frenzies," *Review of Financial Studies* 21(1).
- "Hedge Funds and the Technology Bubble," *Journal of Finance* 59(5), 2004 (with Nagel). Smith Breeden Prize for the best article published in the *Journal of Finance,* 2004 (First Prize).
- "Bubbles and Crashes," *Econometrica* 71(1), 2003 (with D. Abreu). March 2010.

RENÉ CARMONA is the Paul M. Wythes '55 Professor of Engineering and Finance. As director of graduate studies of the Bendheim Center for Finance, he is responsible for the Master in Finance program. He joined Princeton in 1995. He was granted the "Agregation" of mathematics (federal degree) in 1969, and a "These d'Etat" in probability from the University of Marseille in 1977. He was elected fellow of the Institute of Mathematical Statistics in 1984, and of the Society for Industrial and Applied Mathematics (SIAM) in 2009. He is also a member of the Bachelier Finance Society. Among his many editorial responsibilities, he was the co-founder and editor in chief of Electronic Journal in Probability, Communications in Probability and SIAM Journal on Financial Mathematics. He works on mathematical models for the commodity markets, especially the energy and emissions markets, and computational methods for quantitative finance.

COURSES TAUGHT
- ORF 405: Regression & Applied Time Series
- ORF 542: Stochastic Control and Stochastic Differential Games
- ORF 557, 558: Stochastic Analysis Seminar

UNDERGRADUATE STUDENTS ADVISED
- Kyle O'Donovan, "The New Asian Option: Using Temperature and Rainfall to Predict and Hedge the Uncertainty in Chinese Tea Harvests"
- Patrick Ohlendorf, "Reconsidering Public University Debt Management in Light of the 2008 Financial Crisis: A Stochastic Optimization Approach"
- Christian Villaran, "Maintenance Scheduling for Caracas: Maintaining Power Plants in a Failing Grid"
- Michael Weinberg, "Optimal Investment Under Asymmetric Compensation Contracts in a Discrete-Time Framework"

GRADUATE STUDENTS ADVISED
- Zhou Yang, "A Study on Differential Games with Applications to Asset Management and Market-Liquidiity Research"
- Youhong Sun, "Spread Options and Implied and Local Correlations"
- Yi Ma, "Arbitrage Free Monte Carlo Simulation of Implied Volatility Surface Evolutions"

REPRESENTATIVE PUBLICATIONS
- *Indifference Pricing* (editor), Princeton University Press, 2008.
- *Interest Rate Models: An Infinite Dimensional Stochastic Analysis Perspective,* Springer Verlag, 2006.
- *Statistical Analysis of Financial Data in S-Plus,* Springer Verlag, Second Printing, 2006.
- "Optimal Stochastic Control and Carbon Price Formation" (with M. Fehr & J. Hinz)
- "Market Design for Emissions Markets Trading Schemes" (with M. Fehr, J. Hinz & A. Porchet)
- "The Clean Development Mechanism and CER Price Formation in the Carbon Emissions Markets" (with M. Fehr)
- "Singular Forward-Backward Stochastic Differential Equations and Emissions Derivatives" (with F. Delarue, G.E. Espinoza & N. Touzi)
- "Tangent Levy Market Models" (with S. Nadtochyi)
- "Tangent Models as a Mathematical Framework for Dynamic Calibration" (with S. Nadtochyi)

PATRICK CHERIDITO is an associate professor of operations research and financial engineering. His research interests lie in probability theory and its applications to finance and insurance. Recently, he has been working on stochastic models for interest rates, dynamic risk measurement, risk allocation problems and backward stochastic differential equations.

COURSES TAUGHT
- ORF 526: Probability Theory
- ORF 535/FIN 535: Financial Risk Management

UNDERGRADUATE STUDENTS ADVISED
- Gabriel Montenegro, "Options Pricing and Volatility Modeling Through Risk-Neutral Approximations of GARCH Processes"
- William Nguyen, "College Tuition: Modeling and Valuation of Contingent Claims"
- Ray Wang, "A Network Model for the Spread of Financial Contagion"

GRADUATE STUDENTS ADVISED
- Alexander Wugalter, "Pricing and Hedging in Affine Models with Possibility of Default and Characteristic Functions of Log Stock Prices"
- Jared Klyman, "Systemic Risk Measures: DistVaR and Other Too-Big-To-Fail Risk Measures"

RECENT PUBLICATIONS
- "Optimal Consumption and Investment In Incomplete Markets with General Constraints," forthcoming in Stochastics and Dynamics (with Y. Hu).
- "Composition of Time-consistent Dynamic Monetary Risk Measures in Discrete Time," International Journal of Theoretical and Applied Finance 14, 2011 (with M. Kupper).
- "A Note on the Dai—Singleton Canonical Representation of Affine Term Structure Models," Mathematical Finance (with D. Filipovic and B. Kimmerl).
- "Recursiveness of Indifference Prices and Translation-Invariant Preferences," Mathematics and Financial Economics 2, 2009 (with M. Kupper)
- "Time-Inconsistency of VaR and Time-Consistent Alternatives," Finance Research Letters 6, 2009 (with M. Stadje)

GREGORY CHOW is a professor of economics, emeritus, and the Class of 1913 Professor of Political Economy, Emeritus. He was manager of economic research at the I.B.M. Thomas J. Watson Research Center from 1962–70, and director of the Econometric Research Program at Princeton from 1970–97. The program was renamed the Gregory C. Chow Econometric Research Program in 2001. Chow is a member of the American Philosophical Society and of Academia Sinica and a fellow of the American Statistical Association and of the Econometric Society. He has served as associate editor or co-editor of the *American Economic Review, China Economic Review, International Economic Review, Journal of Economic Dynamics and Control, MOCT-MOST,* and the *Review of Economics and Statistics.* Chow's contributions to economics cover three main areas: econometrics, including the often used "Chow test" for parameter stability, the estimation of simultaneous stochastic equations, and criteria for model selection; dynamic economics, including spectral methods and optimal control methods for the analysis of econometric models and dynamic optimization under uncertainty to be solved by the method of Lagrange multipliers (in lieu of dynamic programming); and the Chinese economy, an institutional, theoretical, and quantitative approach to its study. He received his Ph.D. from the University of Chicago. He writes a column in China Business News, the leading economics and finance newspaper in China.

COURSES TAUGHT
- ECP 379/EAS 346: The Chinese Economy
- ORF 571: Economic Analysis of Environmental Problems

REPRESENTATIVE PUBLICATIONS
- *Interpreting China's Economy,* World Scientific, 2010; (Chinese edition) Citic Press, 2010.
- *China's Economic Transformation,* Oxford: Blackwell Publishers, second edition, 2007.
- *Knowing China,* Singapore: World Scientific Publishing Co., 2004.
- "A Time-series Analysis of the Shanghai and New York Stock Price Indices," *Annals of Economics and Finance,* May 2003 (with C. Lawler).
- *Dynamic Economics: Optimization by the Lagrange Method,* Oxford: Oxford University Press, 1997.

ERHAN ÇINLAR is the Norman J. Sollenberger Professor of Engineering in the Department of Operations Research and Financial Engineering. He came to Princeton as a visiting professor of statistics in 1979–80. He is a fellow of the Institute of Mathematical Statistics, a fellow of INFORMS, an elected member of the International Statistical Institute, and the recipient of the Science Prize of TUBITAK. He has served as editor or associate editor of more than 12 journals on probability theory and its applications. His research interests center on martingales, Markov processes, stochastic differential equations, dynamic point processes, mass transport by stochastic flows, and their applications to mathematics of insurance and finance, reliability of complex systems, and modeling and estimation of natural hazards. He received the President's Award for Distinguished Teaching during the June 2010 Princeton Commencement ceremonies. He received the Lifetime Achievement Award for Excellence in Teaching for the Engineering School Student Council in 2011.

COURSES TAUGHT
- ORF 309: Probability and Stochastic Systems
- ORF 551/APC 521: Probability Theory

UNDERGRADUATE STUDENTS ADVISED
- Matthew Connor, "Option Pricing with Momentum and Mean Reversion"
- Graham MacDonald, "Markov Chain and Random Walk Analysis of Professional Squash Players"

REPRESENTATIVE PUBLICATIONS
- "Lyapunov Exponents of Poisson Shot-noise Velocity Fields," *Stochastic Processes and Their Applications* 94, 2001 (with M. Caglar).
- "Spectral Expansion of the Occupation Measure for Birth and Death on a Flow," *Stochastic Processes and Their Applications* 74, 1998 (with J. Kao).
- "Dispersion of Particle Systems in Brownian Flows," *Advances in Applied Probability* 28, 1996 (with C. Zirbel).
- "Mass Transport by Brownian Flows," in *Stochastic Models in Geosystems,* edited by S. A. Molchanov. IMA Volumes in Mathematics and Its Applications, Springer Verlag , 1996 (with C. Zirbel).
- "Conditional Levy Processes," *Computers and Mathematics* 46, 2003.
- Probability and Stochastics, Graduate Texts in Mathematics volume 261, Springer, New York, 2011."

JIANQING FAN is the Frederick L. Moore '18 Professor of Finance. He joined the Department of Operations Research and Financial Engineering in 2003. His research interests are financial econometrics, asset pricing, risk management, nonlinear time series, high-dimensional data analyses, nonparametric modeling, and computational biology. As a specialist in statistics and financial econometrics, Fan received the 2000 Presidents' Award from the Committee of Presidents of Statistical Societies, recognizing the most outstanding statistician under age 40; the 2007 Morningside Gold Medal of Applied Mathematics, given triennially to an outstanding applied mathematical scientist of Chinese descent under age 45; and the Guggenheim Fellowship in 2009. He was the president of the Institute of Mathematical Statistics, an international professional and scholarly society. He is an elected fellow of the American Associa-

tion for the Advancement of Science, the American Statistical Association, and the Institute of Mathematical Statistics. He has coauthored two highly regarded books. He delivered a talk at the 2006 Madrid International Congress for Mathematicians, a high honor in mathematical sciences. He serves as the co-editor of the *Econometrics Journal* and an associate editor of *Econometrica, the Journal of the American Statistical Association* and Journal of Financial Econometrics. He has served as the co-editor (in-chief) of the Annals of Statistics (2004–06), and an editor of the *Journal of Multivariate Analysis* (1998–2000) and *Probability Theory and Related Fields* (2003–05). He earned his Ph.D. from the University of California–Berkeley. He has served as the director of graduate studies of both the Ph.D. program of ORFE and Master in Finance.

COURSES TAUGHT
- ORF 504/FIN 504: Financial Econometrics

UNDERGRADUATE STUDENTS ADVISED
- Ivan Kleinfeld, "Judging the Judges: A Study of Analysts Performance from 2008-2010"
- Danqi Shen, "Forecasting Unemployment Rates with Spatial Autocorrelation and Regional Heterogeneity"
- Anthony Soroka, "The Russell Reconstitution: Technical Trading Strategies"

GRADUATE STUDENTS ADVISED
- Jelena Bradic, "Sparse Estimation and Oracle Properties of Regularized Regression with Non-Polynomial Dimensional Covariates"
- Lei Qi, "Essays on the estimation of time series models"

POSTDOCTORAL FELLOWS SUPERVISED
- Xu Han, "High-dimensional Statistical Learning and Inference"
- Yuan Liao, "Financial Econometrics"

REPRESENTATIVE RECENT PUBLICATIONS
- "Testing and detecting jumps based on a discretely observed process," *Journal of Econometrics,* Fan, Y. and Fan, J. (2011).
- "Non-concave penalized likelihood with NP-Dimensionality," IEEE—Information Theory, Fan, J. and Lv, J. (2011).
- "Sparse high-dimensional models in economics," Annual Review of Economics, Fan, J., Lv, J., and Qi, L. (2011).
- "Nonparametric independence screening in sparse ultra-high dimensional additive models," Journal of American Statistical Association, Fan, J., Feng, Y. and Song, R. (2011).
- " Multiple Testing via FDR_L for Large Scale Imaging Data," The Annals of Statistics. The Annals of Statistics, Zhang, C.M., Fan, J. and Yu, T. (2010).
- "Penalized composite quasi-likelihood for ultrahigh-dimensional variable selection," Journal of Royal Statistics Society B, Bradic, J., Fan, J., and Wang, W. (2011).
- "Multiplex Immunoassay for Lyme Disease Using VlsE1-IgG and pepC10-IgM Antibodies: Improving Test Performance through Bioinformatics," *Clinical and Vaccine Immunology*, Porwancher, R.B., Hagerty, C.G., Fan, J., Landsberg, L, Johnson, B.J.B., Kopnitsky, M., Steere, A.C., Kulas, K. and Wong, S.J. (2011).

HARRISON HONG is the John Scully '66 Professor of Economics and Finance. He teaches courses in finance in the undergraduate, master's, and Ph.D. programs. Before joining Princeton in 2002, he was on the faculty of the Graduate School of Business at Stanford University, most recently as an associate professor of finance. He received his B.A. in economics and statistics with highest distinction from the University of California–Berkeley in 1992 and his Ph.D. in economics from the Massachusetts Institute of Technology in 1997. His research has covered such topics as behavioral finance and stock market efficiency; asset pricing and trading under market imperfections; social interaction and investor behavior; security analyst incentives and forecast biases; organizational form and mutual fund performance; and destabilizing arbitrage, socially responsible investing, and commodities pricing. His work has received numerous awards and grants. He is on the editorial boards of the Journal of Finance and the Journal of International Central Banking. He was awarded the 2009 Fischer Black Prize by the American Finance Association, given bi-annually to the best financial economist under the age of 40.

REPRESENTATIVE PUBLICATIONS
- "Advisors and Asset Prices: A Model of the Origins of Bubbles," *Journal of Financial Economics,* forthcoming (with J. Scheinkman and W. Xiong).
- "Simple Forecasts and Paradigm Shifts," *Journal of Finance* 62, 2007 (with J. Stein and J. Yu).
- "Disagreement and the Stock Market," *Journal of Economic Perspectives* 21, 2007 (with Stein).
- "Do Industries Lead Stock Markets?" *Journal of Financial Economics,* February 2007 (with W. Torous and R. Valkanov).
- "Asset Float and Speculative Bubbles," *Journal of Finance,* June 2006 (with J. Scheinkman and W. Xiong).

HAROLD JAMES, who holds a joint appointment as a professor of international affairs in the Woodrow Wilson School and a professor in the history department, studies economic and financial history and modern German history. He was educated at the University of Cambridge (Ph.D., 1982) and was a fellow of Peterhouse for eight years before coming to Princeton in 1986. In 2004, he was awarded the Helmut Schmidt Prize for Economic History, and in 2005, the Ludwig Erhard Prize for writing about economics. He is chair of the editorial board of *World Politics*.

COURSE TAUGHT
- WWS 340/HIS 466: The History of Financial Crises
- HIS 366: Germany Since 1806
- HIS 554: Germany in 19th and 20th Centuries

REPRESENTATIVE PUBLICATIONS
- *The Roman Predicament: How the Rules of International Order Create the Politics of Empire,* Princeton: Princeton University Press, 2006.
- *Family Capitalism: Wendels, Haniels, and Falcks,* Cambridge: Harvard University Press, (also available in German: Munich, Verlag C. H. Beck), 2006.
- *Europe Reborn: A History 1914–2000,* London: Longman/Pearson Education, 2003.
- *The Deutsche Bank and the Nazi Economic War against the Jews,* Cambridge: Cambridge University Press, 2001.
- *The End of Globalization: Lessons from the Great Depression,* Cambridge: Harvard University Press (also available in Chinese, German, Greek, Japanese, Korean, and Spanish translations), 2001.

JAKUB JUREK joined the faculty of the Department of Economics at Princeton in 2008 and teaches courses on fixed income and asset pricing. His research focuses on theoretical and empirical finance, and emphasizes the role of market structure in price formation. His recent research develops option-based methods for the valuation of collateralized debt obligations (CDOs) and models of market liquidity. Jurek holds an undergraduate degree in applied mathematics and a Ph.D. in business economics, both from Harvard University. Prior to entering graduate school, he worked in the quantitative equity strategy groups at Goldman Sachs and AQR Capital Management, LLC. He has served as a consultant to Grantham, Mayo, van Otterloo, LLC, a Boston-based investment management company, and the Harvard Management Company.

REPRESENTATIVE PUBLICATIONS
- "The Economics of Structured Finance," *Journal of Economic Perspectives* 23(1) (with J. Coval and E. Stafford).
- "Economic Catastrophe Bonds," *American Economic Review* 99(3) (with J. Coval and E. Stafford).
- "The Price of Immediacy," *Journal of Finance* 63(3), June 2008 (with G. Chacko and E. Stafford).

DANIEL KAHNEMAN is a senior scholar at the Woodrow Wilson School of Public and International Affairs. He is also professor of psychology and public affairs, emeritus, at the Woodrow Wilson School, the Eugene Higgins Professor of Psychology Emeritus at Princeton, and a fellow of the Center for Rationality at the Hebrew University in Jerusalem. Kahneman has held the position of professor of psychology at the Hebrew University in Jerusalem (1970–78), the University of British Columbia (1978–86), and the University of California–Berkeley (1986–94). He is a member of the National Academy of Science, the Philosophical Society, and the American Academy of Arts and Sciences, and a fellow of the American Psychological Association, the American Psychological Society, the Society of Experimental Psychologists, and the Econometric Society. He has been the recipient of many awards, among them the Nobel Prize in Economic Sciences (2002); the Lifetime Contribution Award of the American Psychological Association (2007) and the Grawemeyer Prize (2002), both jointly with Amos Tversky; the Warren Medal of the Society of Experimental Psychologists (1995); the Distinguished Scientific Contribution Award of the American Psychological Association (1982); and the Hilgard Award for Career Contributions to General Psychology (1995). Kahneman holds honorary degrees from numerous universities.

REPRESENTATIVE PUBLICATIONS
- "Frames and Brains: Elicitation and Control of Response Tendencies," *Trends in Cognitive Sciences* 11, 2007 (with S. Frederick).
- "Why Hawks Win," *Foreign Policy* 158, 2007 (with J. Renshon).
- "Developments in the Measurement of Subjective Well-being," *Journal of Economic Perspectives* 20, 2006 (with A. Krueger).
- "Anomalies: Utility Maximization and Experienced Utility," *Journal of Economic Perspectives* 20, 2006 (with R. Thaler).
- *Choices, Values, and Frames.* New York: Cambridge University Press and the Russell Sage Foundation, summer 2000 (with A. Tversky).

PAUL R. KRUGMAN is a professor of economics and international affairs. He is the author or editor of dozens of books and several hundred articles, primarily about international trade and international finance. He is also internationally known for his twice-weekly columns in the *New York Times*. He was the Ford International Professor of International Economics at the Massachusetts Institute of Technology and has served on the staff of the U.S. Council of Economic Advisers. In 2008, Krugman received the Nobel Prize in Economic Sciences. He was the recipient of the 1991 John Bates Clark Medal, an award given every two years by the American Economic Association to an economist under 40. He received his Ph.D. from the Massachusetts Institute of Technology. He holds a joint appointment with the economics department and the Woodrow Wilson School of Public and International Affairs.

COURSE TAUGHT
- WWS 472: Special Topics in Public Affairs—The Economics of the Welfare State

REPRESENTATIVE PUBLICATIONS
- *The Conscience of a Liberal,* 2007.
- *Microeconomics,* 2005 (with R. Wells).
- *Principles of Economics,* 2004 (with R. Wells).
- *Currency Crises* (ed.), University of Chicago Press, 2000.

BURTON MALKIEL has been the Chemical Bank Chairman's Professor of Economics at Princeton since 1988. His research interests center on financial markets, asset pricing, and investment strategies. He is a regular op-ed writer for the Wall Street Journal. He also serves on the boards of several financial and non-financial corporations. He has been awarded an Honorary Doctor of Humane Letters from the University of Hartford (1971), Phi Beta Kappa, and the Harvard Business School Alumni Achievement Award for 1984. He has served as the president of the American Finance Association. He received his Ph.D. from Princeton.

COURSES TAUGHT
- ECO 362: Financial Investments

- Joshua Rosner, "The Build America Bond Programs: An Empirical Analysis of Issuer Borrowing Costs and the Muni-Puzzle"
- Sean (Xueyang) Li, "A New Way to Invest: Style Timing Using Dynamic Rank Weighting"
- Alaap Parikh, "Asset Pricing in the Indian Stock Market: Tests of the Size and Value Effects"

GRADUATE STUDENT ADVISED
- Nicholas Racculia "Returns from Investing in Venture Capital"

REPRESENTATIVE PUBLICATIONS
- "The Clustering of Extreme Movements: Stock Prices and the Weather," *Journal of Investment Management* 7:1, 2009 (with A. Saha and A. Grecu).
- "The Value Effect and the Market for Chinese Stocks," *Emerging Market Review* 10, 2009.
- *The Elements of Investing,* New York: Wiley, December 2009 (with C. Elles).
- *A Random Walk Down Wall Street,* New York: W. W. Norton & Co. 10th edition, January 2011.
- "Have Individual Stocks Become More Volatile?" *Journal of Finance,* February 2001 (with J. Campbell, M. Lettau, and Y. Xu) [First Prize paper for the Smith Breeden Prizes for 2002].

STEPHEN MORRIS is the Alexander Stewart 1886 Professor of Economics, and his work ranges from game theory to applied (microeconomic) theory to topics in financial economics. He joined Princeton in 2005. He taught at the University of Pennsylvania from 1991 to 1998, first as an assistant and then as an associate professor. He joined the Yale University faculty as a professor of economics in 1998. Morris received his Ph.D. in economics from Yale in 1991.

COURSES TAUGHT
- ECO 317: The Economics of Uncertainty
- ECO 502: Microeconomic Theory II

UNDERGRADUATE STUDENTS ADVISED
- Matt Zimmerman, "Combating Paternalism with Paternalism to Remedy Market Failure: Policy Proposals to End the Shortage in Available Kidneys for Transplant"
- Jason Huang, "The Trade-Off Between Underpricing and Price Accuracy: An Analysis of Allocation Discrimination in Book Building"

GRADUATE STUDENT ADVISED
- Ming Yang, "Essays in Strategic Information Acquisition"
- Takuo Sugaya, "Essays on Repeated Games With Private Monitoring"
- Andrei Rachkov, "Essays in Mechanism Design"
- Eduardo Grillo, "Essays in Strategic Communication"

REPRESENTATIVE PUBLICATIONS
- "Financial Regulation in a System Context," *Brookings Papers on Economic Activity,* 2009 (with H. Shin).
- "Optimal Communication," *Journal of the European Economics Association Papers and Proceedings* 5, 2007 (with H. Shin).
- "Risk and Wealth in a Model of Self-fulfilling Currency Crises," J*ournal of Monetary Economics* 54, 2007 (with B. Guimaeres).
- "Beauty Contests and Bubbles," *Review of Financial Studies* 19, 2006 (with F. Allen and H. Shin).
- "Central Bank Transparency and the Signal Value of Prices," *Brookings Papers on Economic Activity* 2, 2005 (with H.S. Shin).

ULRICH MÜLLER is an associate professor in the Department of Economics. He received his Ph.D. in economics from the University of St. Gallen, Switzerland. His main research interest is time-series econometrics. His recent work focuses on Baeysian inference, low frequency variability, and the development of econometric tools that are robust to correlations of largely unknown form.

UNDERGRADUATE STUDENTS ADVISED
- James Cooke, "Estimating the Return to Education by Race and Gender"
- Philip Sopher, "Broad Band Internet and Identity Theft"

REPRESENTATIVE PUBLICATIONS
- "Efficient Tests under a Weak Convergence Assumption," *Econometrica*, 79 (2011), 395–435.
- "Efficient Estimation of the Parameter Path in Unstable Time Series Models," *Review of Economic Studies* 77 (2010), 1508–1539. Supplement. (with Phillipe-Emmanuel Petalas.)
- "Valid Inference in Partially Unstable GMM Models," *Review of Economic Studies* 76 (2009), 343–365. (with Hong Li.)
- "Testing Models of Low-Frequency Variability," *Econometrica* 76 (2008), 979–1016. (with Mark Watson.)
- "Tests for Unit Roots and the Initial Condition," *Econometrica* 71 (2003), 1269–1286. (with Graham Elliott.)

JOHN MULVEY is a professor of operations research and financial engineering. His research interests center on designing financial planning systems, primarily for pension plans, hedge funds, and wealthy individuals; developing optimal hedge fund strategies; combining financial optimization and stochastic models; stochastic optimization algorithms; and decentralized risk management. He was a finalist for the Edelman Prize for the Towers Perrin-Tillinghast investment system in 1999. He received his Ph.D. in management from the University of California–Los Angeles.

COURSES TAUGHT
- ORF 534: Investment Science
- ORF 311: Optimization under Uncertainty

UNDERGRADUATE STUDENT ADVISED
- Kelin Chen, "Modeling Financial Markets: Asset Bubbles, Fat Tails, and Efficient Markets"
- Susan Hu, "Zero Emission Vehicle Credits: An Analysis of the Potential Market"
- Adrian Kwok, "Portfolio Management Strategies for Illiquid Investments"
- Tiffany Ng, "Cash Holidays and Stock Returns: An Individual Sector Analysis"
- Austin Robert Stack, "Dissecting the Flash Crash: A Statistical Analysis of Equity, ETF, and Options Markets"

GRADUATE STUDENTS ADVISED
- Lee Ling, "Portfolio Management for Private and Illiquid Investments"
- Astrid Prajogo, "Analyzing Patterns in the Equity Market using ETF Investor Sentiment and Corporate Cash Holding

REPRESENTATIVE PUBLICATIONS
- "Evaluating Style Investment: Does a Fund Market Defined along Equity Styles Add Value?" Feature article, *Quantitative Finance,* fall 2009 (with Woo Chang Kim).
- "An Enterprise Risk Management Model for Supply Chains," *Optimization and Logistics Challenges in the Enterprise,* Springer, 2009 (with H. G. Erkan).
- "Applying Stochastic Programming to the Defined Benefit Pension System," Optimizing the Aging, Retirement and Pension Dilemma, (eds. M. Bertocchi, S. Schwartz, W. Ziemba), Wiley 2009 (with Z. Zhang).
- "Linking Momentum Strategies with Single-Period Portfolio Models," *Handbook of Portfolio Construction: Contemporary Applications of Markowitz Techniques,* Springer, 2009 (with W. Kim and M. Bilgili).
- "Assisting Defined-Benefit Pension Plans," *Operations Research* October 2008 (with Simsek, Z. Zhang, and F. Fabozzi).

BIRGIT RUDLOFF is an assistant professor of operations research and financial engineering. Her research interests include hedging, price bounds and risk measurement in markets with transaction costs, hedging in incomplete markets with convex risk measures, portfolio optimization with risk constraints, mathematical finance, risk management, and convex analysis. She received her Ph.D. in mathematical finance from Martin-Luther University Halle-Wittenberg (Germany) in 2006 and visited the research institute IMPA in Rio de Janeiro and the technical university in Vienna before coming to Princeton in 2006.

COURSES TAUGHT
- ORF 435: Financial Risk Management
- ORF 533: Convex Analysis for Mathematical Finance

UNDERGRADUATE STUDENT ADVISED
- Paul Petrescu, "Set-Valued Deviation Measures and Portfolio Selection by Risk Minimization in Markets with Transaction Costs"
- Julia Xu, "Superhedging in the Presence of Proportional Transaction Costs in a Multi-Period Setting with Multiple Risky Assets"
- Mihaela Yankova, "Set-Valued Average Value at Risk with Random Transaction Costs"

GRADUATE STUDENTS ADVISED
- Zach Feinstein, "Dynamic Risk Measure for Conical Market Models"

REPRESENTATIVE PUBLICATIONS
- "Set-valued Risk Measures with Random Transaction Costs," 2010, submitted for publication (with A. Hamel, F. Heyde).
- "Testing Composite Hypotheses via Convex Duality," 2010, forthcoming in *Bernoulli* (with I. Karatzas).
- "Coherent Hedging in Incomplete Markets," *Quantitative Finance* 9 (2), 2009.
- "Entropic Risk Constraints for Utility Maximization," *Festschrift in Celebration of Prof. Dr. Wilfried Grecksch's 60th Birthday,* Chr. Tammer, F. Heyde (eds.), Shaker Verlag, 2008 (with J. Sass, R. Wunderlich).
- "Continuity and Finite-valuedness of Set-valued Risk Measures," *Festschrift in Celebration of Prof. Dr. Wilfried Grecksch's 60th Birthday,* Chr. Tammer, F. Heyde (eds.), Shaker Verlag, 2008 (with A. Hamel).

JOSÉ A. SCHEINKMAN joined Princeton as the Theodore Wells '29 Professor of Economics in 1999. He received an M.S. in mathematics from the Instituto de Matemática Pura e Aplicada, Brazil, and an M.A. and a Ph.D. in economics from the University of Rochester. Scheinkman is a research associate of the National Bureau of Economic Research, a member of the National Academy of Sciences, a fellow of the American Academy of Arts and Sciences and of the Econometric Society, and a "docteur honoris causa" of the University of Paris-Dauphine. He was named a fellow of the John Simon Guggenheim Memorial Foundation in 2007. From 1973 to 1998, Scheinkman taught at the University of Chicago, where he was from 1995 to 1998 the chair of the economics department, and beginning in 1997 the Alvin H. Baum Distinguished Service Professor of Economics. From 1987–88, he was vice president of the Financial Strategies Group at Goldman, Sachs & Co. He has been a visiting professor at College de France, Princeton University, University of Paris-Dauphine, E.H.E.S.S. (France), Instituto de Matemática Pura e Aplicada, and E.P.G.E. (Brazil). During 2002, he held a Blaise Pascal Research Chair (France). His current research interests are the determinants of the size of the financial industry, asset-price bubbles, and developing tools for empirical studies of asset markets.

COURSES TAUGHT
- ECO 502: Microeconomic Theory II
- ECO 525/FIN 595: Financial Economics I
- FIN 593/ECO 493: Financial Crises

UNDERGRADUATE STUDENT ADVISED
- Maria Chevtsova, "US Private Credit Student Loan ABS"
- Xiaoue Ma, "Reconsidering the Impact of Investor Disagreement on Stock Returns"
- Meredith Pfister, "The Rise of Pet Parents: An Analysis of the Growth of the Pet Industry and the Economics of Pets in the Household"

REPRESENTATIVE PUBLICATIONS
- "Value Added Taxes, Chain Effects and Informality", *American Economic Journal: Macroeconomics,* 2010 (with A. de Paula).
- "Market and Public Liquidity", *American Economic Review Papers and Proceeding,* 2009, (with With P. Bolton and T. Santos)
- "Long Run Risks: An Operator Approach," *Econometrica*, 2009 (with L. Hansen).
- "Advisors and Asset Prices: A Model of the Origins of Bubbles," *Journal of Financial Economics,* 2008 (with H. Hong and W. Xiong).

HYUN SONG SHIN joined Princeton in 2006 as a professor of economics. Before coming to Princeton, he was a professor of finance at the London School of Economics. His recent research has focused on the current credit crisis and the role of risk management techniques and accounting rules in the crisis dynamics. His broader research interests are in financial economics, especially in issues related to disclosures, financial regulation, crises, and financial stability, issues on which he has advised central banks and policy institutions. He is a fellow of the Econometric Society and the British Academy. He received his Ph.D. from the University of Oxford in 1988. He was on leave during the academic year 2009–10, serving as an adviser to President Lee Myung-bak of South Korea.

COURSES TAUGHT
- FRS 114: Recent Developments in Financial Regulations: International Dimensions"
- FIN 591/ECO 491: Cases in Financial Risk Management
- FIN 596/ECO 526: Financial Economics II

UNDERGRADUATE STUDENT ADVISED
- Jeong-In Hong, "Decomposition of the Asian Stock Market CO-Movements"

GRADUATE STUDENTS ADVISED
- Anastasia-Aggeliki Andrikogiannopoulou, "Estimating Risk Preferences: Evidence from Online Sports Gambling"

REPRESENTATIVE PUBLICATIONS
- "Risk and Liquidity," *Clarendon Lectures in Finance, 2009*, Oxford University Press
- "Marking to Market: Panacea or Pandora's Box?" *Journal of Accounting Research* 46, 2008 (with G. Plantin and H. Sapra).
- "Beauty Contests and Iterated Expectations in Asset Markets," *Review of Financial Studies* 19, 2006 (with F. Allen and S. Morris).
- "Disclosure Risk and Price Drift," *Journal of Accounting Research* 44, 2006.
- "Disclosures and Asset Return," *Econometrica* 71, 2003.
- "Social Value of Public Information," *American Economic Review,* 52, 2002 (with Morris).

CHRISTOPHER SIMS has been a professor of economics at Princeton since 1999. He received his Ph.D. from Harvard University in 1968. He taught in the economics department of the University of Minnesota from 1969 to 1990, then moved to Yale University where he taught from 1990 to 1999. He is a member of the National Academy of Sciences and a fellow of the Econometric Society, for which he has served as president and as co-editor of *Econometrica*. He has intermittently served as an adviser, consultant, and visitor to several regional Federal Reserve banks. He has worked on econometric methods, economic theory, and empirical work, mostly related to macroeconomics and monetary policy.

COURSES TAUGHT
- ECO 513: Advanced Econometrics: Time Series Models
- ECO 521: Macroeconomic Theory I
- ECO 522: Advanced Macroeconomic Theory II

UNDERGRADUATE STUDENT ADVISED
- Neha Bansal, "How Safe is the Safety Net? Access to Care in the Emergency Room"
- Sean Emmer, "Semiconductor Innovation in the American Economy: A Growth Accounting Approach"
- Scott Gates, "Faculty Salaries and University Finances: How Selected Public and Private Universities Change the Composition and Compensation of Their Faculties Based on Financial Resources"
- Anna Liu, "Size, Profitability and Risk: A Macroeconomic Perspective on Microfinance Institution Performance"
- Albulen Pano, "The Privatization of Drinking Water: The Effect of Ownership on Water System Regulatory Compliance in the USA"

REPRESENTATIVE PUBLICATIONS
- "Were There Regime Switches in U.S. Monetary Policy?" *American Economic Review* 96(1), March 2006.
- "Implications of Rational Inattention," *Journal of Monetary Economics* 50(3), April 2003.
- "The Role of Models and Probabilities in the Monetary Policy Process," *Brookings Papers on Economic Activity* 2, 2002.
- "The Precarious Fiscal Foundations of EMU," *De Economist* 147(4), 1999.
- "Error Bands for Impulse Responses," *Econometrica* 67(5), 1999 (with T. Zha).

RONNIE SIRCAR is a professor of operations research and financial engineering. He received his doctorate from Stanford University, and taught for three years at the University of Michigan in the Department of Mathematics before coming to Princeton. He has received continuing National Science Foundation research grants since 1998. He was a recipient of the E-Council Excellence in Teaching Award for his teaching in 2002, 2005, and 2006 and the Howard B. Wentz Jr. Junior Faculty Award in 2003. His research interests center on financial mathematics, stochastic volatility models, credit risk, asymptotic and computational methods, portfolio optimization and stochastic control problems, utility indifference valuation, and stochastic differential games.

GRADUATE STUDENTS ADVISED
- Andrew Ledvina, "Differential Games in Oligopolistic Markets"
- Edmond Choi, "Credit & Equity Derivatives"
- Mike Stein, "Energy and Commodity Markets"

REPRESENTATIVE PUBLICATIONS
- "Dynamic Bertrand and Cournot Competition: Asymptotic and Computational Analysis of Product Differentiation," with A. Ledvina, February 2011. To be published in *Risk and Decision Analysis.*
- "Exploration and Exhaustibility in Dynamic Cournot Games," with M. Ludkovski, February 2011, submitted.
- *"Multiscale Stochastic Volatility for Equity, Interest-Rate and Credit Derivatives"* [BOOK] with J.-P. Fouque, G. Papanicolaou and K. Solna, to be published by Cambridge University Press, September 2011.
- "Dynamic Bertrand Oligopoly," *Applied Mathematics and Optimization* 63(1), 2011, pages 11-44 (with A. Ledvina).
- "Games with Exhaustible Resources," *SIAM Journal of Applied Mathematics* 70(7), 2010, pages 2556-2581 (with C. Harris and S. Howison).
- "A Framework for Dynamic Hedging under Convex Risk Measures," with Toussaint, November 2008. To appear in *Proceedings of 2008 Ascona Seminar on Stochastic Analysis, Random Fields and Applications* (eds. R. Dalang, M. Dozzi, F. Russo), Birkhauser.

DAVID SRAER joined the faculty at the Department of Economics at Princeton University in 2009 as a professor in economics and teaches courses in corporate finance for the master's and the Ph.D. programs. He received his B.S. in applied mathematics and economics from École Polytechnique in 2001 and his Ph.D. in economics from the Toulouse School of Economics in 2007. His research has been published in leading journals in economics and finance such as the Review of Economic Studies, the Journal of Finance and the Journal of Financial Economics. It has covered topics such as: the role of collateral value on firms' investment decisions; the importance of family ownership for corporate behavior; the impact of retail investing on idiosyncratic volatility; and the role of dissent in organizations. Sraer is an associate editor for the *Journal of the European Economic Association* and has served as ad hoc referee for leading journals in both economics and finance.

COURSES TAUGHT
- FIN 502: Corporate Finance and Financial Accounting.
- FIN 596/ECO 526: Corporate Finance

UNDERGRADUATE STUDENTS ADVISED
- Christian Blake, "Family Firm Performance: Evidence from the S&P During the Financial Crisis"
- Alec Finley, "Variation in Firm Value in Response to Credit Constraints"
- Steve Low, "Mergers, Acquisitions, & Shareholder Wealth"

REPRESENTATIVE PUBLICATIONS
- "Performance and Behavior of Family Firms: Evidence from the French Stock Market," *Journal of the European Economic Association* 5(4), June 2007 (with D. Thesmar).
- "Optimal Dissent in Organizations," *The Review of Economic Studies* 76, 2009 (with A. Landier and D. Thesmar).
- "Individual Investors and Volatility," *The Journal of Finance,* forthcoming (with T. Foucault and D. Thesmar)
- "Growth LBOs," *The Journal of Financial Economics,* forthcoming (with Q. Boucly and D. Thesmar).

KENNETH STEIGLITZ, the Eugene Higgins Professor of Computer Science, received his doctorate in 1963 from New York University and has been teaching at Princeton ever since. He is a fellow of the Institute of Electrical and Electronics Engineers (1981), a fellow of the Association for Computing Machinery (1997), and a recipient of the Technical Achievement Award of the Signal Processing Society (1981), the Signal Processing Society Award (1986), the IEEE Centennial Medal (1984), the School of Engineering Distinguished Teacher Award (1997), and the IEEE Third Millennium Medal (2000). His current research interests are in agent-based modeling of markets, auctions, and computing using soliton collisions. Kenneth Steiglitz transferred to emeritus status July 1, and will continue to work on emergent behavior in agent-based macroeconomic models.

COURSES TAUGHT
- COS 126/EGR 126: General Computer Science

UNDERGRADUATE STUDENTS ADVISED
- Zhihong Xu "Redesigning EOS: Developing a Realistic Baseline for the Economics via Object-oriented Simulation Framework,"

REPRESENTATIVE PUBLICATIONS
- "Soliton-guided Phase Shifter and Beam Splitter," *Phys. Rev. A* 81, March 2010.
- "Proton Trapping and Transfer with Solitons," *Phys. Rev. A* 79, 021802R, February 2009 (with D. Rand).
- *Snipers, Shills, and Sharks: EBay and Human Behavior,* Princeton University Press, 2007.
- "Making Beam Splitters with Dark Soliton Collisions," *Phys. Rev. A,* 82, 043831, October 2010
- "The Spite Motive and Equilibrium Behavior in Auctions," *Contributions to Economic Analysis & Policy*, 2(1), 2003 (with J. Morgan and G. Reis).

ROBERT VANDERBEI has been a professor of operation and financial engineering since its creation in 1999 and is currently the chair. His research interests focus on algorithms for nonlinear optimization and their application to problems arising in engineering and science. Application areas of interest focus mainly on inverse Fourier transform optimization problems and action minimization problems with a special interest in applying these techniques to the design of NASA's terrestrial planet finder space telescope. He is an associate editor for *Optimization in Engineering and Mathematical Programming*. He is a member of the American Mathematical Society, Society for Industrial and Applied Mathematics, Institute for Operations Research and the Management Sciences, Mathematical Programming Society, SPIE, and the American Astrophysical Society. He received his Ph.D. in applied mathematics from Cornell University in 1981.

COURSES TAUGHT
- ORF 522: Linear Optimization

UNDERGRADUATE STUDENTS ADVISED
- Henry Chu, "Non-Redundant Aperture Masking and its Application in the Analysis of Stars with Planetary System"
- James Connolly, "A Regression Analysis of Madden NFL Team and Player Ratings"
- Sook Yung Kim, "Sovereign Wealth Funds: Their Performance in Global Financial Markets and its Implications for Regulatory Controls"
- Chetan Narain, "Predicting Politics: A Mathematical Approach to Parsing and Evaluating Presidential Campaign Speeches"
- Kexing (Christina) Ren, "An Analysis of Wireless Telecommunication Churn Rates Using Data Mining Methods"
- Carolyn Anastasi, "An Analysis of a Tax on Sugar-Sweetened Soft Drinks Through an Examination of the Differential Response to Price."

REPRESENTATIVE PUBLICATIONS
- "Interior-point Methods for Nonconvex Nonlinear Programming: Jamming and Numerical Testing," *Mathematical Programming* 2003 (with H. Benson and D. Shanno).
- "Two-mirror Apodization for High-contrast Imaging," *Astrophysical Journal* 599, 2003 (with W. Traub).
- "Circularly Symmetric Apodization via Starshaped Masks," Astrophysical Journal 590, 2003 (with D. Spergel and N. Kasdin).
- "Frontiers of Stochastically Nondominated Portfolio," *Econometrica* 71(4), 2003 (with A. Ruszczynski).
- *Linear Programming: Foundations and Extensions.* Kluwer Academic Publishers, 2nd edition, 2001.

ERIK VANMARCKE is a professor of civil and environmental engineering. He received his doctorate from the Massachusetts Institute of Technology in 1970 and joined the faculty, remaining there until 1985. At MIT, he was the Gilbert W. Winslow Career Development Professor and served as director of the Civil Engineering Systems Methodology Group. He has held visiting appointments at Harvard University, Technical University of Delft (the Netherlands), and University of Leuven (Belgium), his undergraduate alma mater, and was the Shimizu Corporation Visiting Professor at Stanford University. He presently holds the Kwang-hua Chair Visiting Professorship at Tongji University in Shanghai, China. His principal expertise is in risk assessment and applied systems science. He authored Random Fields: Analysis and Synthesis, originally published by MIT Press; the second (revised and expanded) was published in 2010 by World Scientific Company. He won several research prizes of the American Society of Civil Engineers and chaired its Council on Disaster Risk Management. He was awarded a Senior Scientist Fellowship from the Japanese Society for the Promotion of Science and is a foreign member of the Royal Academy of Arts and Sciences of Belgium.

COURSES TAUGHT
- CEE 362: Structural Dynamics and Earthquake Engineering
- CEE 558 Applied Random Fields

GRADUATE STUDENTS ADVISED
- Ning Lin, Ph.D. 2010
- Siu-Chung Yau 2011

REPRESENTATIVE PUBLICATIONS
- "Quantitative Risk Analysis of Damage to Structures during Windstorms: Some Multi-scale and System Reliability Effects," Keynote Lecture, *Proceedings International Symposium on Reliability Engineering and Risk Management*, Shanghai, China; Published by Tongji University Press, pp. 93-101, 2010. (with E, Lin, N. and Yau, S.C.)
- "Quantitative Risk Analysis Applied to Dams," Proceedings of the 4th Civil Engineering Conference in the Asian Region (CECAR-4), Taipei, June 2007; Published by the Asian Civil Engineering Coordinating Council (ACECC), pp. 17-21, 2007; also CDRM Monograph No. 5, ASCE, 2010.
- "Risk Assessment of Hurricane Storm Surge for New York City," *J. Geophys. Res.,* 115, D18121, doi: 10.1029/2009JD013630, 2010. (with Lin, N., Emanuel, K.A., Smith, J.A.)
- "Quantifying the Benefits of Risk Reduction in Civil Infrastructure Systems," Chapter 10 in *Frontier Technologies for Infrastructures Engineering,* Eds. S.-S. Chen and A. Ang, CRC Press (Francis & Taylor), Boca Raton, pp. 215-222, 2009.
- *Random Fields: Analysis and Synthesis,* 2nd (revised and expanded) edition, World Scientific Publishing Company, 2010.

MARK WATSON is a professor of economics and public affairs in the Department of Economics and the Woodrow Wilson School. His research interests include econometrics, macroeconomics, and forecasting. He is a research associate at the National Bureau of Economic Research and a fellow of the Econometric Society. He received the Galbraith Award for Graduate Teaching in 1986 and the McGraw Center Graduate Mentoring Award in 2008. He holds a Ph.D. in economics from the University of California–San Diego, and his past credentials include posts at Northwestern University and Harvard University.

COURSES TAUGHT
- ECO 313: Econometric Applications
- ECO 517: Econometric Theory I
- ECO 518: Econometric Theory II
- WWS 507C: Quantitative Analysis (Advanced)

UNDERGRADUATE STUDENTS ADVISED
- Jane Zhao, "The Orphan Drug Act of 1983; An Analysis of Its Impact on Pharmaceutical Innovation"

REPRESENTATIVE PUBLICATIONS
- "Heteroskedasticity-robust Standard Errors for Fixed Effect Panel Data Regression," *Econometrica,* January 2008, Vol. 76, No. 1, 155–174 (with J. Stock).
- Testing Models of Low-frequency Variability (with Ulrich Müller), *Econometrica* 76(5), September 2008.

WEI XIONG is a professor of economics in the Department of Economics. His research interests center on capital market imperfections. His earlier papers cover speculative bubbles induced by heterogeneous beliefs and short-sales constraints, effects of stock price bubbles on managerial incentives and firm investment, asset market contagion, limited investor attention, non-standard investor preferences, and asset pricing with heterogeneous beliefs. He is currently researching financial crises driven by dynamic coordination problems between creditors, bubbles and short-term credit booms, delegated asset management, and financialization of commodities markets. He received his Ph.D. from Duke University in 2001. He is a research associate of the National Bureau of Economic Research and the finance editor of *Management Science.*

COURSES TAUGHT
- FIN 522/ECO 465: Futures, Options, and Financial Derivatives
- FIN 595/ECO 525: Financial Economics I
- FIN S500: Math Camp for MIF Students

UNDERGRADUATE STUDENTS ADVISED
- Zeynep Guner Gul, "Incentives, Compensations and Risk-Taking"
- Tiffany Liu, "The Effect of Mergers and Acquisitions on Executive Compensation"

GRADUATE STUDENTS ADVISED
- Ing-haw Cheng, "Essays in Corporate Governance and Capital Markets"
- Adam Zawadowski, "Essays in Finance"

REPRESENTATIVE PUBLICATIONS
- "The Chinese Warrants Bubble," *American Economic Review,* forthcoming (with J. Yu).
- "Rollover Risk and Credit Risk," *Journal of Finance,* forthcoming (with Z. He).
- "Realization Utility," *Journal of Financial Economics,* forthcoming (with N. Barberis).
- "Heterogeneous Expectations and Bond Markets," *Review of Financial Studies,* 2010 (with H. Yan).
- "What Drives the Disposition Effect? An Analysis of a Long-standing Preference-based Explanation," *Journal of Finance,* 2009 (with N. Barberis).

VISITING FACULTY

During the academic year 2010–11, the Bendheim Center for Finance welcomed the following visiting faculty:

ANA BABUS visited Princeton during the fall and spring semesters. She has received her PhD from Erasmus University Rotterdam in 2008. In the fall of 2011 she joined Imperial College London as an assistant professor. Her primary area of specialization is financial economics and her current research deals with trading in over-the-counter markets. In addition she is interested in game theory, the economics of social networks and microeconomics.

COURSE TAUGHT
- ECO 342: Money and Banking
- FIN 522/ECO 466: Fixed Income: Models and Applications

JEAN-CHRISTOPHE DE SWAAN visited Princeton during the spring semester to teach a joint undergraduate and graduate course on Asian capital markets. He taught a similar class at Yale University in 2008. From 2005–08, he was a senior investment professional and principal at Sansar Capital, one of the largest global long-short equities Asia-dedicated hedge funds, which he joined before inception. Prior to Sansar, he spent five years in McKinsey & Company's corporate finance practice in New York and Singapore. He recently published a lead article on the future of hedge funds in *Caijing*, China's preeminent financial magazine. He received his B.A. from Yale University in political science, an MPhil in international relations from the University of Cambridge, and a master's in public policy from Harvard University's Kennedy School of Government. He is a member of the Council on Foreign Relations.

COURSE TAUGHT
- FRS 149: Hedge Funds: Their Purpose, Strategies and Social Value
- FIN 592: The Rise of Asian Capital Markets

PAOLO COLLA visited Princeton during the fall and spring semesters. He is currently an Assistant Professor of Finance at Bocconi University (Milan, Italy). After receiving an MSc in Economics from Universitat Pompeu Fabra (Barcelona, Spain) and a Ph.D. in Finance from the London School of Economics (London, UK), he spent one year as a post-doc fellow at CORE (Louvain-la-Neuve, Belgium) prior to joining Bocconi University. His research focuses on the role asymmetric information plays in determining individual trading behavior as well as financial market quality. He has recently worked on empirical corporate finance, with special emphasis on determinants of corporate debt structure.

COURSE TAUGHT
- FIN 591: Cases in Financial Risk Management
- FIN 567: Institutional Finance, Trading and Markets

- Elliott Lorenz, "Binary Options and Sports Betting Markets: A Black-Scholes and Binomial Tree Analysis"

MARC HALLIN was a visiting research scholar in the Operations Research and Financial Engineering Department and the Bendheim Center for Finance for the spring and fall semesters. He spent most of his career at the Mathematics Department of the Université libre de Bruxelles. His research interests are in non- and semiparametric inference, the asymptotic theory of statistical experiments, and time series analysis. A fellow of the Institute of Mathematical Statistics and the American Statistical Association, he is member of the Classe des Sciences of the Royal Academy of Belgium.

COURSES TAUGHT
- ORF 524: Statistical Theory & Methods

JEAN JACOD visited Princeton during the spring semester. He is a professor in the Faculty of Mathematics of Université Pierre et Marie Curie (Paris-6). After receiving a Ph.D. from this university, he held a position at the École des Mines de Paris in the Geostatistics Department, then was professor at Rennes and École Polytechnique (Paris), and then at Paris-6 since 1983. His interests are generally in stochastic processes and stochastic integration, with a number of applications to mathematical finance and to statistics of stochastic processes. Recently, he also worked on high-frequency statistics, with special emphasis on financial applications.

COURSE TAUGHT
- ECO 575: Topics in Financial Economics

SEBASTIEN POUGET visited Princeton during the fall and spring semesters to teach courses on Investments and on Behavioral Finance. He is a Professor of Finance at the Toulouse School of Economics, University of Toulouse Capitole, France, and a Researcher at the Institut d'Economie Industrielle. His research has been presented in various conferences including the National Bureau of Economic Research ("NBER") conference on Market Microstructure, and the American Finance Association Meeting. His work on the psychology of financial markets has been published in leading academic journals, including the *Journal of Finance, the Journal of Financial Markets, and the Review of Economic Studies.* His most recent work focuses on speculative bubbles.

COURSE TAUGHT
- ECO 462/FIN 515: Portfolio Theory and Asset Management

O. GRIFFITH SEXTON was, until 1995, a managing director of Morgan Stanley and director of the Corporate Restructuring Group within the firm's Financing and Advisory Services department. Sexton graduated from Princeton in 1965. Following six years of service as an aviator in the U.S. Navy, he attended the Stanford Graduate School of Business, where he received his MBA. He joined Morgan Stanley in 1973 and spent his career there involved in a broad range of the firm's financing and advisory activities. In 1995, he became an active advisory director of Morgan Stanley. Also in 1995, he became an adjunct professor at Columbia University's Graduate School of Business, teaching two courses in the subject of corporate finance. In 2000, he became a visiting lecturer at Princeton. Sexton is a member of the board of directors of Morgan Stanley, and he is a director of Investor AB, a publicly traded company based in Stockholm, Sweden, and of two other privately held companies.

COURSE TAUGHT
• ECO 464/FIN 519: Corporate Restructuring

DARIO VILLANI was a guest lecturer at Princeton during the fall semester. He was a member of the first graduating class of Princeton Master in Finance students in 2002, and he holds a Ph.D. in Theoretical Physics with highest honors from University of Salerno. He is currently a Portfolio Manager at BlueCrest Capital Management, LLC, where he joined from Deutsche Bank as a Managing Director of Global Credit Trading. Prior to joining Deutsche Bank in 2008, he was a Managing Director of the Global Strategic Risk Group at Merrill Lynch. In this role, he headed proprietary trading for structured credit, ABS and CMBS. From 2004 to 2006, he was Vice President of the Proprietary Positioning Business at JPMorgan Chase. Previously, Mr. Villani worked at Hess Energy Trading Company as a Commodities Trader. He has authored over 25 articles in finance, physics and statistics.

COURSE TAUGHT
• ORF 535/FIN 535: Financial Risk Management

STAFF

DAVID BLAIR has been involved with the Bendheim Center for Finance since 2000. In September 2010, he retired after ten years of dedicated support to our Master in Finance students and the Center.

WENDELL COLLINS is the director of corporate relations for the Bendheim Center for Finance. Before joining the center in 2007, she worked in Princeton's Office of Development and Office of the Dean for Research. Before joining the University, Collins spent 11 years at Merrill Lynch in marketing, training, and business development, as well as serving in various management roles at Dow Jones and the Associated Press. Her responsibilities with the center include i) managing the Corporate Affiliates Program, which seeks support for the center from firms interested in finance and which works with corporations to build partnerships investigating financial topics of mutual interest, ii) advising undergraduates and Master in Finance candidates on career issues, including the development of applied finance programs and interview enhancement techniques for the Master in Finance program, iii) facilitating the recruiting activities of corporate affiliates by coordinating on-campus recruiting presentations and organization of events at the center, and iv) promoting and organizing special events involving alumni and advisory council members. She received her undergraduate degree from the University of North Carolina–Chapel Hill.

ELLEN DIPIPPO
Undergraduate Administrator

KAREN NEUKIRCHEN
Graduate Administrator

JESSICA O'LEARY
Department Manager

PH.D. STUDENTS

GRADUATING 2010-11

Ph.D. students in the Bendheim Center for Finance are admitted through the Department of Economics, the Department of Operations Research and Financial Engineering, or the Program in Applied and Computational Mathematics. Nine Ph.D. students graduated in 2011.

ANASTASIA ANDRIKOGIANNOPOULOU received her Ph.D. from the economics department. Her thesis was titled "Essays in Economics: Evidence from Online Sports Gambling." She has accepted an assistant professor position in the department of economics at the University of Geneva.

JELENA BRADIC received her Ph.D. from the operations research and financial engineering department. Her thesis was titled "Sparse Estimation and Oracle Properties of Regularized Regression with Non-Polynomial Dimensional Covariates." She was hired as an assistant professor at the University of California at San Diego.

THOMAS EISENBACH received his Ph.D. from the economics department. His thesis was titled "Essays in Microeconomics." He accepted a position in the research department at the New York Federal Reserve Bank.

XING HIU received her Ph.D. from the department of economics. Her thesis was titled "Essays in Empirical Asset Pricing: Rollover Risk, Liquidity, and Financial Crisis." She accepted an assistant professor position in the department of economics at the University of Hong Kong.

ANDREW LEDVINA received his Ph.D. from the operations research and financial engineering department. His thesis was titled "Differential Games in Oligopolistic Markets." He was hired as an assistant professor at Cal Tech.

JIA LI received his Ph.D. from the economics department. His thesis was titled "Three Essays on Financial Econometrics." He is an assistant professor in the department of economics at Duke University.

JUN MA received his Ph.D. from the operations research and financial engineering department. His thesis is titled "Approximate Policy Iteration Algorithms for continuous, Multi-Dimensional Applications and Convergence Analysis." He accepted a trading position at Parhelion Ltd.

PAULO NATENZON received his Ph.D. from the economics department. His thesis is titled "Essays in Behavioral Decision Theory." He has accepted an assistant professor position in the department of economics at the Washington University of St. Louis.

ALEX WUGALTER received his Ph.D. from the operations research and financial engineering department. His thesis is titled "Pricing and Hedging in Affine Models with Possibility of Default and Characteristic Functions of Log Stock Prices." He has accepted a position at Citigroup as an associate in sales, trading, and quantitative analysis.

DACHENG XIU received his Ph.D. from the program in applied and computational mathematics. His thesis is titled "Essays in Financial Econometrics." He accepted an assistant professor position at the University of Chicago, Booth School of Business.

2010–11

SEMINARS
AND CONFERENCES

CIVITAS FOUNDATION FINANCE SEMINARS

Each week, Bendheim Center for Finance organizes a seminar in which academic experts are invited to present their latest research to the faculty and graduate students of the center. The seminar usually meets on Wednesdays, 2:50–4 p.m., in the Bendheim Center for Finance classroom.

FALL 2010

September 22
Thomas Eisenbach, Princeton University
"The Good and Bad of Liquidity Risk"

September 29
Angie Andrikogiannopoulou, Princeton University
"Estimating Risk Preferences: Evidence from Online Sports Gambling"

October 6
Jia Li, Princeton University
"Testing for Jumps: A Delta-Hedging Perspective"

October 13
Jeremy Stein, Harvard University
"Monetary Policy as Financial-Stability Regulation"

October 20
Dacheng Xiu, Princeton University
"Dissecting Option Prices Using Closed-Form Series Expansion with an Empirical Study of Variance Risk Premia"

November 10
Chris Hennessy, London Business School
"Privately Optimal Securitization and Publicly Suboptimal Risk Sharing"

November 17
Ron Kaniel, Duke University
"The Delegated Lucas-tree"

December 8
Sebastien Pouget, Toulouse School of Economics, visiting Princeton University
"Rational and Irrational Bubbles: An Experiment"

December 15
David Sraer, Princeton University
"Going for Broke: New Century Financial Corporation, 2004-2006"

SPRING 2011

February 23
Ulrike Malmendier, University of California - Berkeley
"Cash is King: What the Market Learns about Targets through Merger Bids" and "Winning by Losing: Evidence on Overbidding in Mergers"

March 2
Harrison Hong, Princeton University
"Quiet Bubbles"

March 23
Annette Vissing-Jorgenson, Northwestern University
"The Aggregate Demand for Treasury Debt" and "The Effects of Quantitative Easing on Long-Term Rates"

March 30
Hui Chen, Massachusetts Institute of Technology
"Market Timing, Investment, and Risk Management"

April 6
Andrew Lo, Massachusetts Institute of Technology
"The Origin of Behavior"

April 13
Shawn Cole, Harvard University
"Bad Advice: Explaining the Persistence of Whole Life Insurance"

April 20
John Beshears, Stanford University
"Self Control and Liquidity: How to Design a Commitment Contract"

April 27
Jakub Jurek, Princeton University
"Crashes and Collateralized Lending"

May 4
Paolo Colla, Universita Bocconi, Visiting Princeton University
"Debt Specialization"

FINANCE PH.D. STUDENT WORKSHOP

Each week, the Bendheim Center for Finance organizes a seminar for its Ph.D. students and faculty in which preliminary research ideas are presented internally. The seminar usually meets on Tuesdays, 12:30–1:30 p.m., in the Bendheim Center for Finance library.

FALL 2010

September 28
Martin Schmalz and Sergey Zhuk
"Learning about Market Risk, CEO Turnover, the Active Funds Puzzle and Momentum"

Jia Li
"Testing for Jumps: A Delta-hedging Perspective"

October 19
Weicheng Lian
"Housing Cycles or Housing Bubbles"

Xing Hu
"Rollover Risk and Credit Spreads in the Financial Crisis of 2008"

October 26
Dong Beom Choi
"Risk Sharing, Credit Crunch and Financial Fragility"
"Feedback between Asset Price and Panic Run"

November 16
Sergey Zhuk
"Endogenous Learning and Rational Bubbles"

Ming Yang
"Optimal Contracts in Providing Liquidity with Endogenous Information Acquisition"

November 23
Ana Babus
"Strategic Relationships in Over-the-counter Markets"

December 7
Thomas Eisenbach and Martin Schmalz
"Anxiety in the Face of Risk"

Hyun Soo Choi (with Harrison Hong and Jose Scheinkman)
"Home Improvements"

SPRING 2011

February 8
Alan Krueger
"Build America Bonds"

March 8
Hyun Soo Choi
"The Role of Lending Law (Anti-predatory Lending) on the Recent Housing Crisis"

Andrew Robinson
"Procyclical Liquidity and Credit Spreads"

March 22
Martin Schmalz and Sergey Zhuk
"Learning about Covariance, and Applications"

Jose Azar
"Diversification, Shareholder Value Minimization, and Competition: A Trilemma?"

March 29
Dirk Paulsen
"Financial Friction in a General Equilibrium Macro Model"

April 5
Xing Hu (Jun Pan and Jiang Wang)
"Noise as Information for Liquidity"

Weicheng Lian
"An Amplification Mechanism in the Housing Market"

April 19
Sergey Zhuk
"Rational Bubbles, Speculative Bubbles and Endogenous Learning"

Jean-Francois Kagy
"Corporate Cash Hoarding" Revisiting the Procyclicality Argument Against the Basel Rules

April 26
Martin Schmalz
"A Human Capital Based Theory of the Firm"

Wei Cui
"Investment and Capital Reallocation"

May 3
Dong Beom Choi
"When Does the Music Stop?: Market Panic-escape and Self-fulfilling Collateral Lending Freeze"

SIXTH CAMBRIDGE-PRINCETON CONFERENCE

This conference, the fifth in the series, brought together faculty from Princeton's Bendheim Center for Finance and the Cambridge Endowment for Research in Finance, thanks to generous support from William H. Janeway '65.

The conference took place on September 10-11, 2010, at the University of Cambridge.

SESSION SCHEDULE

Friday, September 10
Session Chair: Chris Rogers
Hashem Pesaran
"Supply, Demand and Monetary Policy Shocks in a Multicountry New Keynesian Model"
Discussant: Nobu Kiyotaki

Erik VanMarke
"Uses of Random Field Theory for Analyzing Financial Risk"
Discussant: Mike Tehranchi

Session Chair: Yacine Aït-Sahalia
Michael Dempster
"Estimating Exponential Affine Models with Correlated Measurement Errors: Applications to Fixed Income and Commodities"
Discussant: Jakub Jurek

Nobu Kiyotaki
"Financial Intermediation and Credit Policy in Business Cycle Analysis"
Discussant: Mardi Dungey

Saturday, September 11
Session Chair: Nobu Kiyotaki
Peter Szilagyi
"Covered Interest Parity in the Yen Forward Market: New Insights from Threshold Nonlinear Dynamics"
Discussant: Ronnie Sircar

David Sraer
"Individual Investors & Volatility Presenter"
Discussant: D'Maris Coffman

Session Chair: Bill Janeway
Mardi Dungey
"Observing the Crisis: Characterizing the Spectrum of Financial Markets with High Frequency Data (2004-2008)"
Discussant: Yacine Aït-Sahalia

Jakub Jurek
"Crashes & Collateralized Lending"
Discussant: Chris Rogers

Session Chair: Erik VanMarcke
Liang Zhang
"Understanding Asset Returns"
Discussant: Chris Sims

Jianqing Fan
"Vast Volatility Matrix Estimation Using High Frequency Data for Portfolio Selection"
Discussant: Paolo Zaffaroni

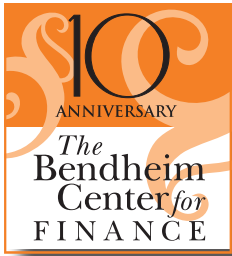Session Chair: D'Maris Coffman
Laura Turner
"Social Security, Endogenous Retirement and Intrahousehold Cooperation"
Discussant: John Mulvey

Chris Sims
"Stepping on a Rake: The Role of Fiscal Policy in the Inflation of the 1970's"
Discussant: Michael Dempster

10th ANNIVERSARY CELEBRATION CONFERENCE

Ten years ago, we opened the doors of the Bendheim Center for Finance to fulfill the same mission we have today: to develop new courses and programs in finance that will afford exciting learning opportunities to Princeton students and to establish a leading center for modern financial research. On September 24, we celebrated this decade of leadership in finance education and research with a day-long conference featuring leading faculty of the program that culminated in a public lecture by the founder of the program, Federal Reserve Chairman Ben S. Bernanke. The full text of his talk is available at the Federal Reserve website.

Friday, September 24
Welcome: David Dobkin
Yacine Aït-Sahalia
Lynn Bendheim Thoman

Panel Discussion: Bubbles, Behaviors, and the Origins of the Crisis
Yacine Aït-Sahalia
Harrison Hong
Daniel Kahneman
José Scheinkman
Ronnie Sircar

Panel Discussion: A New Architecture for the Financial System?
Alan Blinder
Markus Brunnermeier
Jon Corzine
Paul Krugman
Hyun Song Shin

Panel Discussion: Should Finance Research and Teaching Change in Light of the Financial Crisis?
René Carmona
Jianqing Fan
Burton Malkiel
Christopher Sims
Wei Xiong

Public Lecture
Introduction: Shirley M. Tilghman
Lecture: Ben Bernanke

PRINCETON UNIVERSITY HIGH FREQUENCY AND QUANTITATIVE TRADING CONFERENCE

This workshop was organized by Princeton University Graduate Students from Operation and Financial Engineering, Economics, Mathematics and Computer Science and was sponsored by the Bendheim Center for Finance.

Friday, March 25
Keynote Speakers:
Robert Almgren, Co-founder of Quantitative Brokers, "Algorithmic Trading for Interest Rate Future"

Matt Andresen, Co-CEO at Headlands Technologies LLC, "Market Structure 101"

Haim Bodek, CEO at Trading Machines LLC, After the Penny Pilot: the Impact of US Options Markets Decimalization of Liquidity Provision"

Matt Cushman, Former MD at Knight Trading Group, "High Frequency Market Making"

Andrei Kirilenko, Chief Economist at Commodities Futures Trading Commission, "The Flash Crash: The Impact of High Frequency Trading on an Electronic Market"

Joshua Ortego, Associate Director, Head of Index Algorithmic Trading at Susquehanna International Group, "Game Theory and Decision Science's Role in Quantitative Trading"

Michael Sotiropoulos, MD at Bank of America Merrill Lynch, "Optimal Order Execution with Empirical Cost Models"

Clara Vega, Senior Economist at Federal Reserve Board, "Rise of the Mechanics: Algorithmic Trading in the Foreign Exchange Market"

Invited Panelists:
Ann Guo, Global Trader & Quant Recruiter at GETCO LLC

Brennan Hughes, Partner at World Wide Financial Industry Recruiting Services

Joseph Kelley, Head of High Frequency Trading - Futures at Citadel LLC

Peter Nabicht, CTO, Executive VP at Allston Trading

BURTON G. MALKIEL RETIREMENT CONFERENCE

This workshop was organized by Yacine Aït-Sahalia and held on April 8, 2011, at Peyton Hall to celebrate the works of Burton G. Malkiel. Topics were presented by previous students and colleagues of Burt Malkiel and included such topics as monetary policy, index investing, financial crises over the years, and financial reform.

Friday, April 8
Introduction, Richard E. Quandt

"Unconventional Monetary Policies: Entrance and Exit Strategies"
Alan Blinder

"Do Experts Measure Quality: The Case of Restaurant Wine Lists"
Orley Ashenfelter

"An Exploration of Optimal Stabilization Policy"
Greg Mankiw

"Invisible Hand vs. Visible Hand"
Jianping Mei

"Hard Times"
John Campbell

"What Is An Index?"
Andrew Lo

"Concocting CoCos"
George von Furstenberg

CERTIFICATE IN FINANCE

In 1999, the Bendheim Center for Finance started offering an Undergraduate Certificate in Finance (UCF) to Princeton undergraduates. The certificate program in finance has four major components:

- First, there are prerequisites in mathematics, economics, and probability and statistics, as necessary for the study of finance at a sophisticated level. These prerequisite courses are to be completed during the freshman and sophomore years. Students then apply at the end of their sophomore year.
- Second, two required core courses during the junior year provide an integrated overview and background in modern finance.
- Third, students are required to take three elective courses.
- Fourth, a significant piece of independent work must relate to issues or methods of finance. This takes the form of a senior thesis, or for non-ECO or ORF majors only, a separate, shorter piece of independent work if there is no possibility of finance content in their senior thesis or junior paper.

There are 83 students in the Class of 2012 and 100 juniors from the Class of 2013. This brings our total number of undergraduate students in the program (juniors and seniors) to 183 for the 2011/2-12 academic year. This number is subject to change, as we often have students who apply and are admitted mid-year. Students earning the certificate are drawn from a wide cross-section of departments on campus, testifying both to the interdisciplinary flavor of the program and its wide appeal. The breakdown by major is given in the following two tables.

CLASS OF 2011

Total number of certificates awarded: 79 (25 to women or 32 percent)

Major	Number of Students
Chemical Engineering	1
Computer Science	2
Economics	32
Evolutionary and Environmental Biology	1
Electrical Engineering	1
Environmental Engineering	1
English	1
Geosciences	1
History	2
Mathematics	2
Molecular Biology	1
Near Eastern Studies	1
Operations Research and Financial Engineering	22
Philosophy	3
Physics	2
Politics	1
Psychology	1
Spanish	1
Woodrow Wilson School	3

CLASS OF 2012

Total expected number of certificates to be awarded: 83 (21 to women, or 25 percent)

Major	Number of Students
Chemical and Biological Engineering	1
Chemistry	2
Computer Science	4
Economics	36
Ecology and Evolutionary Biology	1
Electrical Engineering	2
Geosciences	1
History	2
Mechanical and Aerospace Engineering	1
Mathematics	3
Operations Research and Financial Engineering	20
Philosophy	2
Physics	2
Politics	2
Psychology	1
Woodrow Wilson School	3

DEPARTMENTAL PRIZES, HONORS, AND ATHLETIC AWARDS TO UCF 2011 STUDENTS

Undergraduate Certificate in Finance (UCF) students continue to receive a high proportion of the prizes awarded by their respective departments. This year, UCF students received a combination of departmental prizes and honors; 8 UCF seniors received 10 departmental prizes (one receiving four prizes and one receiving two prizes) and one UCF junior received two departmental prizes; 18 UCF students were elected to Phi Beta Kappa Society; 29 UCF students were elected to membership in Society of Sigma Xi; 12 UCF students were elected to membership in Tau Beta Pi National Engineering Society; 10 UCF juniors received the Shapiro Prize for Academic Excellence, 2009-2010; and 53 UCF students received academic honors (22 cum laude, 17 magna cum laude, and 14 summa cum laude). Forty-one of our UCF students earned certificates in proficiency from 16 other departments or programs, 9 students earning two additional certificates and 2 earning three additional certificates.

13 UCF STUDENTS RECEIVED 15 DEPARTMENTAL PRIZES AND HONORS

Vishal Chanani (ECO), *George B. Wood Legacy Junior Prize (General), Senior Thesis Prize in Finance (Economics),* and *Albert White '72 Prize in Economics (Economics)*

Vishal Chanani (ECO) and Qingzhen Sophie Wang (MAT), *Birch Family Prize (Bendheim Center for Finance)* and *Peter A. Greenberg '77 Memorial Prize (Mathematics)*

Maria Chevtsova (ECO), Kathleen Traynor '83 *Senior Research Prize (Bendheim Center for Finance)*

Yanran Chen '12 (WWS), *Junior Orator Medal and Maclean Prize (Debating and Public speaking)* Biklan Erkmen (ECO) and Joshua Rosner (ECO), *Wolf Balleisen Memorial Prize (Economics)*

Liutong Li (ECO), *Walter C. Sauer '28 Prize (Economics)*

Michelle Lu (PHY), *Allen G. Shenstone Prize in Physics (Physics)*

Kinneri Mehta (SPN), *The Vicente Llorens Castillo Senior Prize in Spanish (Spanish and Portuguese Languages)*

4 UCF STUDENTS RECEIVED ATHLETIC AWARDS

Robin Prendes (ECO), *The William Winston Roper Trophy (General), The Gordon G. Sikes Medal (Lightweight crew)*

Peter Gudmundsen (ECO), *Scott P. Klurfeld '74 Memorial Award (Lacrosse)*

Alexandre Faust (ORF), *The George Myers Church Tennis Trophy (Tennis)*

Michael Erdman (PHI), *The Treide Trophy (Wrestling)*

18 UCF STUDENTS WERE ELECTED TO PHI BETA KAPPA SOCIETY

Serra Alkoçlar (ORF)
Vishal Chanani (ECO)
Maria Chevtsova (ECO)
Alexandre Faust (ORF)
Andrew Gwozdz (COS)
Xueyang Sean Li (ECO)
Franco Lopez (ORF)
Michelle Lu (PHY)
William Nguyen (ORF)

Kyle O'Donovan (ORF)
Di Pan (ORF)
Meredith Pfister (ECO)
Adam Rosenthal (EEB)
Austin Stack (ORF)
Qingzhen Sophie Wang (MAT)
Michael Weinberg (ORF)
Julia Xu (ORF)
Rui Zhang (ORF)

29 UCF STUDENTS WERE ELECTED TO MEMBERSHIP IN SOCIETY OF SIGMA XI

Caroline Anastasi (ORF)
Hui Fang (ORF)
Alexandre Faust (ORF)
Lawrence Fowler (ENE)
David Freifeld (ORF)
Tushar Gupta (COS)
Andrew Gwozdz (COS)
Zachary Kreider (ORF)
Adrian Kwok (ORF)
Yien Hao Mark Lock (PSY)
Franco Lopez (ORF)
Michelle Lu (PHY)
Blair Miller, Jr. (MOL)
Gabriel Montenegro (ORF)
William Nguyen (ORF)

Kyle O'Donovan (ORF)
Di Pan (ORF)
Paul Petrescu (ORF)
Adam Rosenthal (EEB)
Hannah Sachs (ORF)
Danqi Shen (ORF)
Anthony Soroka (ORF)
Austin Stack (ORF)
Yifeng Wang (GEO)
Michael Weinberg (ORF)
Julia Xu (ORF)
Jeffrey Yang (ORF)
Ruizhi Rebecca Yu (PHY)
Rui Zhang (ORF)

12 UCF STUDENTS WERE ELECTED TO MEMBERSHIP IN TAU BETA PI NATIONAL ENGINEERING HONOR SOCIETY

Alexandre Faust (ORF)
Tushar Gupta (COS)
Andrew Gwozdz (COS)
Adrian Kwok (ORF)
Franco Lopez (ORF)
William Nguyen (ORF)

Kyle O'Donovan (ORF)
Di Pan (ORF)
Austin Stack (ORF)
Michael Weinberg (ORF)
Julia Xu (ORF)
Rui Zhang (ORF)

10 UCF JUNIOR STUDENTS RECEIVED THE SHAPIRO PRIZE FOR ACADEMIC EXCELLENCE 2009-2010

Ka Wai Chan (ECO)
Steven Chen (ORF)
Nathaniel Gardenswartz (ECO)
Ethan Goldstein (COS)
Yu-Sung Huang (ORF)

Samantha Lam (ECO)
Harris Perlman (ORF)
Daniel Wang (MAT)
Huija Wu (ECO)
Ravi Yegya-Raman (ORF)

SENIOR THESES AND INDEPENDENT PROJECTS OF THE CLASS OF 2011

This table shows the senior thesis and independent project titles from the UCF Class of 2011.

Serra Alkoclar	ECO	Do Asset Prices Forecast GDP Growth and Inflation?
Caroline Anastasi	ORF	An Analysis of a Tax on Sugar-Sweetened Soft Drinks Through an Examination of the Differential Response to Price
John Badwick	CHE	The Unified Managed Account: A Growing Resource in Retail Investing
Nikhil Basu Trivedi	MOL	Beyond the "$1000 Genome": From Third-Generation Sequencing to Personalized Medicine
Yasmin Belo-Osagie	HIS	The Banking Crisis in Nigeria – 2009
Joelle Birge	ENG	The Dehumanizing Power of Industrial Capitalism in *Hard Times*
Andrew Bogorad	PHY	An Application of Quantam Perturbation Theory to Behavioral Finance
Alexander Cantwell	ECO	Blood and Sand: The Sentiment Effect from Olympic Success on Market Returns
Edward Casserley	WWS	Problems with Rate of Return Regulation
Vishal Chanani	ECO	Behavioral Instability and the Interconnectivity among Financial Crises: A Study of the United States from 1980 to 2010
Zhaonian Chen	ORF	Modeling Financial Markets: Asset Bubbles, Fat Tails, and Efficient Markets
Maria Chevtsova	ECO	U.S. Private Credit Student Loan ABS: Quality and Performance Before and During the Financial Crisis
Eric Eng	ECO	Stock Return Predictability Using Fundamental and Technical Indicators across Various Time Horizons
Travis Erdman	PHI	Decision Theory and Finance: A Brief Overview
Bilkan Erkmen	ECO	Optimal Extraction, Equilibrium Spot and Forward Price Behavior of Common Property Non-Renewable Resources under Non-Cooperative Differential Cournot Competition
Hui Fang	ORF	Controlling the Elements: Regulating Wind with Hydro in China
Alexandre Faust	ORF	A Stochastic Optimization Approach to Large-Scale Evacuation Planning
Morgan Fowler	ENE	Patent Nonsense - Patent Prescription
David Freifeld	ORF	Does Volatility Pay? An Analysis of VIX Trading Strategies Using Simulation
Adam Fry	ECO	A Look at the Financial Services Authority: Regulation and Liquidity Risk Management in the Context of Northern Rock
Peter Gudmundsen	ECO	The Effect of Formal and Informal Microcredit Institutions on Household Ability to Recover from Negative Economic Shocks in Cape Town, South Africa
Zeynep Gul	ECO	Incentives, Compensation, and Risk-Taking
Tushar Gupta	COS	Dollar Cost Averaging: A Critique
Andrew Gwozdz	COS	Swaptions: Product, Pricing, Hedging
Joshua Harris	PHI	Oracular Vision: On the Use of Expert Judgment
Jeong-In Hong	ECO	Decomposition of the Asian Stock Market Co-movements

Sixuan Hou	ECO	Behavioral Instability and the Interconnectivity among Financial Crises: A Study of the United States from 1980 to 2010
Jason Huang	ECO	The Trade-off Between Underpricing and Price Accuracy: An Analysis of Allocation Discrimination in Book Building
Alexia Inglessis	HIS	Argentina and Greece: Military Regimes Established and Populism Declared
Matthew Katz	ECO	A Storm of Change: The Effect of the El Nino Southern Oscillation on Global Commodity Prices
Zachary Kreider	ORF	Principal Component Analysis of Corporate Yield Spreads
Adrian Kwok	ORF	Portfolio Management Strategies for Illiquid Investments
Yuri Larrabee	ECO	The Effect of Wind Energy on Electricity Prices: A Two-Part Study on a United States Panel and the California ISO Market
Liutong Li	ECO	A New Silk Road? Shareholder Value Effects of Cross-Border Mergers & Acquisitions by Chinese Companies
Xueyang (Sean) Li	ECO	A New Way to Invest: Style Timing Using Dynamic Rank Weighting
Chern Han Lim	ECO	The Contagion Effect on Asian Equity Markets During Financial Crises
Anna Liu	ECO	Size, Profitability, and Risk: A Macroeconomic Perspective on Microfinance Institution Performance
Yien Hao (Mark) Lock	PSY	Spending Blindness: Effects of Differing Payment Mechanisms on Memory
Franco Lopez	ORF	A Structural Model for the FCOJ Market
Michelle Lu	PHY	Investigating Momentum in Stock Prices
Itelina Xiaoye Ma	ECO	Reconsidering the Impact of Investor Disagreement on Stock Returns
Zhihan Ma	WWS	The Unfinished Market Reform: Local Government Intervention in Domestic Chinese Mergers & Acquisitions
Kinneri Mehta	SPN	Immigration in Spain: The Factors that Drive Policy Decisions
Blair Miller, Jr.	MOL	Signum Biosciences: An Atypical Story Of Hardship and Success
Gabriel Montenegro	ORF	Options Pricing and Volatility Modeling Through Risk-Neutral Approximations of GARCH Processes
William Nguyen	ORF	College Tuition: Modeling and Valuation of Contingent Claims
Kyle O'Donovan	ORF	The New Asian Option: Using Temperature and Rainfall to Predict and Hedge the Uncertainty in Chinese Tea Harvests
Cagri Onuk	ELE	Calibrating Stochastic Volatility Models
Di Pan	ORF	Principal Component Analysis on the Volatility Term Structure of the United States Treasury and Swap Markets
Albulen Pano	ECO	The Privatization of Drinking Water: The Effect of Ownership on Water System Regulatory Compliance in the USA
Alaap Parikh	ECO	Asset Pricing in the Indian Stock Market: Tests of the Size and Value Effects
Sohaib Perwaiz	WWS	The Role of Fixed Exchange Rates in Emerging Market Financial Crises: Experience from the 90's
Paul Petrescu	ORF	Set-Valued Deviation Measures and Portfolio Selection by Risk Minimization in Markets with Transaction Costs
Meredith Pfister	ECO	The Last to Fall: Understanding the Late Response of Bank Credit and Lending during the Financial Crisis
Robin Prendes	ECO	Uncertainty and the Propagation of the 2008 Recession

Christian Rolon	ECO	Popularity, Products, and Profits: An Analysis of Celebrity Endorsers, Google Trends and Effect on Stock Prices
Adam Rosenthal	EEB	Valuing Payments for Ecosystem Services and Forest Preservation: Importance of Carbon Sequestration and Biodiversity Conservation
Benjamin Rosner	ECO	Financial Development and the MDGS for Education, Gender Equality, and Health
Joshua Rosner	ECO	The Build America Bond Program: An Empirical Analysis of Issuer Borrowing Costs and the Muni-Puzzle
Hannah Sachs	ORF	Profit vs. Altruism: Microfinance Today Expansion into Public Markets and the Developed World
Daniel Salvato	ECO	A Trip to the Financial Supermarket: An Analysis of the Effect of Diversification on the Valuation of Financial Institutions
Danqi Shen	ORF	Forecasting Unemployment Rates with Spatial Autocorrelation and Regional Heterogeneity
Ben Sheng	ORF	A Stochastic Dynamic Programming Model of Ancillary Storage Using Electric Vehicles to Offset Volatility from Wind Generation
Anthony Soroka	ORF	The Russell Reconstruction: Technical Trading Strategies
Austin Stack	ORF	Dissecting the Flash Crash: A Statistical Analysis of Equity, ETF, and Options Markets
Joseph Stanger	ECO	The Subprime Myth: New Perspectives on Risky Lending & The Financial Crisis
Daniella Turenshine	ECO	The Effect of Capital Structure on Financial Decision-Making in the 2007 Crisis
Casey Van de Walle	ECO	Microfinance under a Microscope: A Study of the Commercialization of the Indian Microfinance Industry
Brad Virbitsky	PHI	New Market Tax Credit: Program Analysis
Yifeng Wang	GEO	Narrowing of Spreads between Onshore and Offshore NDF-implied Yields in Asian Currencies
Qingzhen (Sophie) Wang	MAT	The Utility Maximization Problem in Markets with Transaction Costs: A Set Valued Approach
Michael Weinberg	ORF	Optimal Investment Under Asymmetric Compensation Contracts in a Discrete-Time Framework
Alexandra Wich	POL	Assessing the Emergence and Application of Auditing Reform as Part of the Sarbanes-Oxley Act of 2002
Julia Xu	ORF	Superhedging in the Presence of Proportional Transaction Costs in a Multi Period Setting with Multiple Risky Assets
Jeffrey Yang	ORF	Forecasting MLB Starting Pitchers' Future Performances with Regression and Applied Time Series Analysis
Ruizhi (Rebecca) Yu	EEL	Analysis of a Multi-person Voting Model in a Financial Applications Setting
Norman Yu	MAT	Markov Switching Regimes: A Computer Vision Approach
Angela Yue	ECO	Good News or Bad News? An Analysis of the Bond Market
Rui Zhang	ORF	Winding Up the Grid: Optimal Placement of Wind Farms in China

MASTER IN FINANCE

The distinctive feature of our Master in Finance program is its strong emphasis on financial economics in addition to financial engineering and computational methods. Graduates of our program have a solid understanding of the fundamental quantitative tools from economic theory, probability, statistics, optimization, and computer science, all of which are becoming increasingly vital in the financial industry.

To a greater degree than at any time in the past, there now exists a body of knowledge that is widely agreed to be essential for the proper analysis and management of financial securities, portfolios, and the financial decisions of firms. A driving force behind these developments is a lively exchange of ideas between academia and the financial industry, a collaboration that is the closest parallel in the social sciences to the academic-private sector interactions routinely seen in engineering and the applied sciences.

The Master in Finance program prepares students for a wide spectrum of careers in the financial industry, ranging from quantitative trading strategies, risk management, and financial engineering, to quantitative asset management and macroeconomic and financial forecasting. The program does not require prior work experience, although it can be a plus. The Bendheim Center for Finance provides extensive career assistance to students, including help with internships and job placement, through its own staff. Our placement record has been excellent.

The curriculum is designed to be completed in four terms. Admission letters will specify the expected program length. Individual meetings between students admitted into the program and the director of graduate studies will determine, on the basis of courses previously completed at Princeton or another institution, which courses need to be taken. This format allows exceptionally well-prepared students to complete the program in as little as one academic year. The program is designed to be completed on a full-time basis. Classes are taught during the day, and full-time students take four or five courses per term. Given the logistics, the only possibility for part-time enrollment would be for students who already work in the Princeton area and who would be able to attend class during the day. Part-time students are expected to take a minimum of two classes per term, and a maximum of four years (eight terms) to finish the program. All students are subject to an annual review of academic progress.

Princeton's master's program draws upon the combined strength of a variety of departments at Princeton, including the Department of Economics, the Department of Operations Research and Financial Engineering, the Department of Computer Science, and others. The program has two major course components. First, required core courses will provide (a) the prerequisite skills in mathematics, economics, and probability and statistics necessary for the study of finance at a sophisticated level and (b) an integrated introduction to modern financial analysis. Second, a wide range of elective courses, drawn from many departments, will allow students to tailor the program to fit their own needs and interests. These courses will permit a range of opportunities for specialization and in-depth study of topics of interest to the student. Finally, the required summer internship is meant to provide additional practical experience in addressing real-world finance issues.

ADMISSION REQUIREMENTS

The Master in Finance program is designed both for students with training in mathematical or quantitative fields such as physics or engineering who want to make finance their main field of application, and for students with an economics or business background who want to acquire the quantitative skills essential for well-rounded training in finance. In either case, students must have an interest in, and be able to handle the combination of, economic analysis, mathematics, econometrics, and computer science, which are pervasive in modern finance. An intensive two-week refresher course covering the relevant probability, statistics, and mathematics topics, as required for the core courses, is offered prior to the beginning of classes in the fall. In addition, we organize in September for every incoming class a three-day "boot camp" with industry professionals where various career options are reviewed and help is provided (including resume writing, one-on-one videotaped interview sessions, interviewing techniques, etc.).

Applicants must take either the GRE or the GMAT. Applicants whose native language is not English and who have not received their undergraduate education in the United States must take the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System) exam. Applicants whose native language is not English but who have received their undergraduate education in an English-speaking country do not have to submit these scores. Non-native English speakers who graduate with an undergraduate degree from an institution whose language of instruction is English but not in an English-language country must submit scores from either of these tests. All requirements are based on undergraduate education regardless of any graduate education. The Graduate School does not offer waivers of this requirement.

STATISTICS ON THE ADMISSION PROCESS

ADMISSION

	Applications	Offers	Acceptances
January '04	200	19	9
January '05	296	31	19
January '06	418	47	27
January '07	425	49	32
January '08	660	40	30
January '09	591	24	19
January '10	601	31	25
January '11	729	36	29

APPLICANT PROFILE : GENDER AND AGE

	Female	Male	Median Age
January '04	29%	71%	24
January '05	26%	74%	26
January '06	29%	71%	25
January '07	31%	69%	23
January '08	31%	69%	24
January '09	36%	64%	24
January '10	39%	61%	24
January '11	38%	62%	25

HIGHEST DEGREE BEFORE APPLYING TO PRINCETON'S M.FIN .

	Bachelor	Master	Ph.D.
January '04	85%	14%	1%
January '05	60%	35%	5%
January '06	66%	30%	4%
January '07	68%	28%	4%
January '08	72%	26%	2%
January '09	75%	23%	2%
January '10	8%	20%	2%
January '11	78%	20%	2%

APPLICANT PROFILE : GRE SCORES MEAN (MEDIAN)

		Analytical	Quantitative	Verbal
January '04	Applicants	714 (810)	776 (790)	554 (560)
September '04	Entering Class	768 (780)	786 (800)	609 (620)
January '05	Applicants	705 (745)	781 (800)	547 (580)
September '05	Entering Class	765 (765)	789 (800)	642 (640)
January '06	Applicants	4.47 (4.5) *(new test)*	781 (800)	568 (580)
September '06	Entering Class	5.1 (5) *(new test)*	786.5 (800) 6	47.5 (655)
January '07	Applicants	4.44 (4.5)	786.77 (800)	563.75 (570)
September '07	Entering Class	4.75 (5)	795.39 (800)	600.38 (630)
January '08	Applicants	4.18 (4)	786.43 (800)	553.09 (560)
September '08	Entering Class	4.67 (5)	788.43 (800)	573.75 (570)
January '09	Applicants	4.17 (4)	787.19 (800)	566.05 (580)
September '09	Entering Class	4.58 (4.5)	795.74 (800)	606.32 (610)
January '10	Applicants	4.01 (4)	788.34 (800)	566.63 (570)
September '10	Entering Class	4.42 (4.5)	798.95 (800)	597 (590)
January '11	Applicants	3.84 (4)	791 (800)	580
September '11	Entering Class	4.48 (4.5)	796.8 (800)	632

PROGRAM REQUIREMENTS

The program requirements consist of six core courses and 10 elective courses (see list below), with the following provisions:

- At least five of the elective courses must be at the level 500 or higher.
- At least five of the elective courses must be taken from List 1 below.
- Students must maintain an overall grade average of B or better as well as earn a passing grade in all core and elective courses.
- Audited courses cannot be used to fulfill the program's requirements.

While no master's thesis is required, students interested in independent research may work with a Bendheim Center for Finance-affiliated faculty member on a topic relevant to finance, and by enrolling in the appropriate courses (FIN 560/561), they can receive academic credit equivalent to one or two elective courses (thereby reducing the number of required electives).

CORE COURSES

The core courses of the Master in Finance program provide students with analytical fundamentals of modern finance, both theoretical and empirical. Core courses for students entering the program are:

- Financial Economics—ECO 362 (fall) and FIN 502 (spring)
- Asset Pricing—FIN 501/ORF 514 (fall) and ORF 515/FIN 503 (spring)
- Statistics and Econometrics—ORF 505/FIN 505 (fall) and ORF 504/FIN 504 (spring)

ELECTIVE COURSES

In addition to core courses, which provide a broad survey of topics and techniques of modern finance, the program offers students the opportunity to choose among a variety of elective courses. Some of these courses have prerequisites or require permission of the respective instructors.

LIST 1: FINANCE APPLICATIONS COURSES

FIN 515: Portfolio Theory and Asset Management
FIN 516: Topics in Corporate Finance, Corporate Governance, and Banking
FIN 517: Venture Capital and Private Equity Investment
FIN 518: International Financial Markets
FIN 519: Corporate Restructuring, Mergers, and Acquisitions
FIN 521: Fixed Income: Models and Applications
FIN 522: Options, Futures, and Financial Derivatives
FIN 523: Forecasting and Time Series Analysis
FIN 560: Master's Project I
FIN 561: Master's Project II
FIN 567: Institutional Finance, Trading, and Markets
FIN 568: Behavioral Finance
FIN 570: Valuation and Security Analysis
FIN 590: Financial Accounting

FIN 591: Cases in Financial Risk Management
FIN 592: The Rise of Asian Capital Markets
FIN 593: Financial Crises
ECO 414: Introduction to Economic Dynamics
ECO 525/FIN 595: Financial Economics I
ECO 526/FIN 596: Financial Economics II
ECO 575/FIN 575: Topics in Financial Economics
ORF 527: Stochastic Calculus and Finance
ORF 530: Statistical Analysis of Large Financial Datasets
ORF 531/FIN 531: Computational Finance in C++
ORF 534/FIN 534: Financial Engineering
ORF 535/FIN 535: Financial Risk Management
ORF 538: Analytical and Computational Methods of Financial Engineering
ORF 555: Fixed Income Models
ORF 569: Special Topics in Statistics and Operations Research
ORF 574: Special Topics in Investment Science

LIST 2: GENERAL METHODOLOGY FOR FINANCE

APC 350: Introduction to Differential Equations

APC 503: Analytical Techniques in Differential Equations

APC 518/ORF 518: Applied Stochastic Analysis and Methods

CEE 513: Introduction to Finite-element Methods

CEE 532: Advanced Finite-element Methods

CEE 548: Risk Assessment and Management

CHE 508: Numerical Methods for Engineers

CHE 530: Systems Engineering

COS 318: Operating Systems

COS 323: Computing for the Physical and Social Sciences

COS 333: Advanced Programming Techniques

COS 423: Theory of Algorithms

COS 424: Interacting with Data

COS 425: Database Systems

COS 432: Information Security

COS 436: Human-computer Interface Technology

COS 444/ECO 444: Electronic Auctions

COS 461: Computer Networks

ECO 418: Strategy and Information

ECO 501: Microeconomic Theory I

ECO 502: Microeconomic Theory II

ECO 503: Macroeconomic Theory I

ECO 504: Macroeconomic Theory II

ECO 511: Advanced Economic Theory I

ECO 512: Advanced Economic Theory II

ECO 513: Advanced Econometrics: Time Series Models

ECO 517: Econometric Theory I

ECO 518: Econometric Theory II

ECO 519: Advanced Econometrics: Nonlinear Models

ECO 521: Advanced Macroeconomic Theory I

ECO 522: Advanced Macroeconomic Theory II

ECO 523: Public Finance I

ECO 524: Public Finance II

ECO 531: Economics of Labor

ECO 541: Industrial Organization and Public Policy

ECO 551: International Trade I

ECO 552: International Trade II

ECO 553: International Monetary Theory and Policy I

ECO 554: International Monetary Theory and Policy II

ELE 591: High-tech Entrepreneurship

MAE 503: Basic Numerical Methods for Ordinary and Partial Differential Equations

MAT 301/MAE 305: Mathematics in Engineering I (ODE, PDE)

MAT 302/MAE 306: Mathematics in Engineering II

MAT 305: Mathematical Programming

MAT 591 & MAT 592: Applied Partial Differential Equations

MAT 594/APC 584 Wavelets: Applications of Wavelets in Mathematics and Other Fields

ORF 307: Optimization

ORF 311: Optimization under Uncertainty

ORF 401: Electronic Commerce

ORF 474: Special Topics in Operations Research and Financial Engineering

ORF 522: Linear Optimization

ORF 523: Nonlinear Optimization

ORF 524: Statistical Theory and Methods

ORF 526: Probability Theory

ORF 533: Convex Analysis for Mathematical Finance

ORF 542: Stochastic Control and Stochastic Differential Games

ORF 547: Dynamic Programming

ORF 548: Large-scale Optimization

ORF 549: Stochastic Programming

ORF 551: Probability Theory

ORF 553: Stochastic Differential Equations

ORF 554: Markov Processes

TRACKS

Elective courses can be chosen according to either individual needs and preferences, or to conform to one of the suggested tracks, listed below. It is not necessary for a student to designate or complete a particular track to satisfy the master's requirements; the tracks listed below are merely illustrations of coherent courses of study that students might choose. Beyond the tracks listed below, we offer a number of electives in corporate finance, dealing with the choice and financing of investment projects, firms' determination of dividend policy, optimal capital structure, financial reorganization, mergers and acquisitions, start-up financing, deal structure, incentive design, valuation of high-risk projects, initial public offerings, etc. However, we believe that our students' comparative advantage often lies in other areas encompassed within the modern investment bank such as asset management, risk management, derivatives pricing and trading, fixed income analytics, and other areas where a quantitative background in theoretical and practical aspects of modern finance is essential.

FINANCIAL ENGINEERING AND RISK MANAGEMENT

Financial engineers design and evaluate products that help organizations manage risk-return tradeoffs. Financial engineering is no longer limited to quantitative traders and derivatives specialists, and it is now used widely throughout the private sector for purposes including hedging foreign currency exposures, financing real investment, and managing real and financial risks. The aim of this track is to provide students with the background they need to be leaders and innovators in this growing field. The track includes courses in dynamic programming and stochastic control, financial economics, optimization under uncertainty, probability, and stochastic calculus and computational finance. Special attention is given to the development of the efficient computational techniques that are needed in "real-time" computing environments. In addition, students can elect to focus on the computer-based technologies that are becoming increasingly important in finance, such as the design of efficient trading systems, algorithms, interfaces, large databases, and the security of computer networks. Several courses provide students with the opportunity to acquire practical experience. In particular, full-time students will have the opportunity to work in a small group on actual financial engineering problems under the joint guidance of a faculty member and a high-level industry practitioner.

QUANTITATIVE ASSET MANAGEMENT AND MACROECONOMIC FORECASTING

Highly trained financial specialists are increasingly utilized in the fields of portfolio management and macroeconomic forecasting. Among the quantitative tools used in this area are analysis of earnings revisions, "attribute" screening, and quantitative forecasting methods. Quantitative techniques are widely employed to control portfolio risk and to establish portfolios balanced with different assets (stocks, bonds, real estate, etc.) so as to minimize the variance of returns. Finally, major asset managers, commercial banks, life insurance companies, securities firms, etc., all employ financial economists to formulate strategies consistent with the expected performance of the macroeconomy; required skills include expertise in applied time series analysis and an understanding of the major statistical macroeconomic models.

FINANCIAL TECHNOLOGIES

Computer-based technologies, such as algorithms, efficient trading systems, large databases, multimedia and Web interfaces, parallel processing, and the security of computer networks, are becoming increasingly important in finance. The continued development of e-commerce, the growth of electronic trading, and the renewed emphasis on risk management in all firms are creating a new competitive environment in which increasing the speed and lowering the costs of trading and other financial operations become essential components of success. This track gives students access to the latest tools and techniques of computer science and computational methods applied to finance.

SEMINARS AND COMPUTING ENVIRONMENT

Students are involved in regular seminars offered by academic researchers and industry representatives, and they will have the opportunity to participate in collaborative projects in some of the elective courses. The Financial Engineering Laboratory (equipped with financial data feeds, personal computers, and workstations) has been set up to facilitate such projects. The program provides a standardized computing environment based on Mathematica, MATLAB, S-Plus, and Microsoft Office. Computational skills are taught in a series of workshops and in a course on computational finance in C++.

SELECT COURSE DESCRIPTIONS

ECO 362: Financial Investments
This course surveys the field of investments with special emphasis on the valuation of financial assets. Issues studied include how portfolios of assets should be formed, how to measure and control risk, how to evaluate investment performance, and how to test alternative investment strategies and asset pricing models.

FIN 501: Asset Pricing I: Pricing Models and Derivatives
This course provides an introduction to the modern theory of asset pricing. Topics include: no arbitrage, Arrow-Debreu prices and equivalent martingale measures, security structure and market completeness, mean-variance analysis, Beta-pricing, CAPM, and introduction to derivative pricing.

FIN 502: Corporate Finance and Financial Accounting
This course covers the basics of financial statements, the analysis and recording of transactions, and the underlying concepts and procedures. In addition, a more detailed study of some aspects of financial accounting that have widespread significance is undertaken, such as inventories, long-term productive assets, bonds and other liabilities, stockholders equity, and the statement of changes in financial position. The course provides students with the skills necessary to become informed users of financial statements. Problem sets emphasize an ability to interpret and analyze financial statement disclosures.

FIN 515: Portfolio Theory and Asset Management
This course covers a number of advanced topics related to asset management and asset pricing, including mean-variance analysis, CAPM, APT, market efficiency, delegated money management, stock return predictability, bubbles and crashes, social interaction and investor behavior, security analysts and investor relations, and mutual fund performance and organization.

FIN 516: Topics in Corporate Finance, Corporate Governance, and Banking
The course covers agency and control issues in corporate finance such as managerial compensation, the role of corporate boards, takeovers, leveraged buyouts, and bankruptcy. It also studies the role of banks and other intermediaries' activities in facilitating investment and promoting sound corporate governance.

FIN 518: International Financial Markets
This course studies the assets and institutions of international financial markets. A key difference between these markets and others is the role of exchange rates relating the value of two or more national currencies. The course studies the market-making institutions, the market conventions, and market practices. It also studies the interrelationships between different assets and their pricing, trading, and use by corporations.

FIN 519: Corporate Restructuring, Mergers, and Acquisitions
This course examines some of the most popular restructuring options available to corporate managers and will construct a framework to evaluate the implications they may have to shareholder value.

FIN 521: Fixed Income: Models and Applications
This course deals with the valuation for fixed-income securities. Topics include: (i) interest rate contracts: zero-coupon bonds, coupon bonds, floating rate notes, yields, forwards and futures, swaps, options, caps, swaptions; (ii) arbitrage free pricing in discrete time: Vasicek model, Ho-Lee model, Black-Derman-Toy model; (iii) introduction to continuous-time fixed income modeling: Black model, Heath-Jarrow-Morton; (iv) applications of arbitrage free models to pricing of interest rate contracts; (v) credit risk; and (vi) mortgage-backed securities.

FIN 522: Options, Futures, and Financial Derivatives
The objective of this course is to study the essential techniques of pricing financial derivatives. These techniques include the Black-Scholes formula (awarded 1997 Nobel Prize in economics), binomial tree method, and risk-neutral valuation method. We will also discuss extensively the trading strategies associated with financial derivatives for different purposes and potential problems that can arise in the application of financial derivatives. This course is technical by nature and requires extensive use of calculus, statistics, and Excel spreadsheet programming.

FIN 560/561: Master's Project I and II
Under the direction of a Bendheim Center for Finance-affiliated faculty member, students carry out a master's project and write a report.

FIN 567: Institutional Finance, Trading, and Markets
This course studies financial institutions and focuses on the stability of the financial system. It covers important theoretical concepts and recent developments in financial intermediation, asset pricing under asymmetric information, behavioral finance and market microstructure. Topics include market efficiency, asset price bubbles, herding, liquidity crisis, risk management, market design, and financial regulation.

FIN 568: Behavioral Finance
This course will present models that are psychologically more realistic than the standard "rational actor" model. About 30 percent of the course will be devoted to economics, 70 percent to finance. Applications to economics will include decision theory, happiness, fairness, and neuroeconomics. Applications to finance will include theory and evidence on investor psychology, predictability of the stock market and other markets, limits to arbitrage, bubbles and crashes, experimental finance, and behavioral corporate finance.

FIN 570: Valuation and Security Analysis
This is a specialized corporate finance course. The objective is to teach valuation methods. The course uses accounting and finance concepts for valuing firms and covers the necessary corporate finance concepts with an equal mix of theory and application. Topics include financial statement analysis, capital budgeting methods, estimating cash flows, estimating various costs of capital, valuation of projects, valuation of companies and security valuation, LBOs, mergers and acquisitions, valuing a drug licensing opportunity, the initial public offering valuation, and valuation of strategic and real options.

FIN 590: Financial Accounting
A survey of the concepts and techniques that non-managers use to hold the managers of organized human activity—chiefly corporations—accountable for the resources entrusted to them. Alerts students to the judgments and assumptions that regulators and managers make in that process, even when the managers wish to report honestly. Explores the methods that the managers of resources can (and often do) use to lie about their actual performance. While this course aims to make you a sophisticated user, not producer, of financial statements, you must master some record keeping procedures and vocabulary in order to be the boss, not the servant.

FIN 591: Cases in Financial Risk Management
This course examines the concept of risk and its mitigation, and how the ideas can be applied in the practice of risk management for financial and non-financial companies. The basic toolkit draws on economics, probability theory, and statistics, and they are integrated with more advanced concepts drawn from portfolio choice, derivative securities, and dynamic hedging. The overall aim of the course is to demonstrate how the main concepts have practical applications.

FIN 592: The Rise of Asian Capital Markets
This course explores the increasing weight of Asia in global equity financial markets and its implications, and frames the discussion in the macroeconomic context of the globalization of financial markets and the evolution of the global monetary system. The course puts particular emphasis on concepts of economic development, market efficiency, and corporate governance. Discussions combine analysis of historical trends and recent data and events with insights from practical experience in Asian equity markets. The course also explicitly considers the policy decisions faced by the U.S. and Chinese governments relative to existing global imbalances.

FIN 593: Financial Crises
This course uses economic theory and empirical evidence to study the causes of financial crises and the effectiveness of policy responses to them. Particular attention is given to some of the major economic and financial crises of the past century and to the crisis that began in August 2007.

ECO 525/FIN 595: Financial Economics I
This course covers asset pricing in competitive markets in which traders have homogeneous information. Empirical tests of asset-pricing models and associated "anomalies" are also surveyed. Measures of riskiness and risk aversion, intertemporal asset-pricing models, dynamic portfolio choice, option pricing and the term structure of interest rates, corporate investment and financing decisions, and taxation are studied.

ECO 526/FIN 596: Financial Economics II
This course studies theories and empirical evidence regarding financial markets and institutions that focus on asymmetric information, transaction costs, or both; and rational expectation models of asset pricing under asymmetric information, dynamic models of market making, portfolio manager performance evaluation, principal-agent models of firm managerial structure, takeover bids, capital structure, and regulation of financial markets.

ECO 575/FIN 575: Topics in Financial Economics
This course is intended for Ph.D. students who have already completed the yearlong Ph.D. sequence in finance (ECO 525 and 526) and who intend to write their dissertation in finance. Topics vary by year, focusing on recent developments in the field.

ORF 504/FIN 504: Financial Econometrics
This course covers econometric and statistical methods as applied to finance. Topics include measurement issues in finance, predictability of asset returns and volatilities, value at risk and extremal events, linear factor pricing and portfolio problems, intertemporal models of the stochastic discount factor and generalized method of moments, vector autoregressive and maximum likelihood methods in finance, risk neutral valuation in discrete time, estimation methods for continuous-time models, volatility smiles and alternatives to Black-Scholes, and nonparametric statistical methods for option pricing.

ORF 505/FIN 505: Modern Regression and Time Series
This course examines linear and mixed effect models, nonlinear regression, nonparametric regression and classification, time series analysis, stationarity and classical linear models (AR, MA, ARMA), nonlinear and nonstationary time-series models, state space systems, and hidden Markov models and filtering.

ORF 515/FIN 503: Asset Pricing II: Stochastic Calculus and Advanced Derivatives
This course begins with an overview of basic probability theory and covers the elements of stochastic calculus and stochastic differential equations that are widely used in derivatives modeling, pricing, and hedging. Topics include Brownian motion, martingales, and diffusions and their uses in stochastic volatility; volatility smiles; risk management; interest-rate models; and derivatives, swaps, credit risk, and real options.

ORF 531/FIN 531: Computational Finance in C++
The intent of this course is to introduce the student to the technical and algorithmic aspects of a wide spectrum of computer applications currently used in the financial industry, and to prepare the student for the development of new applications. The student will be introduced to C++, the weekly homework will involve writing C++ code, and the final project will also involve programming in the same environment.

ORF 534/FIN 534: Financial Engineering
This course surveys central topics in the area of financial engineering and multi-period financial planning systems. It covers pricing methodologies integrated with financial planning systems and linking asset and liability strategies to maximize surplus wealth over time. We model the organization as a multi-stage stochastic program with decision strategies.

ORF 535/FIN 535: Financial Risk Management
This course is about measuring, modeling, and managing financial risks. It introduces the variety of instruments that are used to this effect and the methods of designing and evaluating such instruments. Topics covered include risk diversification, planning models, market and nonmarket risks, and portfolio effects.

ORF 538: Analytical and Computational Methods for Financial Engineering
This course introduces analytical and computational methods that are common in financial engineering problems. It is aimed at Ph.D. students and advanced M.A. students who have studied stochastic calculus. The focus is on uses of partial differential equations: their appearance in pricing financial derivatives, connection with Markov processes, and occurrence as Hamilton-Jacobi-Bellman equations in stochastic control problems, and analytical, asymptotic, and numerical techniques for their solution.

ORF 555/FIN 555: Fixed Income Models
This course is an introduction to continuous-time models for the arbitrage-free pricing of interest rate derivatives. Topics include primitives of the bond market and the relation between their dynamics, short rate models, the Heath-Jarrow-Morton methodology and related consistency problems, LIBOR market models, affine term structure models, and risk of default.

MASTER IN FINANCE PLACEMENT

Our program has continued to enjoy excellent success with 100 percent of our 2011 graduates being placed in finance industry jobs and 100 percent internship placement. The candidates for the Master in Finance receive support and assistance with their postgraduate career planning from a coordinated program of resources, including Princeton's Office of Career Services and the Bendheim Center for Finance's directors of corporate relations, Wendell Collins and David Blair. They also benefit from support from our Corporate Affiliates Program and Advisory Council.

OUR GRADUATES WILL BE PURSUING THEIR CAREERS AT:

AQR Capital Management, Greenwich, Ct.
BNP Paribas, New York
Citi Quantitative Strategies, New York
GETCO, Chicago
Goldman Sachs Asset Management, London
Goldman Sachs Investment Banking, Hong Kong
UBS Japan
Goldman Sachs Securities, New York
Goldman Sachs Investment Banking, Singapore
JPMorgan Fixed Income Sales, New York
Ministry of Finance, Singapore

Morgan Stanley Fixed Income Sales & Trading, New York
Morgan Stanley, Interest Rates, New York
Morgan Stanley Sales & Trading, London
Nomura Research, Tokyo
OCBC Bank, Global Treasury Structured Products, Singapore
Proprietary Trading Firm, Chicago
Societe Generale, New York
Valinor Management LLC, New York

OUR FIRST-YEAR STUDENTS HAVE OBTAINED SUMMER INTERNSHIPS AT:

Barclays Capital Risk Management, New York
Citadel Investments, Chicago
Credit Suisse Investment Banking, New York
Credit Suisse Sales & Trading, Hong Kong
Credit Suisse Sales & Trading, Singapore
Goldman Sachs Securities, Hong Kong

Goldman Sachs Securities, New York
JPMorgan Fixed Income, London
KAUST Investment Management, Arlington, VA
Citi, Market Quantitative Analysis, New York
Morgan Stanley Market Risk, New York
Soros Fund Management, New York

FELLOWSHIPS AWARDED

The Gerhard R. Andlinger '52 Graduate Fellowship in Finance was awarded to Ei Yin Mon. Ei Yin came to us from Swarthmore College before working at the Urban Institute. She became very interested in capital markets while in college and decided to switch to finance and attend Princeton University. She interned in risk management and will be working in market risk.

The Bendheim Graduate Fellowship in Finance was awarded to Kieran Fitzgerald. Kieran came to us from Brown University where his Honors Thesis was on "Price Momentum and Asymmetric Volatility."

MFIN MATH CAMP/BOOT CAMP

For the sixth year, the Bendheim Center for Finance conducted a two-week "math camp" program, August 30–September 10, taught by Wei Xiong. The purpose of the math camp is to enrich the finance mathematics background of the incoming students so that they are ready for the mathematical rigors of the program.

Following math camp, we continued our three-day "boot camp" program, which was developed for the incoming students prior to the beginning of classes in September. The camp focuses on a refresher of various finance topics, the types of careers for which the Master in Finance degree prepares students, and some useful information on interviewing and networking skills. Boot camp presenters included the Bendheim Center for Finance faculty, Master in Finance alumni, and speakers from the financial services industry. This program was well received by the incoming students, particularly those who would have to begin interviewing for permanent jobs less than six weeks after starting the program. In 2010, the program's agenda was as follows:

SATURDAY, SEPTEMBER 11

Panel Discussion among Recent Graduates on Careers in Finance and Job Search Best Practices—Nicolas Cojocaru-Durand, Citadel; Duygu Gozeler, HSBC; Theo Kim, Princeton University Investment Company; Adam Lichtenstein, Kepos Capital; Chad Shampine, Morgan Stanley; and Dennis Walsh, Goldman Sachs.

Mock Interviews with Roundtable Participants moderated by David Blair

MONDAY, SEPTEMBER 13

Opportunities in Financial Engineering and Market Strategy—Arnold Miyamoto, Managing Director and Global Head of Markets Quantitative Analysis, Citi

Career Advice and Hedge Fund/Buyside Opportunities—John Massad, Director of Business Development, Caxton Associates

Opportunities in Sales & Trading and Career Mobility—Uma Seshamani, VP, Institutional Equity Sales, Barclays Capital

Princeton Investment Company—Andy Golden, President

The Recruiting Landscape—Chris Resto and Ann Guo, GETCO

Global Arbitrage Trading—Len Kunin, Director, Credit Suisse

Global Equity Derivatives/Delta One Strategy— Marko Kolanovic, MD, and Kapil Dhingra, VP, JPMorgan

TUESDAY, SEPTEMBER 14

Portfolio Management, U.S. Fixed Income—John D. Naud, Director, Citadel

The Role of the Strat—Eric Pan, Executive Director, FX Strategy, and Jean Boyer, Associate, Equity Derivatives Strategy, Morgan Stanley

US Interest Rate Products Electronic Trading—Isaac Chang, Vice President, Goldman Sachs

Career Services Resources and Best Practices—Amy L. Pszczolkowski and Anthony Chiappetta

Economic and Finance Library Resources—Todd Hines

Do's and Don'ts: A Short Guide to Employment Etiquette and Networking Best Practices—Wendell Collins

Perspectives on the markets and future careers in finance—David Blair

MFIN WEEKLY LUNCH AND LEARNS

In addition to boot camp, a number of guest speakers from a variety of areas of finance visited the Bendheim Center in 2010/2011 to address Master in Finance, undergraduate, and PhD students.

Oct. 1, Kirby Daley, Senior Strategist, New Edge, Hong Kong

Oct. 7, Rob Khoury, World Wide Financial Industry Recruiting Services

Oct. 12, Jerry Lou, MD, Morgan Stanley Asia Research

Oct. 13 and 19th, Credit Suisse Investment Banking and Sales & Trading Panels

Oct. 14, Tim Dowling, MD, Deutsche Bank Risk Management

Oct 14, Robert Shiller, Finance and the Good Society

Oct 15, Internship 101 Panel with Second Year students

Oct 20, Bob Greer, Portfolio Manager, PIMCO

Oct 21, Portfolio manager and investor William C. Powers

Oct. 23, MD Harold Kim, Citi Global Markets Asia Pacific

Nov. 8, JPMorgan Quantitative Research

Nov. 10, Edgestream Partners

Nov. 11, Justin Gmelich, head of Credit and Mortgages, Goldman Sachs

Nov. 12, Antoine Chiche, Goldman Sachs Principal Strategies

Nov. 17, Marilyn Fedak, Vice Chairman, Alliance Bernstein

Nov. 17, Luis Seco, Univ. of Toronto RiskLab & Sigma Analysis & Management

Nov. 19, Job Shadowing at JPMorgan & Morgan Stanley

Dec. 3 , Charles Fishkin, Ding Liu and Vicki Walia, Alliance Bernstein

Dec. 7, Deutsche Bank Networking Reception

Dec. 15, Andy Okun, CEO, Watermark

Jan. 5, Antoine Chiche, Valuation Workshop

April 14, Leonard Schaeffer, Healthcare Finance

ADVISORY COUNCIL AND SUPPORTERS

ADVISORY COUNCIL

The Advisory Council for the Bendheim Center for Finance is made up of a group of distinguished leaders in the financial industry. The council meets on campus once a year. In 2011, the meeting took place on April 28-29. We continued our format of including a dinner the night before the morning meeting to enable the council members to exchange ideas in a more informal setting.

COUNCIL MEMBERS

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Andlinger & Company, Inc.

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Citicorp

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Bogle Financial Markets Research Center
Vanguard

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Vice Chairman (retired)
Morgan Stanley Investment Banking Division

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Barclays Capital, Inc.

Jerome H. Powell
Visiting Scholar
Bipartison Policy Center

Lynn Bendheim Thoman
Co-president
Leon Lowenstein Foundation

CORPORATE AFFILIATES PROGRAM

The annual Corporate Affiliates Program offers companies an opportunity to build a significant relationship with the Bendheim Center for Finance faculty and students. Corporate affiliates gain a strong presence and visibility in the Bendheim Center for Finance, interact with faculty and students, learn about important faculty research, and secure a competitive recruiting advantage.

2011 AFFILIATES

Barclays Capital
Citadel Investments Group
Citigroup
Crédit Suisse
DC Energy

Deutsche Bank
Goldman Sachs
Prediction Company, LLC (subsidiary of UBS)

- Annual Report of the Bendheim Center for Finance

- Opportunity to advertise internships and employment opportunities to both Undergraduate Certificate in Finance and Master in Finance students

- Opportunity to use the Bendheim Center for Finance facilities to host recruiting events
- Access to the Bendheim Center for Finance director of corporate relations as a resource for recruiting

- Recognition in the publicly disseminated materials of the Bendheim Center for Finance, including the center's reports and website, which both list corporate affiliates, as well as a hyperlink to each member's website

- Access to research authored by the center's affiliated faculty within the academic year

- Access to Bendheim Center for Finance faculty for internal or client presentations or for sponsored research

- Opportunity to work with the center's faculty and staff to create customized training programs and to design and access distance-learning courses and events such as special lectures and conferences

- Invitation to deliver a guest lecture on campus or to participate as a presenter at Bendheim Center for Finance-sponsored conferences

- Invitation and two reserved seats for all public events hosted by the center

GIFT OPPORTUNITIES

Early in 1998, a $10 million gift from the Leon Lowenstein Foundation enabled Princeton to launch the Bendheim Center for Finance. To establish the University as a national resource for innovative thinking on finance and finance-related topics, the Bendheim Center for Finance brings together leading experts in teaching and scholarship in financial economics. But to realize this vision, significant support beyond the generous Bendheim gift is needed for faculty, curriculum development, and facilities. True excellence in financial economics requires a critical mass of finance researchers, approaching the size of a finance department in a leading business school, as well as important educational initiatives in a state-of-the-art setting.

ACADEMIC PERSONNEL

Endowed Professorships (five committed, two additional needed)
To support the appointment of a distinguished senior faculty member
$4,000,000

Endowed Visiting Professorship (one needed)
To support a distinguished senior visitor who provides expertise in a particular area of study
$2,000,000

Postdoctoral Fellows (one needed)
$1,500,000

Junior Faculty Fellow (one committed, one additional needed)
$1,500,000

FELLOWSHIPS

Graduate Fellowships (three committed, seven additional needed)
To support a new generation of scholars concentrating in finance
$250,000

SUPPORT OF FINANCIAL RESEARCH AND TEACHING

Research and Course Development Funds
Endowed funds to support research and course development
$50,000 minimum

PHYSICAL SPACE

Director's Office
$100,000

Graduate Student Suite
$100,000

ACKNOWLEDGMENTS 2010-11

Princeton University gratefully acknowledges those whose generosity continues to make the Bendheim Center for Finance possible.

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