

Princeton University

Bendheim Center for Finance

Annual Report 2008

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Contents

CONTENTS	2
DIRECTOR'S INTRODUCTION	3
FACULTY	8
VISITING FACULTY	35
VISITING FELLOWS	38
GRADUATING PH.D. STUDENTS	39
FINANCE SEMINARS	40
CIVITAS FOUNDATION FINANCE SEMINAR FALL 2007	40
CIVITAS FOUNDATION FINANCE SEMINAR SPRING 2008	41
FINANCE PH.D. STUDENT WORKSHOP	42
CONFERENCES	45
THE PRINCETON LECTURES IN FINANCE	45
SECOND CAMBRIDGE-PRINCETON CONFERENCE	46
CONFERENCE ON RISK MEASURES AND ROBUST CONTROL IN FINANCE	49
RETHINKING BUSINESS MANAGEMENT: AN EXAMINATION OF THE FOUNDATIONS OF BUSINESS EDUCATION	49
UNDERGRADUATE CERTIFICATE IN FINANCE	55
DEPARTMENTAL PRIZES, HONORS AND ATHLETIC AWARDS TO UCF '08 STUDENTS	57
SENIOR THESES OF THE CLASS OF '08	58
MINI-COURSE ON FINANCIAL MODELING, VALUATION AND ANALYSIS USING EXCEL, VBA AND C++	63
MASTER IN FINANCE	64
ADMISSION REQUIREMENTS	65
STATISTICS ON THE ADMISSION PROCESS	65
PROGRAM REQUIREMENTS	66
CORE COURSES	67
ELECTIVE COURSES	67
TRACKS	69
SOME COURSE DESCRIPTIONS	70
MASTER IN FINANCE PLACEMENT	74
MFIN MATH CAMP/BOOT CAMP	75
ADVISORY COUNCIL	78
CORPORATE AFFILIATES PROGRAM	79
2007-08 PARTNERS	79
BENEFITS	79
GIFT OPPORTUNITIES	81
ACKNOWLEDGEMENTS 2007-08	82

Director's Introduction

The mission of Princeton University's Bendheim Center for Finance is twofold: First, to develop new courses and programs in finance that will afford exciting learning opportunities to Princeton students; and second, to establish a leading center for modern financial research.

Under the aegis of the BCF, Princeton's existing finance curriculum is being expanded and improved, and two academic programs were created: an Undergraduate Certificate in Finance in 1999 and a Master Program in Finance in 2001. Center-affiliated faculty 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 BCF is an ideal environment in which to conduct significant research in finance. It also serves 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.

Proximity to Wall Street and other important centers of private-sector financial research provide an additional source of intellectual stimulation and interchange for the BCF. Students are able to explore both internships and permanent job opportunities in a wide variety of finance-related areas. The BCF also encourages students at all levels to conduct finance-related research at the University by providing such resources as funding senior thesis projects, serving as a clearinghouse and major source of data, and providing expert faculty advisors.

The scholars in the BCF 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 BCF.

Faculty

Faculty matters continue to represent the main challenge faced by the BCF, but 2007-08 was a successful recruiting year for us. For the first time since 2000, we managed to hire a new Assistant Professor in finance through the Economics department. **Jakub Jurek** received his Ph.D. in Business Economics from Harvard University in 2008. His interests are in asset pricing, corporate finance, and behavioral economics. We are also very pleased that **Yuliy Sannikov '00** is joining the Economics department as a Professor of Economics. He received his Ph.D. from Stanford in 2004. His research interests are in game theory, contracts, corporate finance, security design and incentives theory. ORFE has continued to hire successfully in financial engineering, with **Phillippe Rigollet** joining the department as an Assistant Professor from the Georgia Institute of Technology and **Yingying Li**, as a post-doctoral fellow from the University of Chicago.

Ph.D. Students

Seven students advised by BCF faculty graduated in 2008:

- **Kevin Amonlirdviman** received his Ph.D. from the Economics Department. His dissertation studied the role of pessimism in household macroeconomic expectations. He has accepted a position as consultant to BC6 in France.
- **Julio Cacho-Diaz** received his Ph.D. from the Economics Department. His dissertation studied the identification of and inference for jumps using hedge fund returns. He has accepted an Associate position with Ziff Brothers Investments in New York City.
- **Hakan Kaya** received his Ph.D. from Operations Research and Financial Engineering. His studies focused on management of weather risks in commodity markets. He joined the Quantitative Investments Group at Lehman Brothers as a senior associate.
- **Leonard Kostovetsky** received his Ph.D. from the Department of Economics. His thesis studied how the rise of hedge funds and socially responsible investing has affected the money management industry. He has accepted a position as Assistant Professor of Finance at the University of Rochester's Simon Graduate School of Business in Rochester, NY.
- **Martin Oehmke** received his Ph.D. from the Department of Economics. His thesis analyzes large collateral liquidations that follow the defaults of large traders, such as hedge funds. He has accepted an appointment as an Assistant Professor in the Finance department at Columbia University in New York City.
- **Filipos Papakonstantinou** received his Ph.D. from the Department of Economics. His dissertation studied Boards of Directors of corporations and whether different structures lead to different returns. He has accepted an Assistant Professor position at the Imperial College in London.
- **E. Glen Weyl** graduated this year with his Ph.D. in economics, a year after graduating Valedictorian of his undergraduate class at Princeton. His research ranges from antitrust economics of the credit card industry to the foundations of the liberal theory of individual rights. In July he will begin a three year term as a junior fellow at the Harvard Society of Fellows, as well as a yearly visiting position at the Toulouse School of Economics.

Undergraduate Certificate in Finance

Now in its tenth year, the Undergraduate Certificate in Finance continues to do extremely well, attracting record numbers of students. We enrolled 56 juniors from the Class of 2010. 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: 109. This brings our total number of undergraduate students in the program (juniors and seniors) to about 185 this year. The success of the program has been overwhelming, especially in light of our limited resources for senior thesis advising.

Students earning the UCF are drawn from a wide cross-section of departments on campus, 17 in total for the Class of 2008. 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.

61 UCF students received a combination of departmental prizes, honors, and athletic awards; 14 UCF students received departmental prizes and honors (five receiving more than one prize); 2

UCF students received athletic awards; 14 UCF students were elected to Phi Beta Kappa Society; 23 UCF students were elected to membership in Society of Sigma Xi; 8 UCF students were elected to membership in Tau Beta Pi National Engineering Society; and finally, 51 UCF students received academic honors (15 cum laude, 25 magna cum laude and 11 summa cum laude).

Zachary Kurz was the recipient 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 third year we were able to present it to a graduating senior with the highest grade point average in coursework related to the Undergraduate Certificate in Finance.

The large size of the UCF has stretched our limited advising resources. In conjunction with the Dean of the College, we put in place tougher admission requirements into the UCF, starting with the Class of 2008, in order to cap the size of the program at a more manageable level. Specifically, a minimum B+ average in the three prerequisite courses (mathematics, statistics and microeconomics) and a minimum grade of B in each of them will be required for ECO and ORF majors. Once admitted, a minimum B average computed over the two core courses ECO 362 and 363, the three elective courses, and the independent work will be 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 100, 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, in May 2008 we admitted 56 students from the Class of 2010 into the UCF. We expect that the reduced size of the UCF will provide an even better experience for students and faculty alike.

Master in Finance

The sixth full class of the Center's Master in Finance (MFin) graduated in June 2008. Reflecting the interdisciplinary nature of the BCF, the MFin program is nearly unique in producing students with extensive training in both quantitative methods (drawing on the strengths of our Engineering, Computer Science, Mathematics and other departments) and in Economics. This set of skills makes our Master students highly sought after in the job market. The program is designed to be completed in four semesters, but students with strong backgrounds will be able to finish more quickly, in as little as one year.

Because business schools do not generally offer so specialized a program, or expect their students to have such a strong mathematical background, Princeton's MFin offers students a significant advantage in obtaining coveted positions in investment banking, brokerage houses, and similar firms. BCF faculty also benefit from the program because it provides a forum in which they can develop an active intellectual interchange with leading private-sector financial researchers and practitioners.

Years of heavy investment in the placement of our graduating students continue to pay off. The networking efforts of our Director of Corporate Relations, the strong support from our Corporate Affiliates and Advisory Council, and the success enjoyed by our previous graduating classes have been reflected in a strong demand for our 2008 graduates, all of whom accepted permanent employment in financial firms, in a job market made extremely challenging by the uncertainties surrounding the current credit crisis. Our two year students have all accepted offers of summer internships from financial firms. 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 our program's leading position.

We repeated in September 2007 our three-day "boot camp" introductory program which was introduced in 2003 for the incoming students prior to the beginning of classes, and will continue to do so in future years. The camp focuses on a refresher of various finance topics, the types of careers for which the MFin degree prepares students and some useful information and interviewing skills (such as mock videotaped interviews).

The number of MFin applicants continues to grow, reaching 660 in January 2008 (compared to 425 the previous year). This reflects the growing recognition that the program is gaining in the wider quantitative finance community, and among the top undergraduate institutions that are providing us with applicants. It also reflects the pressure faced by employees of financial firms for whom going back to school may be an appealing option in the current environment. We intend to continue keeping the MFin program small, although we grew it slightly over the last two years for three main reasons: the first was to recognize the quality and depth of the applicant pool and avoid rejecting so many very able applicants that we would be discouraging future applicants from even applying; the second was the recognition that we could accommodate the additional students in our existing MFin courses without adverse consequences or the need for additional resources; the third was to graduate a sufficient number of students each year to run an organized placement program that brings potential MFin employers to campus separately from their undergraduate recruiting operations.

We admitted 40 students this year (compared to 49 the previous year), and 30 will be enrolling this coming fall (compared to 32 the previous year). Our selectivity rate continues to be very high, with our program admitting about 6% of its applicant pool. This is a much smaller percentage than our peer programs in quantitative finance (NYU, Columbia, Carnegie-Mellon, Berkeley, Chicago, Stanford, etc.) which typically admit around 25% of their applicant pool and one that is comparable to the most selective business schools. Our yield (75% this year) was also remarkably high, despite the absence in most cases of financial aid, which is limited to a total of 3.5 fellowships spread across the 30 students. Overall, this is a very good sign for the continued success of our program. The high yield meant that we ended up at the high end of our target of 25 to 30 incoming students.

We have continued to conduct interviews of the most promising subset of our applicant pool using our Advisory Council and placement officers. This process 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. In addition to the obvious benefit of collecting very useful information about potential students, we get a positive "halo" effect with the strongest candidates who get to meet our industry-leading Advisory Council members.

Fund Raising

Looking forward, 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 very competitive market, we have found it necessary to make commitments to provide research support for faculty members. All of this requires active fund raising and we continue to work closely with the Development Office to increase the Center's resources. This year we give special thanks to Alfred Hurley '75, William Janeway '65, and Kathleen Traynor DeRose '83 for their generous gifts to the Center.

Our Corporate Affiliates Program has also been quite successful. Under this program, financial firms are asked to make annual gifts to the Center. In exchange, member firms are given certain privileges, such as the right to receive Center publications, to send representatives to Center events, and to receive assistance in recruiting our students (both undergraduate and master students) for internships and permanent jobs. Members for 2007-08 include Barclays Capital, Citadel Investments Group, Citigroup, Crédit Suisse, FreddieMac, Global Environmental Fund, Goldman Sachs, JP Morgan Chase, Lehman Brothers, Merrill Lynch, Moody's Corporation, Morgan Stanley, and Prediction Company LLC (subsidiary of UBS). We welcome our newest member: Prediction Company LLC.

Advisory Council

The Center relies on the help and advice of prominent alumni working in the financial sector. The eighth annual meeting of the Advisory Council took place on campus on May 22-23, 2008. Our meeting format included a dinner the evening before the morning meeting. This enabled the Council members to exchange ideas in a more informal setting. The agenda was centered on the placement of future Master students, fine-tuning of the Undergraduate Certificate in Finance and the design of the benefits offered to Corporate Affiliates. Council members were pleased to note the continued success of the Center's programs.

Conclusion

Finance is important to Princeton's continued success as an educational and research institution because of 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 is not 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 it 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 BCF.

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 enhances the education, training and career opportunities of many of the world's very best students.



Yacine Ait-Sahalia
Otto A. Hack '03 Professor of Finance and Economics
Director, Bendheim Center for Finance
July 2008

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 current 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 Oxford University and a Ph.D. in Economics from Princeton.

Courses taught:

- ECO 418: Strategy and Information
- ECO 502: Microeconomic Theory
- ECO 514: Game Theory

Undergraduate students advised:

- Howard Deutsch, "On-campus Recruiting as a Two-sided Matching Problem or, How I Managed to Find a Job"
- Adam Nebesar, "Oil and War: New Methods for Estimating the Macroeconomic Effects of Oil Shocks, using War in Iraq as a Case Study"

Graduate student advised:

- Attila Ambrus, "Coalitional Rationalizability"
- Daisuke Nakajima, "Essays on Auctions and the War of Attrition with the Allais Paradox"

Representative publications:

- "Bargaining, Reputation and Equilibrium Selection in Repeated Games with Contracts," *Econometrica*, May 2007 (with D. Pearce).
- "Bubbles and Crashes," *Econometrica* 71(1), 173-204, January 2003 (with M. Brunnermeier).
- "Bargaining and Reputation," *Econometrica* 68(1), 85-117, January 2000 (with F. Gul).
- "Information and Timing in Repeated Partnership," *Econometrica*, November 1991 (with P. Milgrom and D. Pearce).
- "On the Theory of Infinitely Repeated Games with Discounting," *Econometrica* 56(2), 383-396, March 1988.

Yacine Aït-Sahalia is the Otto A. Hack 1903 Professor of Finance and Economics and the Director of the Bendheim Center for Finance at Princeton University. He was previously a professor at the

University of Chicago's Graduate School of Business. A past Sloan Research Fellow, he was named an outstanding faculty by *Business Week's 1997 Guide to the Best Business Schools*, and is the recipient of the 1997 Michael Brennan Award, the 1998 Cornerstone Research Award, the 2001 FAME Research Award and the 2003 Aigner Award. 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*. He received his Ph.D. in Economics from the Massachusetts Institute of Technology in 1993 and his undergraduate degree from France's École Polytechnique.

Course taught:

- ECO 575/FIN 575: The Econometrics of Continuous-time Finance

Graduate students advised:

- Julio Cacho-Diaz, "Optimal Portfolio Choice in the Presence of Jumps"
- Rodrigo Guimaraes, "Comparing the Information in Currency Options and the Domestic and Foreign Term Structures of Interest Rates"

Representative publications:

- "Volatility Estimators for Discretely Sampled Lévy Processes," *Annals of Statistics* 35, 355-392, 2007 (with J. Jacod),
- "Maximum Likelihood Estimation of Stochastic Volatility Models," *Journal of Financial Economics* 83, 413-452, 2007 (with R. Kimmel).
- "Saddlepoint Approximations for Continuous-time Markov Processes," *Journal of Econometrics* 134, 507-551, 2006 (with J. Yu).
- "A Tale of Two Time Scales: Determining Integrated Volatility with Noisy High-frequency Data," *Journal of the American Statistical Association*, 2005 (with L. Zhang and P. Mykland).
- "How Often to Sample a Continuous-time Process in the Presence of Market Microstructure Noise," *Review of Financial Studies*, 2005 (with P. Mykland and L. Zhang).

Alexandre d'Aspremont joined Princeton's ORF department in September 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 in 2004. He is a member of the Institute for Operations Research and the Management Sciences (INFORMS) and the Society for Industrial and Applied Mathematics (SIAM).

Courses taught:

- ORF 307: Linear Programming
- ORF 523: Nonlinear Programming

Undergraduate students advised:

- Tiffany Eng, "News or Noise: Text Classification of Financial News using Support Vector Machines"
- Andrew Lieu, "Interest Rate Model Calibration: An Analysis of Rank vs. Stability"
- Vidal Sadaka, "The Effect of Political Reforms on Interest Rates as Turkey Negotiates Accession to the European Union"

Representative publications:

- "Identifying Small Mean Reverting Portfolios," preprint on ArXiv:0708.3048v2.
- "Optimal Solutions for Sparse Principal Component Analysis," preprint on ArXiv:0707.0705v4 (with F. Bach and L. El Ghaoui).
- "Model Selection through Sparse Maximum Likelihood Estimation," preprint on ArXiv:0707.0704 (local pdf file, COVSEL source code), *Journal of Machine Learning Research* 9, March 2008, 485-516 (with O. Banerjee and L. El Ghaoui).
- "Static Arbitrage Bounds on Basket Option Prices," preprint on ArXiv:math.OA/0302243 (local pdf file, source code), *Mathematical Programming, Series A* 106(3), July 2006, 467-489 (with L. El Ghaoui).
- "Interest Rate Model Calibration using Semidefinite Programming," preprint on ArXiv:cs.CE/0302034 (local pdf file), *Applied Mathematical Finance* 10(3), September 2003, 183-213.

David Blair has been involved in the Bendheim Center since 2000. He previously held the post of Director of Corporate Relations for the Center. Prior to joining the Center he had been a Managing Director with Morgan Stanley and, prior thereto, a partner in the law firm of White & Case. His responsibilities with the Center include i) 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 and ii) developing and teaching special seminars and courses in applied finance. He received his undergraduate degree from Princeton and graduate degrees in law and business from Columbia University.

Courses taught:

- Freshman Seminar: Modern Financial Markets
- Seniors Finance 101--Intro to the "Real World"

Alan Blinder is the Gordon S. Rentschler Memorial Professor of Economics. He is also the Co-Director of the Center for Economic Policy Studies at Princeton University, which he founded in 1989. He is former Vice Chairman of the Board of Governors of the Federal Reserve System (1994-1996) and before that was a member of President Clinton's original Council of Economic Advisers (1993-1994). He also served briefly as Deputy Assistant Director of the Congressional Budget

Office in 1975. He is Vice Chairman of Promontory Interfinancial Network, former Governor of the American Stock Exchange, and has been elected to the American Philosophical Society and the American Academy of Arts and Sciences. He is the author or co-author 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 5 24: Domestic Macroeconomics: The Political Economy of Central Banking

Representative publications:

- "Central Bank Communication and Monetary Policy: A Survey of Theory and Evidence," *Journal of Economic Literature*, forthcoming (with M. Ehrmann, M. Fratzcher, J. de Haan, and D. Jansen).
- "Do Monetary Policy Committees Need Leaders? A Report on an Experiment," *American Economic Review Papers and Proceedings*, May 2008 (with J. Morgan).
- "Monetary Policy by Committee: Why and How?" *European Journal of Political Economy*, March 2007.
- "What Did You Learn from the International Financial Crises of the 1990s, Daddy?" , in Eastern Caribbean Central Bank's *Economic Theory and Development Options for the Caribbean: The Sir Arthur Lewis Memorial Lectures* (Randle: Kingston, Jamaica), 2007).
- "Monetary Policy Today: Sixteen Questions and about Twelve Answers," in S. Fernandez de Lis and F. Restoy (eds.), *Central Banks in the 21st Century*, Banco de Espana, pp. 31-72, 2006.

Markus Brunnermeier is the Edwards S. Sanford Professor at Princeton University. He is a 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 an academic consultant to the Federal Reserve Bank of New York. Professor Brunnermeier 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 stock market bubbles, financial and liquidity crisis, hedge funds as well as behavioral economics. He shows that bubbles persist since sophisticated traders prefer to ride a stock market bubble rather than to go against it. His work on financial crisis and risk management studies the interaction between funding and market liquidity and "predatory trading" and explains why liquidity dries up when it is needed most. His research in behavioral finance proposes a shift away from the rational expectations paradigm towards "optimal expectations." He is associate editor of the *Journal of Finance*, the *Review of Financial Studies* and is on the editorial board of the *Journal of Financial Intermediation*. He won various awards, including the Sloan Research Fellowship, the Smith-Breeden Prize for the best paper published in the *Journal of Finance* 2004, grants from the National Science Foundation and he was selected for the Review of Economic Studies Tour. He was on leave 2007-08.

Course taught:

- FIN 501: Asset Pricing I: Pricing Models and Derivatives

- ECO 525/FIN 525: Financial Economics I

Representative publications:

- "Deciphering the 2007-08 Liquidity and Credit Crunch," *Journal of Economic Perspectives*, forthcoming.
- "Market Liquidity and Funding Liquidity," *Review of Financial Studies*, forthcoming, (with L. Pedersen).
- "Money Illusion and Housing Frenzies," *Review of Financial Studies*, 21(1), 135-180.
- "Hedge Funds and the Technology Bubble," *Journal of Finance*, 59(5), 2007-2034, 2004 (with S. Nagel). Smith Breeden Prize for the best article published in the *Journal of Finance*, 2004 (First Prize).
- "Bubbles and Crashes," *Econometrica*, 71(1), 173-204, 2003 (with D. Abreu).

René Carmona, Paul M. Wythes '55 Professor of Engineering and Finance, is with the Department of Operations Research and Financial Engineering. As Director of Graduate Studies of the Bendheim Center, he is responsible for the Master in Finance program. He joined Princeton University in 1995. He was granted the "Agregation" of Mathematics (federal degree) in June 1969, and a "These d'Etat" in Probability from the University of Marseille in June 1977. He was elected Fellow of the Institute of Mathematical Statistics in 1984. He is a member of the Society for Industrial and Applied Mathematics, the Institute of Mathematical Statistics and the Bachelier Finance Society. His research interests center on stochastic analysis as applied to financial models and statistical analysis of financial data. He works on mathematical models for energy and emissions markets and computational methods for credit markets.

Courses taught:

- ORF 505/FIN 505: Modern Regression and Time Series
- ORF 531/FIN 531: Computational Finance in C++
- ORF 557, 558: Stochastic Analysis Seminar

Graduate students advised:

- Albina Danilova, "Indifference Pricing for Weather Derivatives"
- Valdo Durreleman, "From Implied to Spot Volatility"
- Mike Ludkovski, "Monte Carlo Pricing of Energy Tolling Agreements"

Recent publications:

- *Indifference Pricing* (editor), Princeton University Press, forthcoming, 2008.

- *Interest Rate Models: An Infinite Dimensional Stochastic Analysis Perspective*, Springer Verlag, 2006.
- *Statistical Analysis of Financial Data in S-Plus*, Springer Verlag, 2nd Printing, 2006.
- “Optimal Switching with Applications to Energy Tolling Agreements” (with M. Ludkowski).
- “Gas Storage and Supply Guarantees: An Optimal Switching Approach” (with M. Ludkowski).

Patrick Cheridito received his Ph.D. from ETH Zurich (Switzerland) in 2001 and visited universities in Vienna, Paris, Barcelona and Pisa in the academic year 2001-02, before visiting the BCF in 2002-03. Since September 2003, he has been an Assistant Professor in the Department of Operations Research and Financial Engineering. His research interests center on the theory of stochastic processes and their applications to finance. In the last year he has been working on the following research projects: Together with Damir Filipović (University of Munich) and Robert Kimmel (Bendheim Center), he worked on affine models for interest rates; with Mete Soner (Koc University in Istanbul) and Nizar Touzi (Crest in Paris), he studied the problem of hedging contingent claims under gamma constraints; and with Freddy Delbaen and Michael Kupper (both ETH Zurich), he studied dynamic risk measures.

Courses taught:

- ORF 435: Financial Risk Management
- ORF 535: Financial Risk Management
- ORF 527: Stochastic Calculus and Finance
- ORF 558: Stochastic Analysis Seminar

Undergraduate students advised:

- Richard Apple, “How Deep is the Hole? A Stochastic Analysis of the Pension Benefit Guaranty Corporation”
- Ceyda Dagdelen, “Risk Measures and Capital Requirements”
- Elizabeth Larkins, “The Wealth of Nations: An Analysis of the Correlation between United States Economic Indicators and the Probability of Default of Emerging Market Countries”
- Andrea Leewong, “The Stock Market Overreaction Mystery: Human Judgment Bias in Financial Decision-making”
- Joseph McConnell, “Optimal High School Sizes in Relation to School Demographics”
- Joseph Solomond, “Measuring Risk in Sectors of the S&P 500: Calculating VaR and Expected Shortfall Assuming Heavy Tailed Distributions”

Graduate student advised:

- Andrew Moroz, "Determining the Minimum Super-replication Cost of a Contingent Claim under Delta and Gamma Constraints in Discrete Time"

Recent publications:

- "Composition of Time-consistent Dynamic Monetary Risk Measures in Discrete Time," preprint (with M. Kupper).
- "Monetary Risk Measures on Maximal Subspaces of Orlicz Classes," preprint (with T. Li).
- "Time-consistency of Indifference Prices and Monetary Utility Functions," preprint (with M. Kupper).
- "Second Order Backward Stochastic Differential Equations and Fully Non-linear Parabolic PDEs," forthcoming in *Communications on Pure and Applied Mathematics* (with M. Soner, N. Touzi and N. Victoir).
- "Market Price of Risk Specifications for Affine Models: Theory and Evidence," forthcoming in *Journal of Financial Economics* (with D. Filipović and R. Kimmel).

Gregory Chow is Professor of Economics and Class of 1913 Professor of Political Economy, Emeritus, at Princeton University. He was Manager of Economic Research at the I.B.M. Thomas J. Watson Research Center from 1962-1970, and Director of the Econometric Research Program at Princeton University from 1970-1997. The Program was renamed the Gregory C. Chow Econometric Research Program in 2001. Professor 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*. Professor 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.

Course taught:

- ECP 379: The Chinese Economy
- ORF 571: Analysis of Environmental Problems

Representative publications:

- *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*, 17-35, May 2003 (with C. Lawler).
- *Dynamic Economics: Optimization by the Lagrange Method*. Oxford: Oxford University Press, 1997.
- *China’s Economics Education and Economic Reform*. Singapore: World Scientific Publishing Co. 2007 (in Chinese).

Erhan Çinlar first came to Princeton University as a Visiting Professor of Statistics in 1979-80. He is currently the Norman J. Sollenberger Professor of Engineering in the Department of Operations Research and Financial Engineering. He is a Fellow of the Institute of Mathematical Statistics, a Fellow of INFORMS, an elected member of the International Statistical Institute and is the recipient of the Science Prize of TUBITAK. He has served as editor or associate editor of over 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.

Courses taught:

- ORF 309: Probability and Stochastic Systems
- ORF 526: Stochastic Modeling
- ORF 551/APC 521: Probability Theory
- ORF 554: Markov Processes
- ORF 557: Stochastic Analysis Seminar

Representative publications:

- “Lyapunov Exponents of Poisson Shot-noise Velocity Fields,” *Stochastic Processes and their Applications*, 94, 29-49, 2001 (with M. Caglar).
 - “Spectral Expansion of the Occupation Measure for Birth and Death on a Flow,” *Stochastic Processes and their Applications*, 74, 203-215, 1998 (with J. Kao).
 - “Dispersion of Particle Systems in Brownian Flows,” *Advances in Applied Probability*, 28, 53-74, 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, 993-997, 2003.
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Wendell Collins is Director of Corporate Relations for the Bendheim Center for Finance. Before joining the Bendheim Center in 2007, she worked in Princeton's Development office and the Office of the Dean for Research. Before joining Princeton, Collins spent 11 years at Merrill Lynch in marketing, training and business development, as well as served 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 Bendheim 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, and iii) facilitating the recruiting activities of Corporate Affiliates by coordinating on-campus recruiting presentations and organization of events at the Bendheim Center. She received her undergraduate degree from the University of North Carolina, Chapel Hill.

Savas Dayanik joined Princeton's ORF Department in September 2002. His research interests include applied probability, stochastic processes and modeling, optimal stopping, optimal stochastic control with applications to finance, investment decision analysis and operations management. He completed his Ph.D. degree in Operations Research with concentration in Applied Probability at Columbia University in 2002. He received the first prize in the INFORMS 2002 George E. Nicholson Student Paper Competition and in the INFORMS 2005 Junior Faculty Interest Group Paper Competition. He was also selected as the recipient of the IMS 2006 Inaugural Richard L. Tweedie New Researcher Award. He is a member of Institute for Operations Research and the Management Sciences (INFORMS) and Institute of Mathematical Statistics (IMS).

Courses taught:

- ORF 245: Fundamentals of Engineering Statistics
- ORF 417: Dynamic Programming
- ORF 526: Stochastic Modeling
- ORF 542: Controlled Markov Processes

Undergraduate students advised:

- Shern Frederick, "Ideal Damping Factor for Simulating Portfolio Returns: A Market-representative Approach"
- Neset Pirkul, "Insights into the Nature of Successful Acquisitions: An Empirical Approach"
- Todd Levy, "Buying and Selling Movies: An Analysis of the Hollywood Stock Exchange"
- Nishani Siriwardane, "Investment under Uncertainty: Optimal Strategies of CO2 Emitting Firms under the Kyoto Global Emissions Trading Market"

- Kevin Foster, "Your Team is Going Broke! Now Switch to Variable Ticket Pricing. An Analysis of NBA Game Attendance to be used with Revenue Management Techniques"
- Nada Siddiqui, "Re-engineering Portfolio Theory: Optimizing the Diversification of Moet Hennessy-Louis Vuitton (LVMH)"
- Devaushi Singham, "The Option to Abandon as Applied to the Sequential Investment Problem"
- Carl Zhang, "Speculation, Liquidity, and Information: The Puzzle of Chinese B-shares"

Graduate students advised:

- Masahiko Egami
- Semih S. Sezer
- Kazutoshi Yamazaki
- Christian Goulding

Representative publications:

- "Filling the Gap between American and Russian Options: Adjustable Regret," *Stochastics*, 79:1-2, 61-83, 2007 (with M. Ludkovski).
- "Compound Poisson Disorder Problem," *Mathematics of Operations Research*, 31:4, 649-672, 2006 (with S. Sezer).
- "Adaptive Poisson Disorder Problem," *Annals of Applied Probability*, 16:3, 1190-1261, 2006 (with E. Bayraktar and I. Karatzas).
- "Poisson Disorder Problem with Exponential Penalty for Delay," *Mathematics of Operations Research*, 31:2, 217-233, 2006 (with E. Bayraktar).
- "On the Optimal Stopping Problem for One-dimensional Diffusions," *Stochastic Processes and their Applications*, 107(2), 173-212, 2003 (with I. Karatzas).

Jianqing Fan is the Frederick L. Moore '18 Professor of Finance, who joined Department of Operations Research and Financial Engineering in the fall of 2003. As a specialist in statistics and financial econometrics, Professor Fan received the 2000 Presidents' Award from the Committee of Presidents of Statistical Societies, recognizing the most outstanding statistician under age 40, and the 2007 Morningside Gold Medal of Applied Mathematics, given triennially to an outstanding applied mathematical scientist of Chinese decent under age 45. He is the President of the Institute of Mathematical Statistics, an international professional and scholarly society of 4500 members. He is an elected Fellow of the Institute of Mathematical Statistics, the American Statistical Association, and The American Association for Advancement of Science. He has been ranked six times as one of the top 10 highly cited researchers in mathematical sciences, according to

Thomson Incites. He has coauthored two books. He delivered a 45-minute talk at The 2006 Madrid International Congress for Mathematicians, a high honor in mathematical sciences. He serves as the co-editor of *Econometrics Journal* and an Associate Editor of the *Journal of the American Statistical Association*. He has served as the co-editor (in-chief) of *The Annals of Statistics* (2004-2006), an editor of *Journal of Multivariate Analysis* (1998-2000) and *Probability Theory and Related Fields* (2003-2005). He earned his Ph.D. degree at the University of California at Berkeley. His research interests are financial econometrics, asset pricing, risk management, nonlinear time series, high-dimensional data analyses, nonparametric modeling and computational biology.

Courses taught:

- ORF 504/FIN 504: Financial Econometrics

Undergraduates advised:

- Michael Casewell: "Covariate Selection for Intensity-based Credit Risk Models"
- Yin Nan: "Studies of Implied Volatility, Integrated Volatility and Low-frequency Volatility"

Graduate students advised:

- Clifford Lam
- Yue Niu
- Forrest Zhang
- Yang Feng
- Ke Yu

Postdoctoral Fellows supervised:

- Sebastien DeDaveiga
- Oingfeng Liu
- Yichao Wu

Representative recent publications:

- "Multi-scale Jump and Volatility Analysis for High-frequency Financial Data," *Journal of American Statistical Association*, 102, 1349-1362, 2007 (with Y. Wang).
- "Aggregation of Nonparametric Estimators for Volatility Matrix," *Journal Financial Econometrics*, 5, 321-357, 2007 (with Y. Fan and J. Lv).
- "A Selective Overview of Nonparametric Methods in Financial Econometrics" (with discussion), *Statistical Science*, 20, 317-357, 2005.
- "Re-examination of Stanton's Diffusion Estimations with Applications to Financial Model Validation," *Journal of American Statistical Association*, 98, 118-134, 2003 (with C. Zhang).

- *Nonlinear Time Series: Nonparametric and Parametric Methods*, 570pp, Springer-Verlag, New York. *Figures and Computer Programs*, 2003 (with Q. Yao).
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Harrison Hong is the John Scully '66 Professor of Economics and Finance at Princeton University, where he teaches courses in finance in the undergraduate, master 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 at Berkeley in 1992 and his Ph.D. in economics from 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; destabilizing arbitrage, socially responsible investing, and commodities pricing. His work has received numerous awards and grants including two Fama-DFA *Journal of Financial Economics* paper prizes, paper prizes from the European and Western Finance Associations and the Social Investment Forum, and a National Science Foundation grant. He is on the editorial boards of the *Journal of Finance* and the *Journal of Financial Intermediation*.

Courses taught:

- ECO 462/FIN 515: Portfolio Theory and Asset Management
- ECO 525: Financial Economics I

Undergraduate students advised:

- Sean Mahon, "Credit Default Swaps as an Alternative Measure for Default Risk in Value and Growth Stocks"
- Flora Wu, "Picky but Sticky" A Study of Socially Responsible Investors Analysis of Hydrogen Pumping on Stirred Tank Reactor Polymer Electrolyte Membrane Fuel Cell for Hydrogen Purification"

Representative publications:

- "Asset Float and Speculative Bubbles," *Journal of Finance*, June 2006 (with J. Scheinkman and W. Xiong).
 - "Simple Forecasts and Paradigm Shifts," *Journal of Finance* 62, 1207-1242, 2007 (with J. Stein and J. Yu).
 - "Disagreement and the Stock Market," *Journal of Economic Perspectives* 21 109-128, 2007 (with J. Stein).
 - "Do Industries Lead Stock Markets?," *Journal of Financial Economics*, February 2007 (with W. Torous and R. Valkanov).
 - "Advisors and Asset Prices: A Model of the Origins of Bubbles," *Journal of Financial Economics*, forthcoming (with J. Scheinkman and W. Xiong).
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Harold James, who holds a joint appointment as Professor of International Affairs in the Woodrow Wilson School and Professor in the History Department, studies economic and

financial history and modern German history. He was educated at Cambridge University (Ph.D. in 1982) and was a Fellow of Peterhouse for eight years before coming to Princeton University 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 Chairman of the Editorial Board of *World Politics*.

Course Taught:

- WWS 460: History of Financial Crises

Graduate Students advised:

- Conor Healy, "Politics in a Tight Fix" (Politics of Exchange Rate Regimes)
- Klaus Veigel, "Politics of Stabilization in Argentina"

Representative publications:

- *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 MA: Harvard University Press (also available in Chinese, German, Greek, Japanese, Korean, and Spanish translations), 2001.
- *Europe Reborn: A History 1914-2000*, London: Longman/Pearson Education, 2003.
- *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 MA: Harvard University Press, (also available in German: Munich, Verlag C.H. Beck), 2006.

Daniel Kahneman is a Senior Scholar at the Woodrow Wilson School of Public and International Affairs. He is also Professor of Psychology, Emeritus; and Public Affairs at the Woodrow Wilson School, the Eugene Higgins Professor of Psychology Emeritus at Princeton University, and a fellow of the Center for Rationality at the Hebrew University in Jerusalem. Dr. Kahneman has held the position of professor of psychology at the Hebrew University in Jerusalem (1970-1978), the University of British Columbia (1978-1986), and the University of California, Berkeley (1986-1994). Dr. Kahneman is a member of the National Academy of Science, the Philosophical Society, 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 Distinguished Scientific Contribution Award of the American Psychological Association (1982) and the Grawemeyer Prize (2002), both jointly with Amos Tversky, the Warren Medal of the Society of Experimental Psychologists (1995), the Hilgard Award for Career Contributions to General Psychology (1995), the Nobel Prize in Economic Sciences (2002), and the Lifetime Contribution Award of the American Psychological Association (2007). Dr. Kahneman holds honorary degrees from numerous Universities.

Courses taught:

- PSY 101: Introduction to Psychology
- PSY 528/WWS 519: Negotiation, Persuasion, and Social Influence: Theory and Practice
- WWS 312/PSY 321: The Psychology of Decision Making and Judgment
- WWS 502: Psychology for Policy Analysis and Implementation
- WWS 515/PSY 529: Conceptions of the Human Agent: Implications for Policy

Representative publications:

- "Frames and Brains: Elicitation and Control of Response Tendencies," *Trends in Cognitive Sciences*, 11, 45-46, 2007(with S. Frederick).
- "Why Hawks Win," *Foreign Policy*, 158, 34-38, 2007(with J. Renshon).
- "Developments in the Measurement of Subjective Well-being," *Journal of Economic Perspectives*, 20, 3-24, 2006 (with A. Krueger).
- "Anomalies: Utility Maximization and Experienced Utility," *Journal of Economic Perspectives*, 20, 221-234, 2006 (with R. Thaler).
- *Choices, Values and Frames*, New York: Cambridge University Press and the Russell Sage Foundation, summer 2000 (with A. Tversky).

Paul Krugman is the author or editor of dozens of books and several hundred articles, primarily about international trade and international finance. He is also nationally 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. 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 524: Advanced Macroeconomics: Domestic Policy Issues

Representative publications:

- *Currency Crises* (ed.), University of Chicago Press, 2000.
 - *Principles of Economics*, 2004 (with R. Wells).
 - *Microeconomics*, 2005 (with R. Wells).
 - *The Conscience of a Liberal*, 2007.
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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 page writer for *The Wall Street Journal*. He also serves on the boards of several financial and non-financial corporations. He has been awarded the Honorary Doctor of Humane Letters Degree from the University of Hartford (June 1971), Phi Beta Kappa, and the Harvard Business School Alumni Achievement Award for 1984. He received his Ph.D. from Princeton University.

Course taught:

- ECO 362: Financial Investments

Undergraduate students advised:

- Teong Jun, "Dynamic Indexing"
- Adam Mikah Malin, "A Rational Theory of Options Backdating"

Graduate students advised:

- Michael Massey, "Analyses of the Efficiency of the Hong Kong Equity Markets"

Representative publications:

- *From Wall Street to the Great Wall*, W.W. Norton & Co., New York, December 2007 (with P. Taylor, J. Mei, and R. Yang).
- *A Random Walk Down Wall Street*, W. W. Norton & Co., New York, 9th edition paperback, January 2007.
- "Investigating the Behavior of Idiosyncratic Volatility," *The Journal of Business*, 76(4), October 2003 (with Y. Xu).
- "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]
- "Hedge Funds: Risk and Return," *Financial Analysts Journal*, November/December 2005 (with A. Saha).

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

Representative publications:

- "Central Bank Transparency and the Signal Value of Prices," *Brookings Papers on Economic Activity* 2, 1-66, 2005 (with H. Shin).

- “Inertia of Forward Looking Expectations,” *American Economic Review Papers and Proceedings* 96, 152-157, 2006 (with H. Shin).
- “Beauty Contests and Bubbles,” *Review of Financial Studies* 19, 2006 (with F. Allen and 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,” *Journal of Monetary Economics* 54, 2007 (with B. Guimaeres).

Ulrich Müller is Assistant 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 models with time varying parameters, and the development of econometric tools that are robust to correlations of largely unknown form. He was selected as an Alfred P. Sloan Research Fellow for the years 2008-2011.

Courses taught:

- ECO 202: Statistics and Data Analysis for Economics
- ECO 517: Econometric Theory I
- ECO 513: Advanced Econometrics: Time Series Models

Undergraduate students advised:

- Jeylan Erman
- Maggie Li
- Micheal Snyder
- David Lambourn

Graduate students advised:

- Philippe Petalas

Representative publications:

- “Testing Models of Low-frequency Variability,” forthcoming in *Econometrica* (with M. Watson).
- “The Impossibility of Consistent Discrimination between $I(0)$ and $I(1)$ Processes,” forthcoming in *Econometric Theory*.
- “A Theory of Robust Long-run Variance Estimation,” *Journal of Econometrics*, 2007.

- “Efficient Tests for General Persistent Time Variation in Regression Coefficients,” *Review of Economic Studies*, 2006 (with G. Elliott).
- “Tests for Unit Roots and the Initial Condition,” *Econometrica*, 2003 (with G. Elliott).

John Mulvey is Professor of Operations Research and Financial Engineering. His research interests center on designing integrated financial planning systems for institutions, primarily pension plans and 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 Towers Perrin-Tillinghast investment system in 1999. He received his Ph.D. in Management from the University of California, Los Angeles.

Courses taught:

- ORF 311: Optimization under Uncertainty
- ORF 534: Financial Engineering

Undergraduate students advised:

- Chao Lu, “Improving Incentive Fees for Investment Managers”
- Mengxi Ouyang, “Risk Management in Micro-finance”
- Richard Birge, “Analyzing Credit Risks via Financial Engineering Models: Improving the Process”
- Schuster Brett Tanger, “Replicating Private Equity Returns with Liquid Securities”
- Yao Wang, “Applying PCA to Industry Level Data for Equities”

Graduate students advised:

- Mehmet Bilgili, “Regime Switching: Optimizing a Multi-strategy Hedge Fund via Dynamic Overlays”
- Hayan Kaya, “Applying Statistical Learning Theory: Agricultural Commodities and Weather Risks”
- Woo Chang Kim, “Dynamic Investment Strategies for Hedge Funds and Pension Plans: Discovering Patterns”
- Sally Lee-Ling, “A Synthetic Procedure for Generating Private Equity Returns”
- Astrid Prajogo, “Searching for Patterns in Equity Performance via Industry Cycles”
- Yi Ma, “Developing Portfolios of Mean Reverting Series, with an Emphasis on Agricultural Commodities”

Representative publications:

- “Constantly Rebalanced Portfolio: Is Mean-reverting Necessary?” in the *Encyclopedia of Quantitative Finance*, edited by R. Cont, John Wiley and Sons, Ltd., 2008.

- “Improving Equity Diversification via Industry-wise Market Segmentation,” *Journal of Financial Transformation*, 2008.
- “Active Equity Managers in the U.S.: Do the ‘Best’ Follow Momentum Strategies?” *The Journal of Portfolio Management*, 2008.
- “Improving Performance for Long-term Investors: Wide Diversification, Leverage, and Overlay Strategies,” *Quantitative Finance*, April 2007.
- “Improving Investment Performance for Pension Plans,” *Journal of Asset Management*, May 2006.
- “Improving Performance for Long-term Investors: Wide Diversification, Leverage, and Overlay Strategies,” *Quantitative Finance*, April 2007.

Birgit Rudloff is Assistant Professor in Operations Research and Financial Engineering. Her research interests include 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 IIMPA in Rio de Janeiro and the technical university in Vienna before coming to Princeton in September 2006.

Courses taught:

- ORF 435: Financial Risk Management
- ORF 515/ FIN 503: Asset Pricing II: Stochastic Calculus and Advanced Derivatives
- ORF 569: Special Topics in Statistics and Operations Research: Risk Measure Theory

Representative publications:

- “Convex Hedging in Incomplete Markets,” to appear in *Applied Mathematical Finance*, 14(5), 2007.
- “Coherent Hedging in Incomplete Markets,” forthcoming in *Quantitative Finance*.
- “A Generalized Neyman-Pearson Lemma for Hedge Problems in Incomplete Markets,” Proceedings of the Workshop “Stochastische Analysis,” ISSN 1612-5665, 2005.

José 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. Professor Scheinkman is a Research Associate of the National Bureau of Economic Research, a Fellow of the American Academy of Arts and Sciences and of the Econometric Society, and a “docteur honoris-causa” from the University of Paris-Dauphine. He was named a Fellow of the John Simon Guggenheim Memorial Foundation in 2007. From 1973 to 1998, Professor Scheinkman taught at the University

of Chicago, where he was from 1995 to 1998 the Chairman of the Economics Department, and since 1997 the Alvin H. Baum Distinguished Service Professor of Economics. From June 1987 to December 1988, 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, Professor Scheinkman held a Blaise Pascal Research Chair (France). His current research interests are long-run risk, the study of asset-price bubbles and developing tools for empirical studies of asset markets.

Courses taught:

- ECO 371/LAS 346: Topics in Country and Regional Economics: Latin American Economies
- ECO 502: Microeconomic Theory II
- ECO 525/FIN 595: Financial Economics I
- ECO 526: Finance Economics II

Representative publications:

- "Advisors and Asset Prices: A Model of the Origins of Bubbles," *Journal of Financial Economics*, forthcoming (with H. Hong and W. Xiong).
- "Optimal Exercise of American Claims when Markets are Not Complete," *Finance and Stochastics* 11, 2007, 357-372 (with L. Rogers).
- "Executive Compensation and Short-termist Behavior in Speculative Markets," *The Review of Economic Studies* 73, 577-610, 2006 (with P. Bolton and W. Xiong).
- "Equilibria in Systems of Social Interactions," *Journal of Economic Theory*, 130, 44-77, 2006 (with U. Horst).
- "Asset Float and Speculative Bubbles," *Journal of Finance*, 1073-1117, June 2006 (with H. Hong and W. Xiong).

Hyun Song Shin joined Princeton in 2006 as Professor of Economics. Before coming to Princeton, he was 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 of the British Academy. He received his Ph.D. from Oxford University in 1988.

Courses taught:

- ECO 363: Corporate Finance and Financial Institutions
- ECO 526: Financial Economics II

Graduate students advised:

- Anastasia-Aggeliki Andrikogiannopoulou
- Ing-Haw Cheng
- Manoj Govil
- Justinas Pelenis

Undergraduate students advised:

- Jeffrey Bernstein, "Bargain Shopping?: An Empirical Analysis of Retail Industry LBOs' Effect on Local Product Market Competition"
- Amara Suebsaeng, "Returns on Socially Responsible Investment Mutual Funds"
- Elaine Wong, "Impact of Market Prices on Valuation: Case Study of the European 3G License Allocation"
- Drew Woodbury, "Rise and Fall of Amaranth Advisors: Lessons for Risk Management"

Representative publications:

- "Marking to Market: Panacea or Pandora's Box?" *Journal of Accounting Research*, 46, 435 – 460, 2008 (with G. Plantin and H. Sapra)
- "Beauty Contests and Iterated Expectations in Asset Markets," *Review of Financial Studies*, 19, 2006, 719-752 (with F. Allen and S. Morris).
- "Disclosure Risk and Price Drift," *Journal of Accounting Research*, 44, 351-379, 2006.
- "Disclosures and Asset Return," *Econometrica*, 71, 105-133, 2003.
- "Social Value of Public Information," *American Economic Review*, 52, 1521-1534, 2002, (with S. Morris).

Christopher Sims has been Professor of Economics at Princeton University 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 also served as president and as a co-editor of *Econometrica*. He has intermittently served as 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.

Representative publications:

- "Were there Regime Switches in US Monetary Policy?" *American Economic Review*, 96(1), 54-81, 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, 1-60, 2002.
- “The Precarious Fiscal Foundations of EMU,” *De Economist*, 147(4), 415-436, 1999.
- “Error Bands for Impulse Responses,” *Econometrica*, 67(5), 1113-1156, 1999 (with T. Zha).

Ronnie Sircar received his doctorate in 1997 from Stanford University. He taught for three years at the University of Michigan in the Department of Mathematics before coming to Princeton’s ORF Department, where he is an Associate Professor. He has been the recipient of National Science Foundation Research Grants during the period 1998-present. He was a recipient of the E-Council Excellence in Teaching Award for his teaching spring term 2006, and the Howard B. Wentz Jr. Junior Faculty Award in 2003. His research interests center on stochastic models in finance, particularly for market volatility and credit risk; optimal control and hedging problems in incomplete markets; and valuation of employee stock options.

Courses taught:

- ORF 335/ECO 364: Introduction to Financial Engineering
- ORF 538: Analytical & Computational Methods for Financial Engineering
- ORF 575: Financial Engineering Seminar: Credit Risk

Current Graduate students:

- Siu-Tang Leung

Representative publications:

- “Accounting for Risk Aversion, Vesting, Job Termination Risk and Multiple Exercises in Valuation of Employee Stock Options,” *Mathematical Finance*, 2008, forthcoming (with T. Leung).
- “Exponential Hedging with Optimal Stopping and Application to ESO Valuation,” preprint, 2008 (with T. Leung).
- “A General Framework for Evaluating Executive Stock Options,” *Journal of Economic Dynamics and Control*, 31(7), 2007 (with W. Xiong).
- “Optimal Static-dynamic Hedges for Exotic Options under Convex Risk Measures,” preprint, 2008 (with A. Ilhan and M. Jonsson).
- “Optimal Investment with Derivative Securities,” *Finance & Stochastics*, 9(4), 2005 (with A. Ilhan and M. Jonsson).

Kenneth Steiglitz, 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 IEEE (1981), a Fellow of the ACM (1997), and has received the Technical Achievement Award of the Signal Processing Society (1981), the Signal Processing Society Award (1986), the IEEE

Centennial Medal in 1984, the School of Engineering Distinguished Teacher Award in 1997, and the IEEE Third Millennium Medal in 2000. His current research interests are in agent-based modeling of markets, auctions, and computing using soliton collisions.

Courses taught:

- COS 444: Electronic Auctions
- COS 323: Computing for the Physical & Social Science
- COS 576: Nonstandard Computation
- FRS 119: Beyond Silicon: The Future(s) of Computers

Undergraduate students advised:

- Avigail Kifer, "Syndication or Collusion? Cooperation in Auctions with Financially Constrained Buyers"
- Christopher K. Chan, "A Java Library Implementation of the Gold-food Economic Model in Repast and MASON" (Part I); "An Agent-Based Model of a Minimal Economy" (Part II)

Representative publications:

- *Snipers, Shills, and Sharks: EBay and Human Behavior*, Princeton University Press, 2007.
- "Quantum Theory of Manakov Solitons," *Phys. Rev. A* 71, 053805, 1-10, May 11, 2005 (with D. Rand and P. Prucnal).
- "The Spite Motive and Equilibrium Behavior in Auctions," *Contributions to Economic Analysis & Policy*, 2(1), Article 5, 2003 (with J. Morgan and G. Reis).
- "Effects of Price Signal Choices on Market Stability," *Journal of Economic Behavior and Organization*, 52(2), 235-251, October 2003 (with H. Mizuta and E. Lirov).
- "Computing with Solitons," *Encyclopedia of Complexity and Systems Science*, Springer, Heidelberg (invited) in press (with D. Rand).

Lars E. O. Svensson is on leave from Princeton University and is Deputy Governor of Sveriges Riksbank, the central bank of Sweden. He joined the Economics Department in the fall of 2001. He had been Professor of International Economics at the Institute for International Economic Studies, Stockholm University, since 1984. He has published extensively in scholarly journals on monetary economics and monetary policy, exchange rate theory and policy, and general international macroeconomics. He has lectured and visited at universities, central banks and international organizations in many countries. He is a member of the Royal Swedish Academy of Sciences, a member of Academia Europae, a foreign member of the Finnish Academy of Science and Letters, a foreign honorary member of the American Academy of Arts and Sciences, a Fellow of the Econometric Society, a research associate of the National Bureau of Economic Research, a research fellow of the Centre for Economic Policy Research, London, and a Fellow of the European Economic Association. He was a member of the Prize Committee for the Alfred Nobel

Memorial Prize in Economic Sciences through 2002 and its chair during 1999-2001. He has been active as adviser to Sveriges Riksbank (Bank of Sweden) and has regularly consulted for international, U.S., and Swedish agencies and organizations. In 2000-2001, he undertook a review of monetary policy in New Zealand, commissioned by the New Zealand government. In 2002, he chaired a committee evaluating monetary policy in Norway. Before his appointment as deputy governor, he was a member of the Academic Advisory Board and the Monetary Policy Advisory Panel of the Federal Reserve Bank of New York. He received his Ph.D. in Economics from Stockholm University.

Courses taught:

- ECO 200: Advanced Principles of Economics: Concepts and Applications
- ECO 504: Macroeconomic Theory II
- ECO 522: Advanced Macroeconomic Theory
- ECO 554: International Monetary Theory and Policy II

Representative publications:

- "Credible Commitment to Optimal Escape from a Liquidity Trap: The Role of the Balance Sheet of an Independent Central Bank," *American Economic Review*, 97, 474-490, 2007 (with O. Jeanne).
- "Time Consistency of Fiscal and Monetary Policy: A Solution," *Econometrica* 74, 193-212, 2006 (with M. Persson and T. Persson).
- "Implementing Optimal Policy through Inflation-forecast Targeting," in Ben S. Bernanke and Michael Woodford (eds.), *The Inflation-Targeting Debate*, University of Chicago Press, 19-83, 2005 (with M. Woodford).
- "Indicator Variables for Optimal Policy," *Journal of Monetary Economics*, 50, 691-720, 2003 (with M. Woodford).
- "What Is Wrong with Taylor Rules? Using Judgment in Monetary Policy through Targeting Rules," *Journal of Economic Literature*, 41, 426-477, 2003.

Robert Vanderbei has been a Professor in Operations Research and Financial Engineering since 1999. He is currently the Chair of that Department. 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 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 307: Optimization
- ORF 522: Linear Optimization

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, 695-701, 2003 (with W. Traub).
- “Circularly Symmetric Apodization via Starshaped Masks,” *Astrophysical Journal*, 590, 593-603, 2003 (with D. Spergel and N. Kasdin).
- “Frontiers of Stochastically Nondominated Portfolio,” *Econometrica*, 71(4), 2003 (with A. Ruszczyński).
- *Linear Programming: Foundations and Extensions*, Kluwer Academic Publishers, 2nd edition, 2001.

Erik VanMarcke is Professor of Civil and Environmental Engineering. He was on the faculty of the Massachusetts Institute of Technology until 1985, since receiving his doctorate there in 1970. At MIT, he was the Gilbert W. Winslow Career Development Professor and served as Director of the Civil Engineering Systems Methodology Group. He held visiting appointments at Harvard University, the Technical University of Delft (The Netherlands), and the University of Leuven (Belgium), his undergraduate alma mater, and was the Shimizu Corporation Visiting Professor at Stanford University. His principal expertise is in risk assessment and applied systems science. He authored *Random Fields: Analysis and Synthesis*, published by the MIT Press, recently reprinted in the MIT Classics Series, and extended this work to modeling space-time processes and complex systems. 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 360 & 548: Risk Assessment and Management
- CEE 558: Random Fields and Random Media

Undergraduate students advised:

- Andrew Brett, “The Impact of Hurricane Mitigation on the Costs of Extreme Events”
- Lisa Kamran Bilir, “Comparing Costs under Uncertainty as a Guide for Public Policy: An Application of Markov Chains to Region-based Water Management in California”
- Geoffrey Adamson, “Catastrophic Risk of Florida Landfalling Hurricanes: The Effect of El Nino on Financial Engineering Applications”

Graduate student advised:

- Mark Dobossy, "Reliability Analysis of Self-centering Steel Frames Subjected to Strong Earthquake Ground Motions"
- Nan Ding, "Enterprise Risk Management: Applications in Software Development and Data Security"

Representative publications:

- "Hedging and Fox Strategies for Reducing Risks in Infrastructure Systems," *Natural Hazards Review*, 7(3), 2006 (with C. Taylor).
- Quantum-physics-based Probability Models with Applications to Reliability Analysis," Chapter 16 in *Engineering Design Reliability Handbook*, Eds. Nikolaidis, Ghiocel and Singhal, CRC Press, 2005.
- *Infrastructure Risk Management Processes: Natural, Accidental, and Deliberate Hazards*, Monograph No. 25, Council on Disaster Risk Management and Technical Council on Lifeline Earthquake Engineering, Published by ASCE, 2005 (ed., with C. Taylor).
- *Acceptable Risk Processes: Lifelines and Natural Hazards*, Monograph No. 21, Council on Disaster Reduction and Technical Council on Lifeline Earthquake Engineering, Published by the American Society of Civil Engineers, (ed. with C. Taylor).
- *Random Fields: Analysis and Synthesis*, The MIT Press, Cambridge, MA and London, England, ISBN 0-262-22026-1, 1983; reprinted in MIT Press Classics Series, 2004.

Mark Watson is Professor of Economics and Public Affairs in the Economics Department 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 has been awarded National Science Foundation research grants from 1982-2008, has 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 513: Advanced Econometrics: Time Series Models
- ECO 518: Econometric Theory II
- WWS 507c: Quantitative Analysis

Undergraduate students advised:

- Ryan Kim

- Yunmi Kong
- Ryan McCullough

Representative publications:

- “Why Has Inflation Become Harder to Forecast,” *Journal of Money, Credit and Banking*, Vol. 39, No. 1, 2007 (with J. Stock).
- “Heteroskedasticity-robust Standard Errors for Fixed Effect Panel Data Regression,” *Econometrica*, January 2008, Vol. 76, No. 1, pp. 155-174 (with J. Stock).
- “Testing Models of Low-frequency Variability,” *Econometrica*, forthcoming (with U. Müller).

Wei Xiong is Professor of Economics in the Department of Economics. His research interests center on speculative bubbles, financial market crisis, and behavioral finance. His recent papers provide a framework to analyze speculative behavior of investors and its implications for stock price dynamics and managerial incentives. His earlier papers analyze the contagion and market liquidity during crisis periods. He is currently working on asset pricing with heterogeneous beliefs, realization utility preferences and agency frictions in financial markets. He received his Ph.D. from Duke University in 2001. He is a fellow of the National Bureau of Economic Research and an associate editor of *Management Science* and *Review of Finance*.

Courses taught:

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

Undergraduate students advised:

- Ishna Berry, "An Evaluation of Moral Hazard and Regulatory Response During the S&L Crisis"
- William Wachter, "The Cross-market Impacts of Chinese Share Reform"
- Matthew Popper, "Hedging Debt with Equity during Liquidity Crises: Is the Merton Model Still Effective?"
- Andrew Husby, "Determinants of Monthly Cross-border U.S. Equity Flows: Expected Returns and Past Return Shocks"

Representative publications:

- “What Drives the Disposition Effect? An Analysis of a Long-standing Preference-based Explanation,” *Journal of Finance*, forthcoming (with N. Barberis).

- “Advisors and Asset Prices: A Model of the Origins of Bubbles,” *Journal of Financial Economics*, forthcoming (with H. Hong and J. Scheinkman).
- “Executive Compensation and Short-termist Behavior in Speculative Markets,” *Review of Economic Studies*, 2006 (with P. Bolton and J. Scheinkman).
- “Asset Float and Speculative Bubbles,” *Journal of Finance*, 2006 (with H. Hong and J. Scheinkman).
- “Investor Attention, Overconfidence and Category Learning,” *Journal of Financial Economics*, 2006 (with L. Peng).

Visiting Faculty

During the academic year 2007-08, the BCF welcomed the following visiting faculty:

Dariush Ashrafi is a retired executive who was a partner of Ernst and Young in their New York Office, serving many of their international clients, until 1990. During the next 10 years he was the Chief Financial Officer and a member of the Board of Directors of two companies which were taken public during his tenure. Both companies were listed on the NYSE after their IPO. His final position before retiring was the President and Chief Operating Officer of Schein Pharmaceutical Inc., one of the largest generic pharmaceutical companies in the United States. He is an inactive CPA licensed in New York and has both engineering and business degrees from MIT. He visited the BCF as a lecturer during the fall term.

Course taught:

- ECO 207: Introduction to Financial and Managerial Accounting

Amil Dasgupta is a Reader (Associate Professor) in Finance at the London School of Economics. His research interests lie in information economics and game theory applied to finance, with an emphasis on the theories of financial intermediation and financial crises. During the 2007-8 academic year, he visited the Bendheim Center where he taught the core course in Corporate Finance to masters students, an optional course in Trading and Markets to both masters and advanced undergraduate students, and part of an advanced Ph.D. course in Financial Economics. Dasgupta obtained his PhD in Economics in 2002 from Yale University. He has published extensively in leading academic journals such as the *Review of Economic Studies*, the *Journal of Economic Theory*, *Theoretical Economics*, and the *Journal of the European Economic Association*. Dasgupta is a Member of the Editorial Board of the *Review of Economic Studies*, and a research affiliate of the Centre for Economic Policy Research (CEPR) in London.

Hans Follmer is Professor Emeritus for Mathematics at Humboldt University of Berlin and Andrew D. White Professor-at-Large at Cornell University. After a Ph.D. from Erlangen University and Postdoc positions at Erlangen, Massachusetts Institute of Technology and Dartmouth, he was professor at the Universities of Frankfurt and Bonn, at ETH Zurich, and at Humboldt University since 1994. He is a member of the German National Academy of Sciences "Leopoldina" and of the Academie Europaea, and in 2007 he received a honorary degree from the University Paris-Dauphine. His interests are in stochastic analysis and mathematical finance. He was Visiting Professor at ORF in the fall term 2007 and taught a course on "Risk Measures and their Dynamics" at the Bendheim Center for Finance.

Jean Jacod is Professor at the Faculty of Mathematics of Université Pierre et Marie Curie (Paris-6). After a Ph.D. from this university, he held a position at the Ecole des Mines de Paris in the

Geostatistics Department, then he was professor at Rennes and Ecole 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. He visited the Bendheim Center for Finance during spring term 2008.

Course taught:

- ECO 575: Topics in Financial Economics.
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Darius Palia is the Thomas A. Renyii Chair in Banking and a Professor in Finance and Economics at Rutgers Business School. His research is generally in empirical corporate finance (with a focus on corporate governance) and on financial institutions. During fall 2007, he visited the Bendheim Center where he taught the Valuation and Security Analysis course to both masters and undergraduate students. He has published extensively in the top academic journals and is widely cited by other academic studies. Darius has a PhD in Finance from NYU. Prior to joining Rutgers he was on the faculty of Columbia University for many years, and has also been a visiting faculty member at the University of Chicago and UCLA.

Course taught:

- ECO 469/FIN 570: Valuation and Security Analysis
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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. Mr. Sexton graduated from Princeton University 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 May 1995, Mr. Sexton became an active Advisory Director of Morgan Stanley. In September 1995, Mr. Sexton became an Adjunct Professor at Columbia University's Graduate School of Business, teaching two courses in the subject of Corporate Finance. In the spring of 2000, he became a Visiting Lecturer at Princeton University. Mr. Sexton is a member of the Board of Directors of Morgan Stanley, and 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
-

Motohiro Yogo is a Visiting Assistant Professor in the Department of Economics and the Bendheim Center for Finance, an Assistant Professor of Finance at the Wharton School of the University of Pennsylvania, and a Faculty Research Fellow of the National Bureau of Economic Research. He received a Ph.D. in economics from Harvard University in 2004 and an A.B. in economics from Princeton University in 2000.

Courses taught:

- FIN 501/ORF 514: Asset Pricing I: Pricing Models and Derivatives
- ECO 521/ECO 466: Fixed Income: Models and Applications

Undergraduate students advised:

- John Niehaus, "Consumption Smoothing over Time in Market-based and Bank-based Financial Systems"

Representative publications:

- "Does Firm Value Move Too Much to be Justified by Subsequent Changes in Cash Flow?" *Journal of Financial Economics*, 2008 (with B. Larrain).
 - "Efficient Tests of Stock Return Predictability," *Journal of Financial Economics*, 2006 (with J. Campbell).
 - "A Consumption-based Explanation of Expected Stock Returns," *Journal of Finance*, 2006.
 - "Luxury Goods and the Equity Premium," *Journal of Finance*, 2004 (with Y. Aït-Sahalia and J. Parker).
 - "Estimating the Elasticity of Intertemporal Substitution when Instruments are Weak," *Review of Economics and Statistics*, 2004.
-

Visiting Fellows

The Center welcomed the following visiting fellows during the academic year 2007-08:

Gorazd Brumen is a Ph.D. candidate at the University of Zurich, Switzerland. He spent the spring term of 2008 at the Bendheim Center for Finance as a Visiting Student Research Collaborator under the supervision of Professors Markus Brunnermeier and Yacine Aït-Sahalia. He worked on contagion issues in structural network models and merger decisions arising from them. Part of his work deals with quantitative issues in credit risk models. Gorazd will remain at Princeton for the fall term 2008.

Max Fehr is a Ph.D. candidate at ETH Zurich. He spent the spring term 2008 at the Bendheim Center for Finance as a Visiting Student Research Collaborator under the supervision of Professor René Carmona. He studied the design of emission trading schemes based on stochastic equilibrium models for the price formation of emission credits and products whose manufacturing causes pollution.

Zhiguo He is a Ph.D. candidate at the Department of Finance at Northwestern University. He spent academic year 2007-2008 at the Bendheim Center for Finance as a Postdoctoral Research Associate where he worked on research related to contract theory, corporate finance and banking.

Snorre Lindset is an Associate Professor at the Trondheim Business School in Norway. He visited the Bendheim Center for Finance as a Visiting Fellow during the academic year 2007-2008. While at Princeton, he worked on the effect of incomplete and asymmetric information on credit spreads, optimizing the amount of education in a portfolio setting, and the WACC in a world with taxes.

Gara Minguez-Afonso is a Ph.D. candidate at the London School of Economics. She spent the academic year 2006-2007 at the Bendheim Center for Finance as a Visiting Student Research Collaborator under the supervision of Professor Hyun Shin. She worked on the analysis of balance sheet interactions and their implications for the propagation of asset price bubbles and financial crises. Gara remained at Princeton for academic year 2007-2008 as a Visiting Student.

Luitgardt Veraart finished her Ph.D. at the University of Cambridge before coming to Princeton in autumn 2007. She spent the academic year 2007-2008 at the Bendheim Center for Finance as a Postdoctoral Research Associate, where she worked on option pricing models with stochastic volatility and modelling of systemic risk in financial networks.

Graduating Ph.D. Students

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. Seven Ph.D. students graduated in 2008.

- **Kevin Amonlirdviman** received his Ph.D. from the Economics Department. His dissertation, "Pessimism in Household Macroeconomic Expectations," was written under the direction of Jonathan Parker. He accepted a position as consultant to BC6 in France.
- **Julio Cacho-Diaz** received his Ph.D. from the Economics Department. His dissertation "Identification and Inference of Jumps using Hedge Fund Returns," was written under Yacine Aït-Sahalia's supervision. He accepted an Associate position with Ziff Brothers Investments.
- **Hakan Kaya** received his Ph.D. from Operations Research and Financial Engineering. His studies focused on management of weather risks in commodity markets. He joined the Quantitative Investments Group at Lehman Brothers as a senior associate.
- **Leonard Kostovetsky** received his Ph.D. from the Department of Economics. His thesis studied how the rise of hedge funds and socially responsible investing has affected the money management industry. He accepted a position as Assistant Professor of Finance at University of Rochester's Simon Graduate School of Business in Rochester, NY.
- **Martin Oehmke** received his Ph.D. from the Department of Economics. His thesis analyzes large collateral liquidations that follow the defaults of large traders, such as hedge funds. He accepted an appointment as an Assistant Professor in the Finance and Economics Division at Columbia Business School in New York City.
- **Filipos Papakonstantinou** received his Ph.D. from the Department of Economics. His dissertation, "Boards of Directors: Returns and Value," was written under the supervision of Markus Brunnermeier. He accepted an Assistant Professor position with the Tanaka Business School at the Imperial College in London.
- **E. Glen Weyl** graduated this year with his Ph.D. in economics, a year after graduating Valedictorian of his undergraduate class at Princeton. His research ranges from antitrust economics of the credit card industry to the foundations of the liberal theory of individual rights. In July, he will begin a three year term as a junior fellow at the Harvard Society of Fellows, as well as a yearly visiting position at the Toulouse School of Economics.

Finance Seminars

Each week, the Bendheim Center for Finance organizes a seminar where academics are invited to present their latest research to the faculty and graduate students of the Center. The seminar usually meets on Wednesdays, 2:50-4:00 p.m. in the Bendheim Center for Finance classroom.

Civitas Foundation Finance Seminars, Fall 2007

September 26

Gara Minguez Afonso, LSE

Liquidity and Coordination

October 3

Martin Oehmke, Princeton University

Illiquidity and Collateralized Lending

October 9

Leonard Kostovetsky, Princeton University

Brain Drain: Are Mutual Funds Losing Their Best Minds?

October 10

Julio Cacho-Diaz, Princeton University

Hedge Funds and Jumps

October 16

Filippos Papanikolaou, Princeton University

Boards of Directors: Returns and Value of Industry Experience

October 17-18-19

Darrell Duffie, Stanford University

Princeton Lectures in Finance

October 24

Department-wide seminar in Economics: Mark Watson, Princeton University

Some Empirical Applications of Large N&T Factor Models

November 7

Zhiguo He, Northwestern University

Agency Problems, Firm Valuation, and Capital Structure

November 14

Ayako Yasuda, The Wharton School
The Economics of Private Equity Funds

November 28

Motohiro Yogo, The Wharton School
Portfolio Choice in Retirement: Health Risk and the Demand for Annuities, Housing, and Risky Assets

December 5

Victoria Ivashina, Harvard Business School
Institutional Stock Trading on Loan Market Information

December 12

Rafael Repullo, CEMFI, visiting Columbia University
Does Competition Reduce the Risk of Bank Failure?

Civitas Foundation Finance Seminars, Spring 2008

January 8-February 13

Job market talks

February 26

Viral Acharya, London Business School
Moral Hazard, Collateral and Liquidity

March 5

Jiang Wang, Massachusetts Institute of Technology
Market Liquidity, Asset Prices, and Welfare

March 12

Darius Palia, Rutgers University
Corporate Governance and Firm Performance: Evidence from Large Governance Changes

March 26

Department-wide seminar in Economics: Roland Benabou, Princeton University
“Groupthink: Collective Delusions in Organizations and Markets” and “Ideology”

April 2

Amil Dasgupta, London School of Economics
The Price Impact of Institutional Herding

April 8

Chenggang Xu, London School of Economics

Does Financial Regulation Matter? Market Volatility and the US 1933/34 Acts

April 9

Christian Gollier, University of Toulouse

Does Ambiguity Aversion Reinforce Risk Aversion? Applications to Portfolio Choices and Asset Prices

April 16

Joachim Voth, Universitat Pompeu Fabra

Betting on Hitler: The Value of Political Connections in Nazi Germany

April 23

Eric Ghysels, University of North Carolina

News – Good or Bad – and Its Impact on Volatility Predictions over Multiple Horizons

April 30

Amit Seru, University of Chicago GSB

Did Securitization Lead to Lax Screening: Evidence from Subprime Loans?

May 7

Jialin Yu, Columbia Business School

Commonality in Disagreement and Asset Pricing

Finance Ph.D. Student Workshop

Each week, the Bendheim Center for Finance organizes a seminar for its Ph.D. students and faculty where preliminary research ideas are presented internally. The seminar usually meets on Tuesdays, 12:00-1:20 p.m. in the Bendheim Center for Finance library.

Fall 2007

September 25

DeForest McDuff: “How Local are Real Estate Markets? Home Price Risk and Index Hedging using Localized Real Estate Indices”

October 9

Leonard Kostovetsky: “Brain Drain: Are Mutual Funds Losing Their Best Minds?”

October 16

Filippos Papanikolaou: "Boards of Directors: Returns and Value to Industry Experience"

October 23

Rene Carmona: "TBA," Francesco Bianchi: "Good Beta, Bad Beta, and Rare Events"

November 27

Konstantin Milbradt: "Fund Flows and Risk Taking"

Felipe Schwartzman: "A Model of Financial (De)Regulation"

December 11

Luitgard Veraart: "Optimal Market Making in FX"

Spring 2008**February 5**

Snorre Lindset: "Credit Spreads and Incomplete Information"

Adam Zawadowski: "Do the Rich Price the Market?"

February 19

DeForest McDuff: "Home Price Risk, Local Market Shocks, and Index Hedging"

Martin Schmalz: "Why the Noise? The Pattern of Information Flow in Social Systems"

February 26

Viral Acharya, London Business School: "Moral Hazard, Collateral and Liquidity"

March 4

Gorazd Brumen: "Pricing Credit Risk in Buyer-supplier Chains"

Glen Weyl: "Is Arbitrage Socially Beneficial?"

March 25

Ing-Haw Cheng: "Long-term Capital and Short-term Management"

Per Krusell, Economics Faculty: "Asset Pricing in a Huggett Economy"

April 8

Chenggang Xu, Hong Kong University of Science and Technology, LSE: "Does Financial Regulation Matter? Market Volatility and the US 1933/34 Acts"

April 15

Dante Amengual: "Estimation of Stochastic Volatility Models: A Market Based Approach"

Gorazd Brumen: "A Fast Algorithm for Computation of Hitting Time Distributions"

April 29

Konstantin Milbradt: "Margins and Endogenous Liquidity Crisis"

Felipe Schwartzman: "Dynamics Effects of Liquidity Provision"

Conferences

During the past year, the Bendheim Center for Finance organized the following conferences and events on campus.

The Princeton Lectures in Finance

Each year, the BCF organizes a series of public lectures. The Princeton Lectures in Finance are delivered by a leader in the field of finance. The author is invited to the BCF to deliver the contents of his or her book in the form of three two-hour lectures to the Center's faculty and students. The lectures form the basis of a book to be subsequently published by Princeton University Press.

The **2007** *Princeton Lectures in Finance* were given by Darrell Duffie of Stanford University on the topic of "Capital Immobility and Its Implications for Asset Pricing."

- October 17. Lecture 1: The Mobility of Capital, Prices, and Information in Asset Markets: An Overview
- October 18. Lecture 2: Search-based Theories of Over-the-counter Markets
- October 19. Lecture 3: Evidence from Fixed-income Markets

The 2008 Princeton Lectures in Finance will be given by John Campbell of Harvard University, in November 2008, on the topic of "Risk and Return."

Third Cambridge-Princeton Conference

This conference, the third 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 21-22, 2007, in room 103 of the Bendheim Center.

Friday September 21

Session Chair: Yacine Ait-Sahalia

Mike Tehranchi (joint session with Chris Rogers)

The Implied Volatility Surface Does Not Move by Parallel Shifts

Discussant: Ronnie Sircar

Rene Carmona (joint session with Sergey Nadtochiy)

Local Volatility Dynamic Models

Discussant: Mike Tehranchi

Session Chair: Michael Dempster

Mardi Dungey (joint session with Michael McKenzie and Vanessa Smith)

News, No-News and Jumps in the US Treasury Market

Discussant: Yacine Ait-Sahalia

Markus Brunnermeier (joint session with Tobias Adrian)

Hedge Fund Tail Risk

Discussant: Michael McKenzie

Conference Dinner

Saturday, September 22

Session Chair: Mark Watson

Chris Rogers (joint session with Surbjeet Singh)

The Cost of Illiquidity and its Effects on Hedging

Discussant: Motohiro Yogo

Hyun Shin (joint session with Guillaume Plantin)

Carry Trades and Speculative Dynamics

Discussants: Nicos Savva and John Eatwell

Session Chair: Bill Janeway

Michael Dempster (joint session with Elena Medova and S. W. Yang)

Empirical Copulas for CDO Tranche Pricing using Relative Entropy

Discussant: Rene Carmona

Alexandre d'Aspremont: Identifying and Trading Small Mean Reverting Portfolios

Discussant: Vanessa Smith

Session Chair: Patrick Cheridito

Paolo Zaffaroni (joint session with M. Hashem Pesaran)

Optimal Asset Allocation with Factor Models for Large Portfolios

Discussant: Jianqing Fan

John Mulvey (joint session with Woo Chang Kim)

Active Equity Managers in the U.S.: Do the "Best" follow Momentum Strategies?

Discussant: Elena Medova

Session Chair: John Eatwell

Takashi Yamagata (joint session with Vanessa Smith)

Volatility-Return Analysis using Dynamic Panels

Discussant: Mark Watson

Wei Xiong (joint session with Nicholas Barberis)

Realization Utility, Abstract

Discussant: Chris Rogers

Humboldt-Princeton Conference: Semiparametrics Meets Mathematical Finance

October 27-28, 2007

Ronnie Sircar Princeton Homogeneous Groups and Multiscale Intensity Models for
Multiname Credit Derivatives

*Patrick
Cheridito*

Princeton

Equilibrium Pricing in Incomplete Markets

Jianqing Fan Princeton Estimating Large Covariance Matrix with Applications to Portfolio
Allocation and Risk Management

Chenghu Ma Xiamen MPS-Risk-Aversion and Continuous-Time Mean-Variance Analysis in Presence of Lévy Jumps

Birgit Rudloff Princeton Convex Hedging in Incomplete Markets

Wolfgang Härdle Humboldt DSFM for Dynamic Volatility Hedges

Nikolaus Hautsch Humboldt The Impact of Macroeconomic News on Quote Adjustments, Noise, and Informational Volatility

Volodia Spokoiny WIAS Adaptive Methods in Quantitative Finance

Denis Belomestny WIAS Methods of MC Pricing of Callable Derivatives

Ulrich Horst Humboldt Adverse Selection and Risk Transfer in Principal Agent Games

Peter Bank TU Berlin A Large Investor Trading at Market Indifferent Prices

Conference on the Mathematics of Credit Risk

As part of a research initiative funded by the National Science Foundation (NSF), the second Princeton credit conference was held at the University on May 23-24, 2008. As in the previous Princeton Conference on Credit Risk, held in 2004, a reception at the end of the first day was followed by a dinner. Financial support from the National Science Foundation and Morgan Stanley is gratefully acknowledged.

Dario Villani, Managing Director in the Global Strategic Risk Group at Merrill Lynch, and alumnus of the Master in Finance program, was a guest speaker.

Invited Speakers

D. Brigo (Fitch-QFR), F. Fabozzi (Yale University), C. Finger (Risk Metrics), R. Frey (Leipzig University), K. Giesecke (Stanford University), J. Hull (Toronto University), T. Hurd (Mac Master University), R. Jarrow (Cornell University), M. Jeanblanc (Evy University), Y. Jiao (Ecole Polytechnique Paris), J.P. Laurent (University of Lyon), J. Naud (JP Morgan Chase), P. Schoenbucher (ETH Zurich)

Organizing Committee

Rene Carmona (Princeton University), Jean Pierre Fouque (University of California Santa Barbara), Ronnie Sircar (Princeton University), Thaleia Zariphopoulou (The University of Texas at Austin).

Rethinking Business Management: An Examination of the Foundations of Business Education

This conference was organized by Harold James and took place on May 17-19, 2007, at Princeton University. The conference of the Witherspoon Institute is co-sponsored by the Clayton Fund, the Social Trends Institute and the Bendheim Center for Finance.

This conference proposed to examine experiences of business school education in light of social and ethical responsibilities. The thesis that was presented for the discussion at the conference was that effective management is grounded both on good business science and on robust ethical and anthropological conceptions of human flourishing.

Second New York Fed-Princeton Liquidity Conference

This conference was jointly sponsored by the Federal Reserve Bank of New York and the Bendheim Center for Finance at Princeton University. The conference organizers were Tobias Adrian of the Federal Reserve Bank of New York and Markus Brunnermeier of Princeton University.

Financial markets experienced extraordinary events in August 2007. The increase in delinquency rates in subprime mortgages coupled with the mismatch of the maturity structure of off-balance-sheet conduits and structured investment vehicles (SIVs) led to a sudden drying up of the asset-backed commercial paper market, higher money market interest rate spreads, and the failure of several financial institutions, including a classic bank run in the United Kingdom.

This conference brought together experts in liquidity and researchers who analyze the underlying mechanisms that cause liquidity dislocations. The goal was to further the understanding of these mechanisms and to link them to current policy tools. The conference took place at the Federal Reserve Bank of New York, 12th Floor Conference Center, 33 Liberty Street, New York, New York.

Registration and Breakfast

Welcoming Remarks

Timothy Geithner, President,
Federal Reserve Bank of New York

Understanding the Subprime Mortgage Crisis

Yuliya Demyanyk, Federal Reserve Bank of St. Louis
Otto Van Hemert, New York University

Discussant: *Christopher Mayer*, Columbia University

[The Response of Corporate Financing and Investment to Changes in the Supply of Credit](#)

Michael Roberts, University of Pennsylvania
Michael Lemmon, University of Utah

Discussant: *Augustin Landier*, Old Lane and New York University

[Imperfect Competition in the Inter-Bank Markets for Liquidity as a Rationale for Central Banking](#)

Viral Acharya and Denis Gromb, London Business School
Tanju Yorulmazer, Federal Reserve Bank of New York

Discussant: *Adriano Rampini*, Duke University

[Understanding the Securitization of Subprime Credit](#)

Adam Ashcraft and Til Schuermann, Federal Reserve Bank of New York

[Precautionary Reserves and the Interbank Market](#)

Adam Ashcraft, Jamie McAndrews, and David Skeie, Federal Reserve Bank of New York

[The Federal Home Loan Bank System: Lender of Next-to-Last Resort?](#)

Morten Bech, Federal Reserve Bank of New York

[Why Are Almost All ABCP Vehicles Sponsored by Non-U.S. Banks?](#)

Carlos Arteta, Mark Carey, and Ricardo Correa, Board of Governors of the Federal Reserve System

[What Happened to the Quants in August 2007?](#)

Andrew Lo and Amir Khandani, Massachusetts Institute of Technology

[The Quant Liquidity Crunch](#)

Kent Daniel, Goldman Sachs Asset Management

Panel Discussion

John Geanakoplos, Yale University and Ellington Capital Management

Diana Hancock, Federal Reserve Board

Chi-Fu Huang, Platinum Grove Asset Management

Brian Peters, Federal Reserve Bank of New York

Hyun Shin, Princeton University

Jeremy Stein, Harvard University

Stochastic Analysis and Applications from Mathematics Physics to Mathematical Finance

This conference was held on June 13-15. Modern applied mathematics seeks to

understand and quantify a broad range of phenomena throughout the physical, biological, engineering, industrial and economic worlds. Due to the inherent complexity and random nature of many of the phenomena and systems which are studied, the use of techniques which directly take into account and exploit their stochastic properties to understand their behavior are very powerful and widely used.

This international conference, sponsored by the [National Science Foundation](#), the [Office of Naval Research](#), the [ORFE Department](#) and the [Bendheim Center for Finance](#) at Princeton University, brought together many leading applied mathematicians working in these and related areas, to report on recent developments of broad interest and to point the way for exciting directions for future research. There were also a number of talks by prominent

junior researchers.

A. *Topics*

- Random Schrödinger operators in mathematical physics
- Wavelets and signal analysis
- Stochastic partial differential equations
- Particle transport
- Wave propagation in random media
- Stochastic filtering
- Mathematical finance

B. *Speakers*

- **Yacine Aït-Sahalia** (Princeton University)
- **Anestis Antoniadis** (Universite Joseph Fourier, Grenoble)
- **Sara Biagini** (University of Pisa)
- **Erhan Çinlar** (Princeton University)
- **Albina Danilova** (Oxford University)
- **Ingrid Daubechies** (Princeton University)



- **...** (Princeton University)
- **...** (University of California at ...)
- **...** (University of ...)
- **...** (University)
- **...** (University of Michigan)
- **...** (University)
- **...** (University of North ...)
- **...** (University of Kansas)
- **...** (Warwick University)
- **...** (University)
- **...** (Polytechnique)
- **...** (University)

C. *Guest of Honor*

The conference theme was inspired by the unique career trajectory of Professor René Carmona, and we used the occasion of the conference also to celebrate his 60th birthday. René Carmona over the past 30 years has had a great impact in developing and applying stochastic methods to a wide array of problems, from Mathematical Physics, to Computational Statistics, Signal Processing, and

recent interests in Mathematical Finance. Through his influence on students, postdoctoral associates, junior faculty, and senior colleagues, Professor Carmona has advanced application of stochastic analysis in a unique and far-reaching manner.

CCCP Mathematical Financial Workshop

The 2007 CCCP Mathematical Finance Workshop intended to bring together researchers in mathematical finance for the exchange of ideas and the discussion of emerging problems in the field. This year's workshop was held November 30th to December 1st, 2007 in the Friend Center. Sponsors of the conference were the Bendheim Center for Finance, Department of Operations Research and Financial Engineering, Morgan Stanley and the National Science Foundation.

Speakers included Peter Carr (New York University and Bloomberg), Rene Carmona (Princeton University), Rama Cont (Columbia University), Paolo Guasoni (Boston University), Jean Jacod (Universite Paris VI), Steve Kou (Columbia University), Ken Kim (Columbia University), Kasper Larsen (Carnegie Mellon University), Dilip Madan (University of Maryland), Alexander Schied (Cornell University), Steven E. Shreve (Carnegie Mellon University), Ronnie Sircar (Princeton University), Thaleia Zariphopoulou (University of Texas), and Gordan Zitkovic (University of Texas).

Undergraduate Certificate in Finance

In 1999, the Bendheim Center for Finance started offering an Undergraduate Certificate in Finance 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, if there is no possibility of finance content in their senior thesis or junior paper, a separate, shorter piece of independent work is required instead.

Now in its tenth year, the Undergraduate Certificate in Finance continues to do extremely well, attracting record numbers of students. We enrolled 56 juniors from the Class of 2010. 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: 109. This brings our total number of undergraduate students in the program (juniors and seniors) to about 165 this year. The success of the program has been overwhelming, especially in light of our limited senior thesis advising resources. As discussed in the Director's introduction, we instituted grade requirements starting with the Class of '08 in order to admit a more manageable number of students into the program.

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 '08

Total number of certificates awarded: 85 (24 to women or 28%)

Major	Number of Students
Art	1
Chemistry	1
Chemical Engineering	4
Computer Science	1
Economics	30
Electrical Engineering	4
English	1
History	2
Italian	1

Mathematics	3
Molecular Biology	5
Operations Research & Financial Engineering	18
Physics	3
Politics	1
Psychology	2
Woodrow Wilson School	8

Class of '09

Total expected number of certificates to be awarded: 113 (39 to women or 35%)

Major	Number of Students
Archeology	1
Chemistry	4
Computer Science	5
Economics	34
Electrical Engineering	4
English	1
History	5
Mathematics	5
Mechanical and Aerospace Engineering	1
Molecular Biology	1
Operations Research & Financial Engineering	33
Physics	1
Politics	3
Slavic Languages and Literature	1
Sociology	1
Woodrow Wilson School	13

Class of '10

Total Expected number of certificates to be awarded: 56 (17 to women or 30%)

Major	Number of Students
Chemical Engineering	3
Civil and Environmental Engineering	1
Computer Science	2
Economics	15
Electrical Engineering	3
History	1
Mathematics	5
Mechanical and Aerospace Engineering	1
Operations Research & Finance Engineering	16
Philosophy	1
Physics	1
Psychology	1
Politics	1
Slavic Languages and Literature	2

Departmental Prizes, Honors and Athletic Awards to UCF '08 Students

UCF students continue to receive a high proportion of the prizes awarded by their respective departments. This year, 61 UCF students received a combination of departmental prizes, honors, and athletic awards; 14 UCF students received departmental prizes (five receiving more than one prize); 2 UCF students received athletic awards; 14 UCF students were elected to Phi Beta Kappa Society; 23 UCF students were elected to membership in Society of Sigma Xi; 8 UCF students were elected to membership in Tau Beta Pi National Engineering Society; and finally, 51 UCF students received academic honors (15 cum laude, 25 magna cum laude and 11 summa cum laude). 46 of our UCF students earned Certificates in Proficiency from 16 other departments/programs.

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.

17 UCF students received 20 departmental prizes and honors:

- Robert Duke Biederman, *Class of 1901 Medal*
- Jennifer Smith, *David F. Bowers Prize* and *Edward H. Tumin Memorial Prize*
- Zachary Kurz, *Birch Family Prize* and *Kenneth H. Condit Prize*
- Selena Kalvaria, *Irma S. Seitz Prize in the Field of Modern Art*
- Abhinav Jha, *Robert Thornton McCay Prize*
- Marek Hlavac, *Wolf Bayesian Memorial Prize*
- Ryan Kim, *Daniel I. Rubinfeld '67 Prize in Empirical Economics* and *The Richard Swinnerton Trophy*
- Matthew Popper, *Senior Thesis Prize in Finance*
- Marek Hlavac, *Halbert White '72 Prize in Economics*
- Michael Wang, *Charles Ira Young Memorial Tablet and Medal*
- Michael Jester, *Molecular Biology Senior Thesis Prize*
- Kayvon Tehranian, *T. Cuyler Young Award* and *Montgomery Raiser '92 Thesis Prize*
- Schuster Tanger, *Ahmet S. Cakmak Prize*
- Alison Wood, *Miller-Schroeder Memorial Prize*
- Howard Yu, *Gregory T. Pope '80 Prize for Science Writing (second)*

- Kayvon Tehranian, *Lieutenant John A. Larkin Jr. Memorial Prize*
- Michael Baity, *The War Memorial Trophy*

14 UCF students were elected to Phi Beta Kappa Society:

Michael Baity (ORF), Jin Ge (CHE), Marek Hlavac (ECO), Jonathan Jarow Jr. (WWS), Abhinav Jha (CHM), Zachary Kurz (ORF), Alejandro Montealegre (ECO), Matthew Popper (ECO), David Rose (WWS), Yiğit Satilmaz (ORF), Michael Siliciano (WWS), Jennifer Smith (ECO), Amara Suebsaeng (ECO), and Nan Yin (ORF).

23 UCF students were elected to membership in Society of Sigma Xi:

Michael Baity (ORF), Richard Birge (ORF), Nicholas Burroughs (PHY), Michael Caswell (ORF), Christopher Chan (COS), April Frieda (ORF), Alanna Gregory (ORF), Ellen Hukkelhoven (MOL), Abhinav Jha (CHM), Zachary Kurz (ORF), Derrick Leung (ORF), Daniel Lieber (MOL), Aaron Linsky (ORF), Adrian Ross (PHY), Yiğit Satilmaz (ORF), Max Staller (MOL), Schuster Tanger (ORF), Michael Wang (ELE), Alison Wood (PSY), Anand Yegya-Raman (ORF), Nan Yin (ORF), Howard Yu (PHY), and Chen Zhang (ORF).

8 UCF students were elected to membership in Tau Beta Pi National Engineering Society:

Michael Baity (ORF), April Frieda (ORF), Jin Ge (CHE), Zachary Kurz (ORF), Yiğit Satilmaz (ORF), Schuster Tanger (ORF), Anand Yegya-Raman (ORF), and Nan Yin (ORF).

2 UCF students received athletic awards:

- Michael Baity, *The War Memorial Trophy* (swimming)
- Ryan Kim, *The Richard Swinnerton Trophy* (tennis)

Senior Theses of the Class of '08

This table shows the senior thesis titles from the Undergraduate Certificate in Finance Class of 2008:

		Financing the Silver Screen: The Economy of the Italian Cinematographic Industry from the 60s
Catherine Adams	ITA	to Today: An English Summary
Michael Baity	ORF	Gambling Your Investment: Applying the Kelly Criterion to Portfolio Theory
Turner Batty	ECO	Financial Business Method Patents: Effects on Competition, Pricing, and Corporate Earnings
		More Bang for your Buck: An Empirical Analysis of Retail Industry LBOs' Effect on Local
Jeff Bernstein	ECO	Product-Market Competition
Ishna Berry	ECO	An Evaluation of Moral Hazard and Regulatory Response During the S&L Crisis

Money Chasing Buyout Deal? The Effect of Fund Size on Transaction Values in Private Equity

Robert Biederman	ECO	Buyouts, 1994-2006
		Loan Loss as a Function of the Interest Rate: Reassessing Probability of Default for a Portfolio of Homogeneous Loans
Richard Birge	ORF	
Nikhil Bumb	ELE	Dimensionality Reduction of Financial Data
Nicholas Burroughs	PHY	A Random Walk to Wall Street: Physical Insight Into Volatility in Financial Markets
Michael Caswell	ORF	Covariate Selection for Intensity-Based Credit Risk Models
		Part I: A Java Library Implementation of the Gold-Food Economic Model in Repast and MASON
Christopher Chan	COS	Part II: An Agent-Based Model of Minimal Economy
John Curtius	WWS	In Defense of Financial Stability: Hedge Funds, Systemic Risk, and Regulatory Implications
Christopher D'Ambrosia	ENG	A Venture into the World of Rare Book Prices
Vitaliy Elbert	ECO	Can Oil and Norway Help Predict the Russian Stock Market?
April Frieda	ORF	Valuation of Swing Options using the Longstaff-Schwartz Method
		Warlordism and Provincial Public Finance in Republican China: Chen Jitang's Guangdong
Jin Ge	CHE	from 1931 to 1936
Fernando Gonzalez-Quintanilla	ORF	Exploiting Crashophobia: A Study on Abnormally Steep Volatility Skews on American Equity
		Options in Declining Markets
		Optimal Risk Profiling Strategies and Testing Policies for Cardiovascular Disease in Female
Alanna Gregory	ORF	Patients in the United States
		One More for "One Less": Increasing the Availability of Vaccines Targeting Human Papillomavirus
Anita Gupta	MOL	in the Developing World
Shriram Harid	WWS	The Dubai Phenomenon: Understanding a Developmental Anomaly
		The Effects of Tradability and Ownership on Stock Returns: Evidence from the Chinese Stock
Jeffrey Harris	ECO	Market
Weiyin He	MAT	An Empirical Analysis of Recent CDS Basis Trends

Claire Henderson	HIS	American Bond-age: Investing on the New York Stock Exchange from 1922 to 1929
Marek Hlavac	ECO	Fundamental Tax Reform: The Growth and Utility Effects on a Revenue-neutral Flat Tax Star Search: Signal Detection Applied to the Identification of Elite Players in the National
Edward Hoa	ORF	Basketball Association
Kane Hochster	POL	Do Voters Affect or Elect Tax Policies? A Study of Electoral Control and Its Effects on Tax Policy Binding Specificity of a Deoxyoligonucleotide Designed to Deliver Psoralen to the Sickle Cell
Ellen Hukkelhoven	MOL	Anemia Mutation Site
J. Peter Jarrow	WWS	Capital Inflows and the Credit Crunch: Foreign Origins of a U.S. Crisis
Michael Jester	MOL	The Current State and Future of Ethanol as a Transportation Fuel
Abhinav Jha	CHM	Retirement Planning in an Uncertain World Watch the Market Go Pop! An Analysis of Artists, Dealers, and Collectors in the Market for
Selena Kalvaria	ART	Pop Art in the 1960s
Robert Katz	ECO	Pay for Performance? An Empirical Analysis of Mutual Fund Expenses Across Investment Styles
Avigail Kifer	MAT	Global Games and the Japanese Yen Carry Trade: Modeling the 1998 and 2007 Liquidity Holed
Ryan Kim	ECO	Modeling Hurricane Impact on Natural Gas Volatility using GARCH and Other Methods
Zachary Kurz	ORF	The VIX Index and it's Options: An Empirical Investigation
Derrick Leung	ORF	Unyoking the Cash Cow: Who Should Own the New Jersey Turnpike?
Daniel Lieber	MOL	TetraLogic Pharmaceuticals
Aaron Linsky	ORF	Weather and Soybeans: A Convenient Story
Patrick Liu	ECO	Household Luxury Goods Holdings: Differences Across Demographics and Economic Cycles Short Term Responses of the Stock Market to Large Daily Price Changes: An Empirical,
Logan Lowe	ECO	Behavioral Finance, and Neuroeconomic Analysis
Chao Lu	ORF	Hedge Fund Compensation Structure and Risk Taking
Nicholas Maciunas	ECO	Wage and Inequality Effects of Foreign Direct Investment in Lithuania
Sean Mahon	ECO	Credit Default Swaps as an Alternative Measure for Default Risk in Value and Growth Stocks
Terry McGuirk	ECO	Does Stock Market Optimism Cause Overpayment in Mergers and Acquisitions?

Alejandro Montealegre	ECO	A New Pricing Factor for Financial Crises
Martha Morton	HIS	Finders Keepers, Losers Weepers: Germany's Plunder of Peripheral Countries during World War II
Shayla Mulvey	PSY	Prediction Markets: Accuracy, Perceptions and Comparisons to Other Forecasting Methods
Kithinji Muriira	ORF	African Financial Markets: Quantifying Political Risk Consumption and Income Smoothing Over Time in Market-based and Bank-based Financial
John Niehaus	ECO	Systems
James Nowicke	WWS	The Economic and Financial Impacts of Carbon Policy in the United States A Study of Foreign Direct Investment Into Latin America in Two Parts: Political Determinants and
Margaret Orr	ECO	Sensitivity Analysis
Mengxi Ouyang	ORF	A Decision-Making Model for Borrowers of U.S. Microloans
John Phillips	EEL	Applications of Robustness to Portfolio Optimization
Matthew Popper	ECO	Hedging Debt with Equity During Liquidity Crises: Is the Merton Model Still Effective?
David Rose	WWS	Preparing for the Inevitable: A Comprehensive Disaster Insurance Policy
Adrian Ross	PHY	The Promise of Fusion: A Comparative Study on the Stellarator and Tokamak Designs A Statistical Study on Swaps: Regression Analysis and PCA Modeling on the 10-Year Interest
Yigit Satilmaz	ORF	Rate Swap Spread Against Certain Determinant Factors
Saish Setty	ECO	Sticky Prices: An Examination of Housing Dynamics
Michael Siliciano	WWS	Impact of Financial Innovation on Crisis Propagation: Lessons from the 2007 Credit Crunch Determinants of Risk Aversion: Understanding its Relationship with Known Behavioral and
Jennifer Smith	ECO	Demographic Correlates
John Snyder	MAT	A Quantitative Risk Model for Portfolios of Hedge Fund Risk, Responsibility, and Reward: An Empirical Examination of the Relationship Between
John Spivey	ECO	Corporate Sustainability and the Cost of Equity
Max Staller	MOL	An Investigation of the Overhead Rates Charged by Princeton University on Federal Grants Principles and Performance: The Relationship Between Screening Strategies and Returns of
Amara Suebsaeng	ECO	Socially Responsible Mutual Funds

Schuster Tanger	ORF	Demystifying Private Equity and Venture Capital via Portfolio Replication Strategies
Kayvon Tehranian	WWS	The Political Economy of Natural Gas Cartelization: Will the GECF Evolve into a Natural Gas Version of OPEC?
Mariela Vacheva	ECO	Low-Cost Flight Training in Europe: Dream or Reality
Anu Verma	ECO	Evaluating the Consolidation of the Financial Sector: An Empirical Study of Loan and Deposit Rates
William Wachter	ECO	The Cross-Market Impacts of Chinese Share Reform
Michael Wang	ELE	A Non-Copyable Disk (NCdisk): Concept, Architecture, Security Protocol, and Business Analysis
Taylor White	CHE	Green Power: The Economics of Wind Energy
David Williams Jr.	WWS	The Economics of Nuclear Energy: A Study on the Financial Competitiveness of Nuclear Energy and the Costs of a Phase-out
Yan Yu Elaine Wong	ECO	The Impact of Market Prices on Valuation: A Case Study on the European 3G License Allocation Process
Alison Wood	PSY	The Trust Allocator Game: Observing the Effects of Credible Signaling and Matching Protocol on Trust Dynamics in Dyads
Andrew Woodbury	ECO	The Collapse of Amaranth Advisors: An Examination of a Hedge Fund Detailed from a Risk Management Perspective
Aleksandra Wronecka	ELE	Does Portfolio Turnover Matter? Turnover Rates and Performance of Actively Managed Portfolios
Flora Wu	ECO	Picky but Sticky? A Study of Socially Responsible Investors
Hannah Xu	CHE	Analysis of Hydrogen Pumping on Stirred Tank Reactor Polymer Electrolyte Membrane Fuel Cell for Hydrogen Purification
Lucy Xu	CHE	Coping with Extracytoplasmic Stress
Eren Yanik	ECO	Investigating the Effect of the "Carry Trade" on Turkey: Prospects and Threats
Arand Yegya-Raman	ORF	Real Options Analysis as Applied to Research and Development Project Valuation in the Pharmaceutical Industry
Eugene Yi	WWS	Unlocking Iraq's Oil Potential: How to Increase Foreign Investment into Iraq's Oil Economy
Nan Yin	ORF	Forecasting Volatility: Option Implied Volatility vs. Historic High-frequency and Low-frequency

Volatility

History Rhymes: How Current Subprime Woes Echo the S&L Crisis Paper in lieu of the Finance

Howard Yu PHY Certificate

Clelia Azcharias ECO Saving Patterns in the US: Risky Asset Share by Demographic Group

Chen Zhang ORF Variance Swap Hedging in an Imperfect Options Market

Mini-Course on Financial Modeling, Valuation and Analysis

using Excel, VBA and C++

This seven-session, not-for-credit, mini-course, taught students the fundamentals of constructing financial models in Microsoft Excel, VBA and C++. It is designed to provide real experience in applying financial concepts to valuation models, and to teach the basic mechanics involved in financial modeling. In the process, students should be better able to recognize the intuition behind financial concepts that they have already been taught in other finance courses.

Undergraduate Certificate in Finance and Master in Finance students were strongly encouraged to attend. It was possible to take the first four sessions separately from the last three.

In the first four sessions, students gained a proficiency in Microsoft Excel and VBA and its use as a tool for rigorous financial analysis. They also were presented with certain commonly accepted methodologies of presentation in the areas of financial analysis and valuation. As a result of this class, students should be better able to construct a variety of financial analyses such as projections and valuations. This valuable skill will be applicable in areas as diverse as investment analysis, government service, and financial management of non-profit organizations. On-line tutorials in Microsoft Excel were provided.

The last three sessions introduced financial modeling using C++. This was particularly useful for students who enrolled in ORF 531/FIN 531: Computational Finance in C++ during the spring semester, which is highly recommended for all Master in Finance students.

The sessions took place 8:00 p.m.-10:00 p.m., in the Friend Center, Room 009, on November 27 and 28, and December 3, 4, 12, 13, and 17. The course was taught by Gabriel Gray.

Master in Finance

The interdisciplinary Bendheim Center for Finance offers a Master in Finance degree. The distinctive feature of Princeton's 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 is intended to prepare students for a wide range of careers both inside and outside the financial industry, including financial engineering and risk management, quantitative asset management, macroeconomic and financial forecasting, quantitative trading, and applied research. The program does not require prior work experience, although it can be a plus. The BCF provides extensive career assistance to students, including help with internships and job placement, through its own staff. Our placement record has been excellent. The program has a small number of merit-based fellowships (in the form of a fraction of the full-year's tuition cost) that we grant to our top applicants.

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 flexible 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 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 (1) the prerequisite skills in mathematics, economics, and probability and statistics necessary for the study of finance at a sophisticated level and (2) 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 mathematical (or physics and engineering) training, who want to make finance their main field of application, and for students with an economics (or business or social science) background, who want to acquire the quantitative skills essential for a 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 that are pervasive in modern finance. An intensive two-week review course, The Math Refresher Course for Incoming MFin Students (aka “math camp”) covering probability and topics in mathematics, as required for the core courses, and is taken by students prior to the beginning of classes in the fall. In September, for the incoming class, we also organize a three-day “boot camp” with industry professionals where various career topics and resources are reviewed and help is provided (including resume-writing, one-on-one videotaped interview sessions, 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 or the IELTS exam.

Statistics on the Admission Process

	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

Highest Degree Before Applying to Princeton’s M.Fin.

	Bachelor	Master	Ph.D.
January 04	85%	15%	1%
January 05	60%	35%	5%
January 06	66%	30%	4%
January 07	68%	28%	4%
January 08	72%	26%	2%

Applicant Profile: Gender & 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

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)	647.5 (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)

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.
- The program can be completed in one or two years; most complete it in two. 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.
- 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-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. The organization of the core courses for students entering the program is:

- 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 will offer 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 512: Trading and Securities Markets
- 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

- FIN 568: Behavioral Finance
- FIN 570: Valuation and Security Analysis
- 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 555: Fixed Income Models
- ORF 569: Special Topics in Statistics and Operations Research
- ORF 574: Special Topics in Investment Science
- WWS 451: Special Topics in Public Affairs: Regulation of International Financial Markets

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 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 305/MAT 301: Mathematics in Engineering I
- MAE 306/MAT 302: Mathematics in Engineering II
- MAE 503: Basic Numerical Methods for Ordinary and Partial Differential Equations
- MAT 301/MAE 302: Mathematics in Engineering I (ODE, PDE)
- 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: Stochastic Modeling
- ORF 542: Controlled Markov Processes
- 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 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, but 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 Track

Computer-based technologies are becoming increasingly important in finance, such as algorithms, efficient trading systems, large databases, multimedia and web interfaces, parallel processing and the security of computer networks. The continued development of e-commerce, the growth of computer-based trading and the renewed emphasis on risk management in all firms are creating a new competitive environment where 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++.

Some 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

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 512: Trading and Securities Markets

This course covers the organization and regulation of stock markets; price formation, volatility, and liquidity in the secondary market (market microstructure); stock market crashes, Keynes beauty contest comparison and herding behavior; and the listing decision and the primary market for raising equity capital for firms.

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; (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 1973 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 & II

Under the direction of a Bendheim-affiliated faculty member, students carry out a Master's project and write a report.

FIN 567: Institutional Finance

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% of the course will be devoted to economics, 70% 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.

ECO 525/FIN 595: Financial Economics I

This course covers asset pricing in competitive markets where 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 year-long 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

A survey of central topics in the area of financial engineering and multi-period financial planning systems. Pricing methodologies integrated with financial planning systems. 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 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 19 of 21 of our 2008 graduates being placed in finance industry jobs. The candidates for the Master in Finance degree get support and assistance with their post-graduate career planning from a coordinated program of resources, including Princeton's Office of Career Services and the BCF's Directors of Corporate Relations, Wendell Collins and David H. Blair. They also benefit from support from our Corporate Affiliates and Advisory Council.

Our graduates will be pursuing their careers at:

Black Rock Financial Management	Analyst
Citadel Investment Group	Investment and Trading Analyst
College Road Capital LLC	Founder
Crédit Suisse (Sebourg)	Analyst
Crédit Suisse (Hong Kong)	Associate
JPMorgan Chase	Associate
	Associate (Proprietary Positioning Business)
	Research Associate
Lehman Brothers	Senior Associate
Merrill Lynch	Associate
Morgan Stanley	Associate
Morgan Stanley (Asia Pacific)	Analyst, Fixed Income Division
NRG Energy	Natural Gas Trader
PRINCO	Senior Analyst
Susquehanna International Group	Trader

Our first year students have obtained summer internships as follows:

Banco de Mexico	Dafne Ramos Ruiz
Citigroup Capital Markets (Hong Kong)	Sang Hun Kang

Constellation Energy
Constellation Energy Commodities Group
Goldman Sachs (London)
Goldman Sachs Asset Management
Hagin Investment Management
JPMorgan Chase

JPMorgan (Hong Kong)

Lehman Brothers

Merrill Lynch
Merrill Lynch (London)
Morgan Stanley Investment Management
UBS Investment Bank
UBS Securities LLC

Dongxu Lu
Evan Meikleham
Vincent Moissinac
Dennis Walsh
Joshua Dunn
Tamer Bakiciol
Andrew McElroy
Yingmin Jian
Jianguo Wang
Jin Yan
Sujay Kumar Davuluri
Maja Giduskova
Aaron Katz
James Petsoulakis
Nicolas Cojocar-Durand
Mert Genc
Dan Moraru
Monisha Jayakumar
Tong Zhao

Fellowships Awarded

The Gerhard R. Andlinger '52 Graduate Fellowship in Finance was awarded to Matthieu Boisot. Matthieu came to us from the Ecole Polytechnique in France and interned as a researcher with Crédit Suisse in London.

The Bendheim Graduate Fellowships in Finance were awarded to Joshua Dunn and Maria Giduskova. Joshua received his Ph.D. in Physics from the University of Colorado where he was a graduate research assistant. Maria was a special student in Harvard University's Department of Mathematics and had previous work experience as a Research Associate at the Federal Reserve Bank of Boston.

MFin Math Camp/Boot Camp

For the third year, we conducted a two-week "math camp" program. 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.

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 MFin degree prepares students and some useful information on interviewing skills. The boot camp presenters came from the BCF faculty, MFin alumni, and the financial services industry. This program was very 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 September 2007, the program's agenda was as follows:

Monday, August 27, 2007

- | | |
|-------------------|--|
| 8:30 to 9:00 a.m. | Welcome – Continental Breakfast at Bendheim Center |
| | Sign up for resume writing and video tape interview sessions with Kathleen Mannheimer, Graduate Career Services, and interviews with D.H. Blair and Wendell Collins. |
| 9:00 a.m. to Noon | Math Camp |
| 1:00 to 4:00 p.m. | Math Camp |

Tuesday, August 28 to Friday, August 31

Math Camp

September 1-3 Days off

September 4 through September 7

Same as Tuesday, August 18 Math Camp schedule except that an exit test will be given 1-4 p.m. on Friday, September 7

Saturday, September 8

- | | |
|---------------------|--|
| 8:30 to 9:00 a.m. | Welcome – Continental breakfast at Bendheim Center |
| 9:00 to 10:00 a.m. | Introduction – Yacine Aït-Sahalia and René Carmona |
| 10:00 to 11:00 a.m. | Structure of Modern Investment Bank – David Blair |
| 11:00 to Noon | Do's and Don'ts – A Short Guide to Employment Etiquette, Wendell Collins and David Blair |
| 1:00 to 3:00 p.m. | Panel Discussion among recent graduates on interviewing techniques and job search methodology (Dave Steckl, John Naud, Matthieu Philip, Theo Kim and Amar Sujjanani) |
| 3:30 to 5:30 p.m. | Mock interviews with Roundtable Participants |

Monday, September 10

- | | |
|--------------------|--|
| 9:00 – 10:15 a.m. | Career presentation by John Massad, Managing Director, Black Rock, on career issues in fixed income |
| 10:15 – 11:30 a.m. | Career Presentation by John Shapiro, Managing Director of Morgan Stanley's commodities trading desk, on career issues in commodities trading |

11:30 – noon Introduction to Career Services and Placement Resource by Kathleen Mannheimer, Associate Director – Office of Career Services

1:00 – 1:30 p.m. Economic and Finance Library Resources – Bobray Bordelon

1:30-3:00 p.m. Presentation by Merrick Chung of Crédit Suisse

Tuesday, September 11

9:30-11:45 a.m. Graduate School orientation

12:15-2:15 p.m. Presentation by Ben Dattner on interviewing and networking/Lunch at Bendheim Center

2:15-3:45 p.m. Presentation on career issues in proprietary trading by Kian Esteghamat of JP Morgan

4:00-5:30 p.m. Career presentation by Andy Golden, President of PRINCO on opportunities with university endowments

Wednesday, September 12

Appointments with Collins, Blair and Mannheimer for videotape interview training and finalize resume as necessary

Advisory Council

The Advisory Council for the Bendheim Center is comprised of a group of distinguished leaders in the financial industry. The Council meets on campus once a year. In 2008, the meeting took place on May 22-23. 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.

Mr. Gerhard R. Andlinger
Chairman of the Board
Andlinger & Company, Inc.

Mr. Kenneth Hersh
Chief Executive Officer
NGP Energy Capital Management

Mr. Hamid Biglari
Managing Director
Citigroup Global Markets, Inc.

Mr. William H. Heyman
Vice Chairman & Chief Investment Officer
The Travelers Companies, Inc.

Mr. John C. Bogle
President
Bogle Financial Markets Research Center
Vanguard

Mr. Alfred F. Hurley, Jr.
Vice Chairman
Emigrant Bank

Mr. Richard H. Bott
Vice Chairman (Retired)
Morgan Stanley Investment Banking Division

Mr. William H. Janeway
Senior Advisor
Warburg Pincus

Mr. Hugh E. McGee III
Global Head of Investment Banking
Lehman Brothers, Inc.

Mr. John L. Cecil
Senior Advisor
Lehman Brothers

Ms. Heidi G. Miller
Executive Vice President & Chief Executive
Officer
JPMorgan Chase

Mr. Christopher A. Cole
Managing Director
Goldman Sachs & Co.

Ms. Sharmin Mossavar-Rahmani
Managing Director
Goldman Sachs & Co.

Mr. Howard E. Cox, Jr.
General Partner
Greylock Management Corporation

Mr. David A. DeNunzio
Vice Chairman, Mergers and Acquisitions
Crédit Suisse

Mr. Jeffrey M. Peek (Chair)
Chairman and Chief Executive Officer
CIT Group, Inc.

Mr. J. Michael Evans
Partner and Managing Director
Goldman Sachs & Co.

Mr. Jerome H. Powell
Managing Partner for North America
Global Environment Fund

Mr. John Hepburn
Advisory Vice Chairman
Morgan Stanley & Co.

Lynn 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 BCF faculty and students. Corporate affiliates gain a strong presence and visibility in the BCF, interact with faculty and students, learn about important faculty research, and secure a competitive recruiting advantage.

2007-08 Partners

Barclays Capital
Citadel Investments Group
Citigroup
Crédit Suisse
FreddieMac
Global Environment Fund
Goldman Sachs
JPMorgan Chase
Lehman Brothers
Merrill Lynch
Moody's Corporation
Morgan Stanley
Prediction Company, LLC (subsidiary of UBS)

Benefits

- Annual Report of the BCF
- Opportunity to advertise internships and employment opportunities to both Undergraduate Certificate in Finance (almost 260 in 2007-08) and Master in Finance students (43 in 2007-08)
- Opportunity to use the BCF facilities to host recruiting events
- Access to the BCF Director of Corporate Relations as a resource for recruiting

- Recognition in the publicly disseminated materials of the BCF, including the Center's reports and website which both list corporate affiliates, as well as a hyperlink to each member's website
- Access to all research authored by the Center's affiliated faculty within the academic year
- Access to BCF faculty for internal or client presentations or for sponsored research
- Opportunity to work with BCF 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 BCF 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 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 BCF 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) <i>support the appointment of a distinguished senior faculty member</i>	To	\$4,000,000
Endowed Visiting Professorship (one needed) <i>To support a distinguished senior visitor who provides expertise in a particular area of study</i>		\$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) <i>To support a new generation of scholars concentrating in finance</i>	\$250,000
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Support of Financial Research and Teaching

Research and Course Development Funds <i>Endowed funds to support research and course development</i>	\$50,000 min.
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Physical Space

Director's Office	\$100,000
Graduate Student Suite	\$100,000

Acknowledgements 2007-08

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

Gerhard R. Andlinger '52

Chester Baylis, Jr. '29 (d)

Robert M. Baylis '60

Robert Bendheim '37

Hamid Biglari *87

David H. Blair '67

Charles Brodbeck '71

David Carlin '60

David A. DeNunzio '78

Kathleen DeRose '83

The Family of Carl H. Donner '20

J. Michael Evans '80

Edward B. Goodnow '47

Mr. and Mrs. Randall A. Hack '69

John K. Hepburn '72

Robert R. Hermann, Jr. '75

Kenneth Hersh '85

William H. Heyman '70

Alfred Hurley '75

Mrs. Stanley G. Ivins W34

William H. Janeway '65

Richard Korhammer '88

Oliver M. Langenberg '35

Susan Payne Madole '76

Edward E. Matthews '53

John Mayer '62

Reuben M. Morriss, III '58

Sharmin Mossavar-Rahmani '80

Robert B. Payne, Jr. '74

Robert B. Payne, Sr. '45

Jeffrey M. Peek '69

John G. Quigley

John H. Scully '66

Lynn Bendheim Thoman '77

Dario Villani *02

Evan A. Wyly '84

Mr. and Mrs. Paul M. Wythes '55

William T. Young, Jr. '70

The Civitas Foundation

The Leon Lowenstein Foundation

Princeton Class of 1950

The Starr Foundation